

Supply Chain Risk & Resiliency Playbook

SCRM Consortium October 1st, 2021

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Supply Chain Risk Management Consortium



The Digital Manufacturing Institute

Supply Chain Risk & Resiliency (SCR&R) Playbook Executive Summary

The goal of the Supply Chain Risk and Resiliency (SCR&R) Playbook (Fieldbook), specified by MxD's Care Acts SCRA2 Project (1.2 Develop Best Practices Playbook, MxD Contract Number: HQ00342190010), serves as a guideline to enable Pilot Manufacturers including the Defense Logistics Agency, Oshkosh, Lockheed Martin, Dow and Jiohit, led by MxD to implement SCR&R. The Pilots will utilize a joint technology SCR&R platform developed in collaboration by Software AG, Supply Dynamics, RAAD, Coupa and The Supply Chain Risk Management Consortium (SCRMC).

The SCRMC is responsible for training education, integration and development of benchmark SCR&R capabilities. The SCRMC has consolidated Best-in-Class proven SCR&R solutions within this Playbook, which can serve as a SCR&R deployment roadmap for the Pilots.

The Playbook recognizes that traditional supply chain strategies are no longer enough to maintain viability in a post-COVID world. A series of Benchmark statistics was gathered to demonstrate the "as is" world of risk management. These were gathered by the SCRMC in a series of interviews with the pilots.

Risk Management is defined, and common terminology is provided supporting the mantra that "Risk Management is a Two-sided coin. One company's risk event can be another company's risk opportunity."

A series of methodologies, tools and capabilities are provided in a logical order whose implementation will achieve organizations' goals to elevate supply chain resilience to an equal level with supply chain operational efficiency in creating net value to the organization.

People, Process, Data and Technology are shown to set the foundation for SCR&R. Special focus is placed on the role of leaders to manage successful completion of SCR&R projects. These projects will escalate risk management beyond traditional processes associated with financial risk. The Playbook utilizes Needs Assessment Scoping activities undertaken by organizations for data driven processes to prepare for risk. Organizations are likely to find differing and perhaps conflicting internal company risk assessments which must be acknowledged and reduced. There is multiple use of tools which break down the tactical activities of SCR&R practitioners.

Reflecting the value of supply chains to meet the needs of customers and suppliers, the Playbook emphasizes the Voice of the Customer and looks holistically at end-to-end supply chains. Additional tools are used in this process such as scenario planning including Business Continuity exercises and supply chain risk process mapping which overlays past supply chain mapping that overemphasized efficient operations to the potential diminution of supply chain risk management.

Finally, the measurement of operational performance incorporates Key Risk Indicators, along with Key Performance Indicators to identify a balanced trade off with these metrics. This culminates in organizations' clarification of their risk to understand where they find themselves in the maturity stages of SCR&R. The higher the maturity stage, the Playbook demonstrates, is the greater the competitive advantage of the organization. A substantial amount of the Playbook is devoted to the PPDT/Strategic-Tactical-Operational Matrix Description. It is a dynamic list that we can expect to continue to grow in the future. Change Acceleration Process Best Practices are provided to guide practitioners.

The providers selected for the SCR&R Project have developed an architecture for the technology platform. Schematics for each provider's demonstrations are provided in the Playbook.

The SCRMC is grateful for the cooperation of MxD, the project Pilots and Providers to make their time available to contribute to this body of knowledge advancing the capabilities of industry to meet the needs of customers and suppliers. This is in the national interest of the country for a resilient and efficient foundation for our economy.

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Project Team Makeup

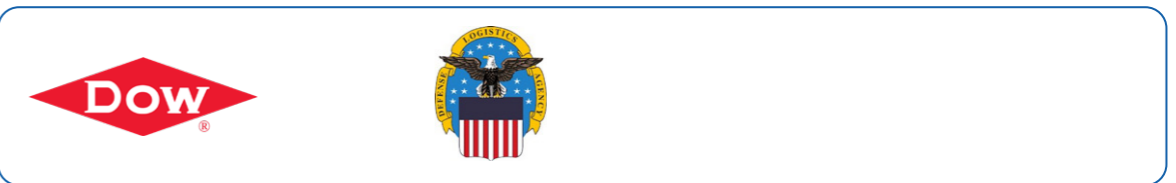
Solution Providers



Pilot Manufacturers



Advisors



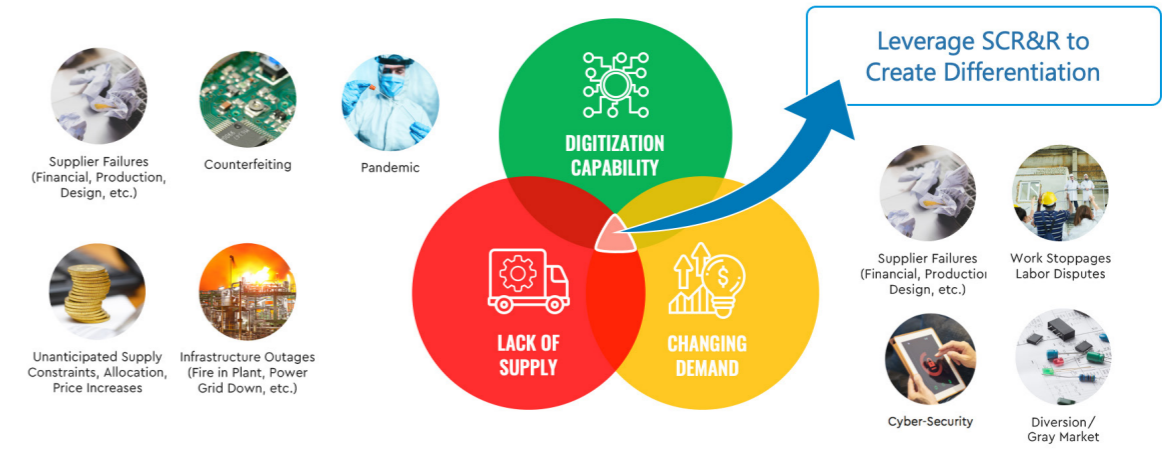
Stakeholders



1. Introduction to the Supply Chain Risk and Resiliency (SCR&R) Playbook



WHO IS GOING TO WIN?



ADDRESSING THE NEED FOR SPEED CAN BE YOUR COMPETITIVE ADVANTAGE

Figure 1.1: COVID-19 Landscape

1.1. Risk Management is a Two-sided coin

Supply chain risks occur more frequently as supply chains expand to all corners of the earth (Figure 1.1). Supply chain resilience is becoming a competitive differentiator to gain and keep business.

Surveys and studies have concluded that supply chain risk is increasing globally for various reasons and that supply chain resilience is increasingly a competitive differentiator. The financial impact of supply chain disruptions can be devastating and is often not understood until it is too late. Supply chain strategies driven primarily by cost management and delivery improvements are no longer comprehensive enough to ensure competitive success.

Traditionally, supply chain strategies have been driven by cost reduction and delivery improvements in a Just-in-Time (JIT) environment. These traditional strategies are no longer enough to maintain viability in the post-COVID world. There has been staggering, and an uneven negative impact from the pandemic on manufacturers due to artificial DEMAND & SUPPLY SHOCKS across the globe for every industrial sector.

“The COVID-19 pandemic has once again driven home the necessity of managing operational and supply chain risks. It has catapulted these issues to the top of CEO’s agendas and the unexpected now has to be considered probable.”

McKinsey November 2019 Risk Report.

Benchmark Supply Chain Risk & Resiliency (SCR&R) Statistics

- On average, every company will experience eleven risk events within twelve months. This equates to USD 350,000 per event or USD 4,000,000 per year.
- The United Nations Disaster Recovery Team has accumulated natural disaster statistics for 25 years together with Insurance Companies. When a region

is affected by a natural disaster, 25% of the companies within the affected region will go out of business 12-15 months after the event occurs. An additional 15% of the total companies affected go out of business within 24 months after the event. Taking these statistics from natural disasters and applying these statistics across the globe, like the pandemic, paints a very concerning outlook for companies.

No one is immune to the impact of the pandemic.

For publicly held companies, statistics and surveys have stated that if you experience a major disaster, you can expect a decrease in shareholder value of 7-10%.

A review of previous work related to risk supports several conclusions.

1. While some risk definitions focus strictly on the probability of an event occurring, a richer perspective extends this to incorporate a valuation of the consequence of that event.
2. Some definitions of risk focus only on the downside of risk, whereas other perspectives are more expansive and consider all variability as risk, including lost opportunities.

Today’s challenge is not allowing the fear of supply chain risk to paralyze organizations from pursuing essential opportunities for growth and advancement. Risk is something that needs to be managed as well as respected. Thus, our mantra

**“Risk Management is a Two-sided coin.
One Company’s risk event can be another
Company’s risk opportunity.”**

1.2. Purpose

The Playbook document has been developed to support the Pilots (Dow, DLA, Oshkosh, Lockheed, Jiobit) led by MxD to implement SCR&R. The SCR&R playbook contains the descriptions and diagrams of the scenarios for the Pilot’s SCR&R team. The playbook’s goal is to provide a set of proven best practices to identify, assess, mitigate and manage risks proactively. The SCR Consortium has collaborated with Supply Dynamics, SAG GS, RAAD360, and Coupa to develop the playbook.

1.3. Value Proposition (Figure 1.2)

- **Strategic Advantage:** Identifying risks faster than your nearest competitor.
- **Gain Substantial Cost Avoidance & Cost Reduction** by proactive planning protocols, such as “Digitizing-the-Supply-Chain”
- **Creating Additional Revenue and Gaining Market Share** from proactive approaches and reactive responsiveness for risk events
- **SURVIVAL!** Cost reduction, top-line revenue and market share growth.

BENEFITS OF INDOCTRINATING A SCR PROGRAM

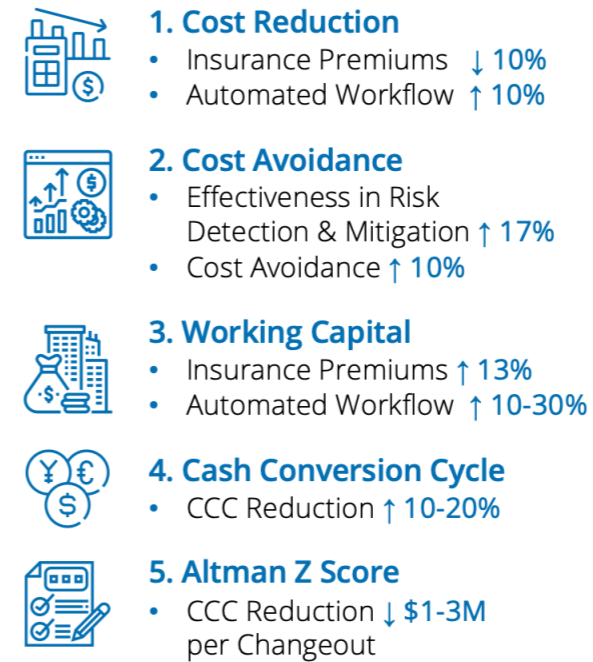
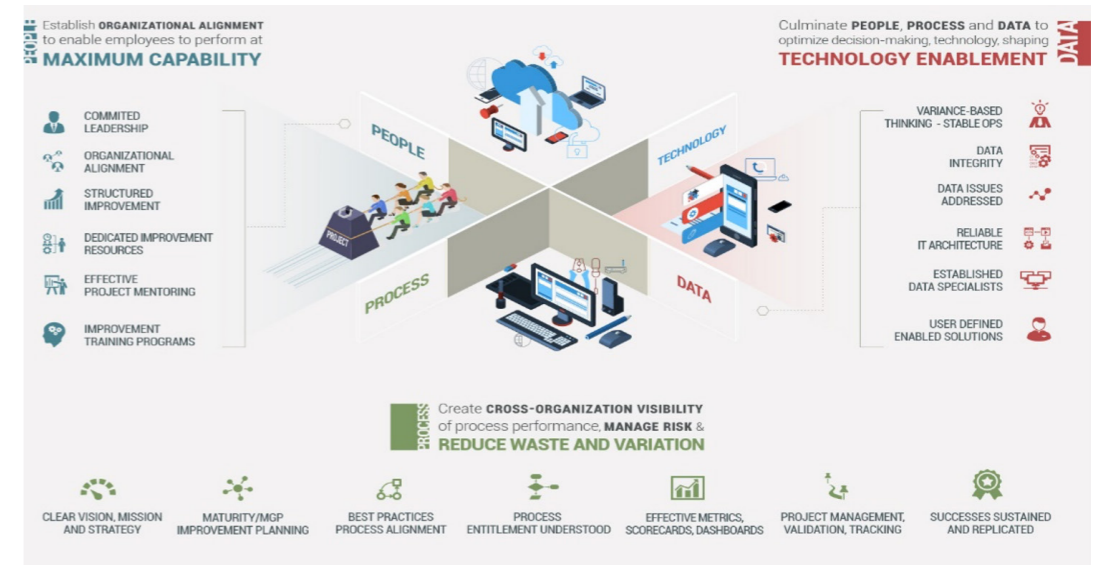


Figure 1.2 SCR&R Value Proposition Summary

If you can Identify, Assess & Mitigate a risk faster than your nearest competitor, that’s your strategic advantage.

1.4. Note: This is a living document and will be updated at the project’s close in May 2022.

2. People, Process, Data and Technology (PPDT) Introduction



Building Foundation while Balancing Near and Long term Goals

Figure 2.1: People Process Data Technology Framework

2.1. People Process Data Technology (PPDT) Framework Philosophy

The People Process Data Technology (PPDT) Framework (Figure 2.1) originated from 30+ years of deploying business transformation across different company profiles. The common underlying framework where companies became quickly successful was founded following the People, Process, Data and Technology sequence. Companies/Organizations that executed technology before considering the leadership and culture resulted in unsuccessful sustainable deployments. At best, leading with Technology transformations was successful for up to 24 months but quickly unwound after new management took over the organization.

The cohesiveness of the organizational culture through organizational End-to-End Process understanding as a foundation ensures that the Technology will sustain the investment. Furthermore, substantiating process and organization standards with trustworthy and believable data with actionable key process indicators and key risk indicators enables sustainable solutions.

2.2. Strategic Tactical Operational (STO) Philosophy

The STO philosophy is based on organization decision-making level.

- (S) **Strategic:** Senior Leadership (e.g., C-Suite and VPs)
- (T) **Tactical:** Mid-Level Leadership ((e.g., General Managers, Facility/Plant Managers, Program Managers, Directors))
- (O) **Operational:** Front-Line Personnel

From a time-horizon perspective, the STO Philosophy is the following:

- Strategic Decision - Making View is Quarterly to Yearly over 1-3+ years.
- Tactical Decision - Making View is Monthly through 18 months
- Operational Decision - Making is Hourly, Shift, Daily, Weekly

PPDT Playbook Framework

Framework	People	Process	Secure Data	Technology
Strategic	3, 9, 11	8 - 12	9, 10	12 - 13
Tactical	3, 9, 10, 11	4 - 11	5 - 11	12 - 16
Operational	11	4 - 11	5 - 11	13 - 16

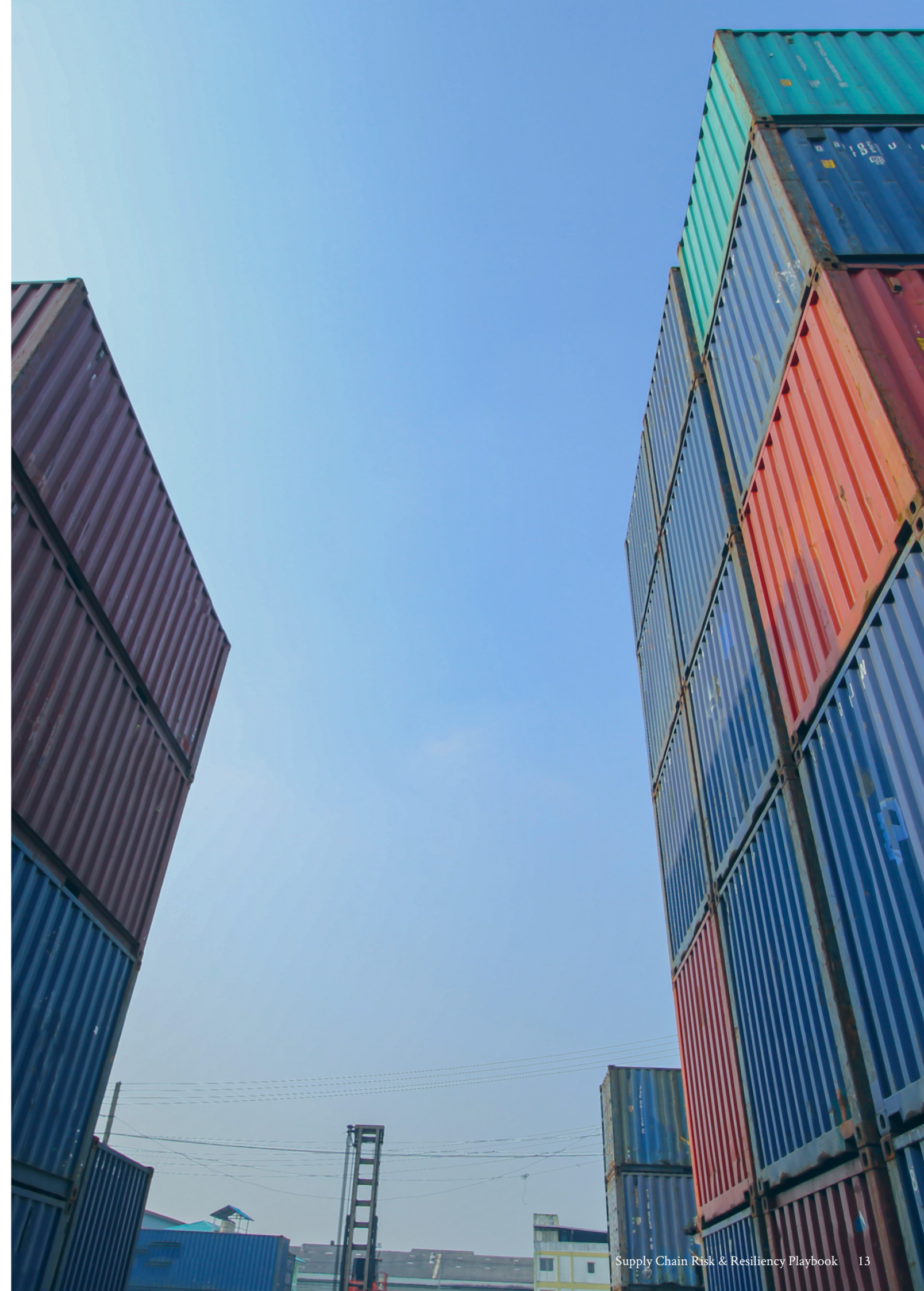
3	Leadership Development Overview
4	Scoping (Needs Assessment): Charter
5	Scoping (Needs Assessment): VOC
6	Identify Risks/Pain Points in SC
7	Supply Chain Risk Process Mapping
8	Develop Scenario Planning & Build Response Plans
9	Business Continuity Planning (BCP) "Table-Top" (Full Day) ... F2F Preferred but can be performed Virtually
10	Develop Key Risk Indicators (KRIs) for pilot and/or Illumination 1. KRI Hierarchy. 2. Balanced Scorecard 3. STO Hieratchy
11	Align 38 SCR&R Best Practices
12	Change Acceleration Process Best Practices
13	- Architecture/Schematics - Capability vs. Functional Requirements Matrix
14	Overall SCRM Systems Features and Functions
15	SCRM System Capabilities
16	Secure Data Exchange

Figure 2.2: PPDT | STO Framework aligned to Playbook Sections

2.3. Playbook Framework

The SCR&R Playbook Capabilities are aligned to the PPDT | STO Matrix to provide the framework to deploy SCR&R within your organization. The Playbook sections have been aligned to PPDT Framework (Figure 2.2). With the many best practices and technologies, the deployment order aligned to your level in the SCR&R Consortium's 21st Maturity Model is imperative to drive the success of your tailored SCR&R program.

Additional details of how PPDT | STO framework is addressed in Section 10 – KRI Hierarchy.



3. Leadership Development Overview

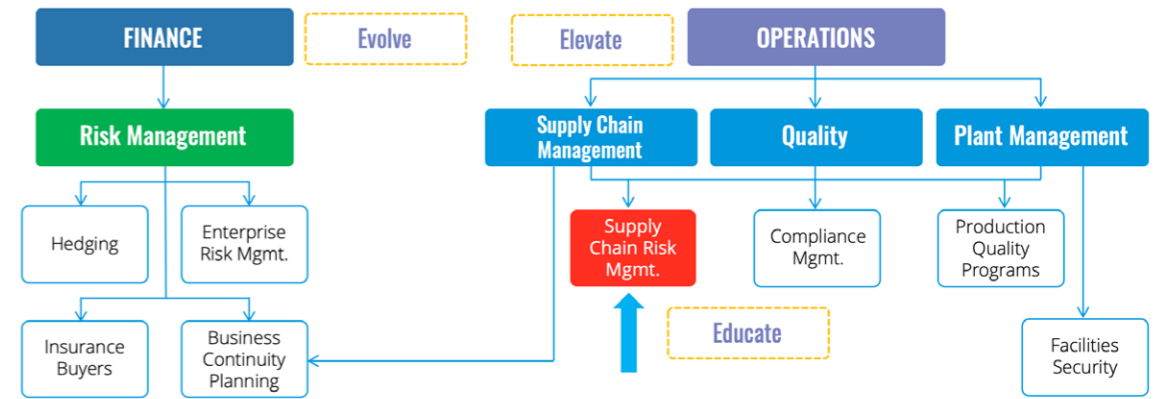


Figure 3.1: SCR&R Corporate Structure

3.1. Description (Figure 3.1)

The Leadership Development Overview is a critical success factor for the 90-Day Action Plan and your SCR&R journey. First, we advocate identifying the SCR&R lead, which perhaps your company has already done, by exercising the 90-Day SCR&R Action Plan Assessment. Second, securing a sponsor tends to be a bit more difficult. The SCR&R Sponsor provides the funding for any SCR&R project, provides “Executive Cover,” which means a commitment to the team, and provides guidance when needed.

3.2. WHY do this?

As the SCR&R Lead, you need executive cover and funding, as we said above. This also ensures that the SCR&R project/deployment, however long it is, will be funded and will maintain adequate resources to be successful. The executive cover also provides you, the Lead and your team, with potential access to other peers, via the sponsor. Without a sponsor, the probability of moving forward and sustaining the journey becomes a bit more problematic and uncertain.

3.3. Estimated Time Duration

This action item is a bit difficult for us to estimate. If you have exercised a few SCR&R tools, techniques, and tactics, then you have a baseline to utilize for sponsorship to move forward. It could take you another month or more before your sponsor agrees with the game plan and finds the funds. If you have not begun the journey and have no formal SCR&R Game Plan, it will take longer.

3.4. Completion Milestones

The first step is to secure an SCR&R sponsor. The SCR&R Sponsor should believe in the SCR&R journey and is empowered to provide executive cover through the CEO (and Board). The Executive(s) will provide funding and resources for the SCR&R team. To support the program, freeing up cross-functional resources (e.g., Procurement, Supply

Chain - Logistics & Warehousing, Manufacturing, Engineering, Marketing/Sales, Finance) is instrumental in moving the program in a positive direction.

Once the sponsorship is secured, the next set of milestones is to ensure the education and SCR&R language is established for the organization. Awareness is often initiated through webinars and brainstorming sessions to identify and assess the company's risks. An indication of completing the milestones is when the SCR&R "language" communications are inherently aligned at the Strategic and Tactical levels.

3.5. Future State

Once executive sponsorship resources and funds are established, there are a host of initiatives to be launched.

1. First, education and awareness of the team members is paramount.
2. Then, perhaps Train-the-trainer sessions by the team for other departments or disciplines.
3. The SCR&R Lead should begin to think about a Communication Plan that will be shared with all disciplines affected by and required to contribute to the SCR&R journey. A good source document to create the Communication is the Initiative Charter.
4. As the team moves forward, another possibility could be exercising the Consortium's 90-Day Assessment/Action Plan Tool, to identify early SCR&R initiatives and move at a pace you and your company are comfortable with in an effort to complete those action items and demonstrate a solid ROI.



The key is to demonstrate value for the organization with early wins!

3.6. Challenges & Hints

First and foremost, middle to upper management may not see the value. You may be forced to exercise some "Consultative Selling" techniques, in terms of WHAT you need, WHY do this and WHAT the company receives in the way of bottom-line benefits. We've injected helpful hints throughout this report, within our 4-part SCR&R Education Workshop Decks and in our SCR&R Benchmark Report.

3.7. Practitioner Day-in-the-Life

The expected role(s)/position(s) and their corresponding activities to support/execute the Leadership Development Capability.

'Give and Get' Summary

3.7.1. Give

Personnel Resources Time for Cross-Functional Stakeholder (Senior Leadership to GM-Level Personnel) to support the development of the increasing Leadership Capability to be able to Support SCR&R.

3.7.2. Get

The leadership aligns with an agreed-upon scope, stakeholder commitment requirements, and communications plan for the SCR&R Platform, ensuring the project's success is met.

Roles and Responsibilities Summary

3.7.3. Process Owner (Accountable):

Ensures that the Charter is completed to meet Executive Management's expectations

- CEO | Board

3.7.4. Process Implementer (Responsible):

Facilitates the development of establishing the SCR&R Leadership Team and Communication Plan SC Risk Manager/Director/VP

- Supply Manager – Ops or Supply Chain
- SC Risk Manager | SC Manager with Strong Facilitator Skills
- or Team Up with an experienced Master-Black-Belt | Change Management Facilitator
- or who has performed cross-functional initiatives or leverage outside consulting to support.

3.7.5. Process Evaluator (Recipient of the output of the process):

Recommended stakeholders to participate – Preferably in collaborative session:

- SC/Logistics GM/Director
- IT Assigned PM
- Sales/Mktg VP
- Engineering Director
- SCR&R Director/Mgr
- Procurement GM
- OPEX Director
- Ops GM/Director
- Strategy Dir
- Finance GM
- Legal
- HR

Appendix A3: SCR&R Leadership Overview

4. Scoping (Needs Assessment):

Initiative Charter for Scoped Deliverables to Establish a SCR&R Platform







INITIATIVE TEAM LEAD NAME & PROVIDERS: _____	PROBLEM STATEMENT: _____ <ul style="list-style-type: none"> • Provide context of the "pain" that is currently occurring. • Provide data, if available; utilize placeholders, if not available. • Include defect, object, extent, impact
INITIATIVE TITLE: _____	
PLANT OR FUNCTION WHERE PROCESS RESIDES: _____	
TEAM VISION (WHERE) STATEMENT: _____ <ul style="list-style-type: none"> • What does success look like in 5-10 Years? Where do we want to be? • Ideal Final Result to Win in the industry. • Target 12- 20 words 	OBJECTIVE STATEMENT(S): _____ <ul style="list-style-type: none"> • Can be at the mean (average) level • From x to y performance in z timeframe
MISSION (WHAT): _____ <ul style="list-style-type: none"> • Rallying Cry - within 8-14 months: • Target 5-8 words; Drives alignment in the short term • Generally 3-8 Mission Statements (Foundation and Enabling) 	KEY MEASURES OF SUCCESS (METRICS): _____ <ul style="list-style-type: none"> • Quality, Time, Cost & Capacity perspectives to "Tell the Story"
STRATEGY/ MEANS (HOW): _____ <ul style="list-style-type: none"> • What does success look like in 6, 18, 36 months? • Reference Multi-Generational Plan 	KEY BUSINESS/FUNCTIONAL STAKEHOLDERS NEEDS: _____
DRAFT PROPOSAL DATE TO EXECUTIVE TEAM BY: _____	DEPENDENCIES/LINKAGES TO OTHER INITIATIVES: _____
KEY MILESTONES: _____ Capture the absolute "must haves" to launch Aligned Activities with dates....	PROPOSED INITIATIVE START DATE: _____
	SCOPE BOUNDARIES: _____
	TEAM MEMBERS: _____ <ul style="list-style-type: none"> • Insert name, role on team, job title * Indicates a resource availability constraint
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  Current State Documentation </div> <div style="text-align: center;">  Needs/Gap Analysis </div> <div style="text-align: center;">  Finalize Scope </div> <div style="text-align: center;">  Execution Roadmap </div> </div>

Figure 4.1: Project Charter: Aligning Stakeholders to the Job-to-Be-Done

4.1. Initiative Charter Description (Figure 4.1)

The development of the Supply Chain Risk & Resiliency (SCR&R) initiative charter is the first document that the team should develop. The initiative charter serves as the primary communication document to gain cross-functional stakeholder alignment. Understanding that this is an alignment tool, it is a living document until Voice-of-the-Customer (the following tool – Section 5) and both the outside-in ‘Identify Risks/ Pain Points in the Supply Chain’ and inside-out ‘SC Risk Mapping’ exercises have been completed. Through these exercises, the challenges (process pain) and boundaries are discussed and aligned with the cross-functional team. Additionally, it is encouraged to leverage available data to baseline current performance for the chosen scoped Key Performance Indicators (KPIs) and Key Risk Indicators (KRIs), understanding that data collection systems will need to be established to create trustworthy data.

Note: the initiative charter is not structured like a typical project charter. It contains a strategy perspective of launching a group of projects with a concerted communication plan to achieve an overall goal. The Hoshin Kanri approach is a proven approach used to develop a hierarchy of projects aligned at Strategic, Tactical and Operational Levels. It is recommended that the company utilize your preferred flow-down approach to manage the projects to drive success. An aligned KPI | KRI Hierarchy is suggested to be used to gain prioritized alignment to a balanced scorecard approach involving Financial, Internal Process, Customer, Innovation Growth, Talent and Learning perspectives.

4.2. WHY do this?

The main reasons to have an initiative charter include stakeholder alignment, the basis of the communication plan, scope definition, value proposition, and measures of success. The initiative charter tells the story to senior leadership and stakeholders on why we are doing the initiative, what is in and out of scope, the value of performing the initiative, and the resources needed to execute the initiative over what period of time. The Charter will be leveraged to create the communication plan to sell the initiative's value to the organization.

The Charter should be reviewed and updated initially every month and then reviewed quarterly to ensure that all stakeholders align to the initiative's goals and vision. The charter can change over time, but ALL stakeholders must approve all changes to the latest communicated version. It is suggested that an SCR&R Governance Team be created to support the effort. Usually, the SCR&R Governance Team is composed of mid-tier Leaders (General Manager Level) and supported by Senior Leaders (VPs) sanctioned by the C-Suite. Monthly status report meetings should be reviewed with the Senior Leadership team. Depending on the activity, the SCR&R Governance will meet Weekly with breakout meetings, as required to complete the tasks. The pace and quality of these meetings will set the speed of implementation of the SCR&R journey.

4.3. Estimated Time Duration

The process of developing a charter can take anywhere between a few weeks to a quarter. It is primarily dependent on the establishment and regiment of the SCR&R Governance Team with the support of the Senior Leadership Team.

4.4. Completion Milestones

You know you are done when you have the alignment of the Cross-functional SCR&R Governance Team and that they are all speaking the same language in what the initiative is all about. Additionally, all affected stakeholders outside the Governance Team are also informed and agree on the scoped initiative and their agreement to support the initiative with their resources relative to other projects and initiatives.

4.5. Future State

Upon completion of the charter, the initiative (with targeted projects) is executing and moving forward aligned to the scheduled milestones (Gantt Chart) and goals. Again, the initiative charter should be reviewed quarterly, at a minimum throughout the execution of the initiative's staged execution.

4.6. Challenges & Hints

The first challenge is gaining senior leadership support and the SCR&R Initiative prioritization amongst the organization's other initiatives. Dedicated time for the cross-functional personnel resources is often a significant challenge to move the SCR&R initiative charter forward. Another challenge is gaining access to data and IT systems. Gaining access (and authorization) to data through ERPs, local IT collection systems and 3rd party suppliers with the IT resources needed to support the data integration can be a significant challenge.

Caution: The project lead should not complete the initiative charter by themselves and then present it to the team. At a minimum, it should be completed by represented by all stakeholder groups. Understanding that this may be a challenge initially, ensure that all stakeholders are aware and keep them informed of the progress and provide them every opportunity to participate.

Note: People (Resources), Process (End-to-End Scope), Data (IT System Access, Enterprise Information Management (EIM)) are the core requirements before launching a Technology-Based Solution.n.



4.7. Practitioner Day-in-the-Life

The expected role(s)/position(s) and their corresponding activities to support/execute the development of the Initiative Charter capability.

‘Give and Get’ Summary

4.7.1. Give

Personnel Resources Time for Cross-Functional Stakeholder (Senior Leadership and GM-Level Personnel) to support the development of the charter

4.7.2. Get

Aligned SCR&R initiative charter with an agreed-upon scope, stakeholder commitment requirements and communications plan for the SCR&R Platform

Roles and Responsibilities Summary

4.7.3. Process Owner (Accountable):

Ensures that the SCR&R Initiative Charter is completed to meet Executive Management’s expectations

- SC Risk Manager/Director/VP
- Supply Manager – Ops or Supply Chain

4.7.4. Process Implementer (Responsible):

Facilitates the development of the SCR&R Initiative Charter

- SC Risk Manager | SC Manager with Strong Facilitator Skills
- or Team Up with an experienced Master-Black-Belt | Change Management Facilitator
- or who has performed cross-functional initiatives or leverage outside consulting to support.

4.7.5. Process Evaluator (Recipient of the output of the process):

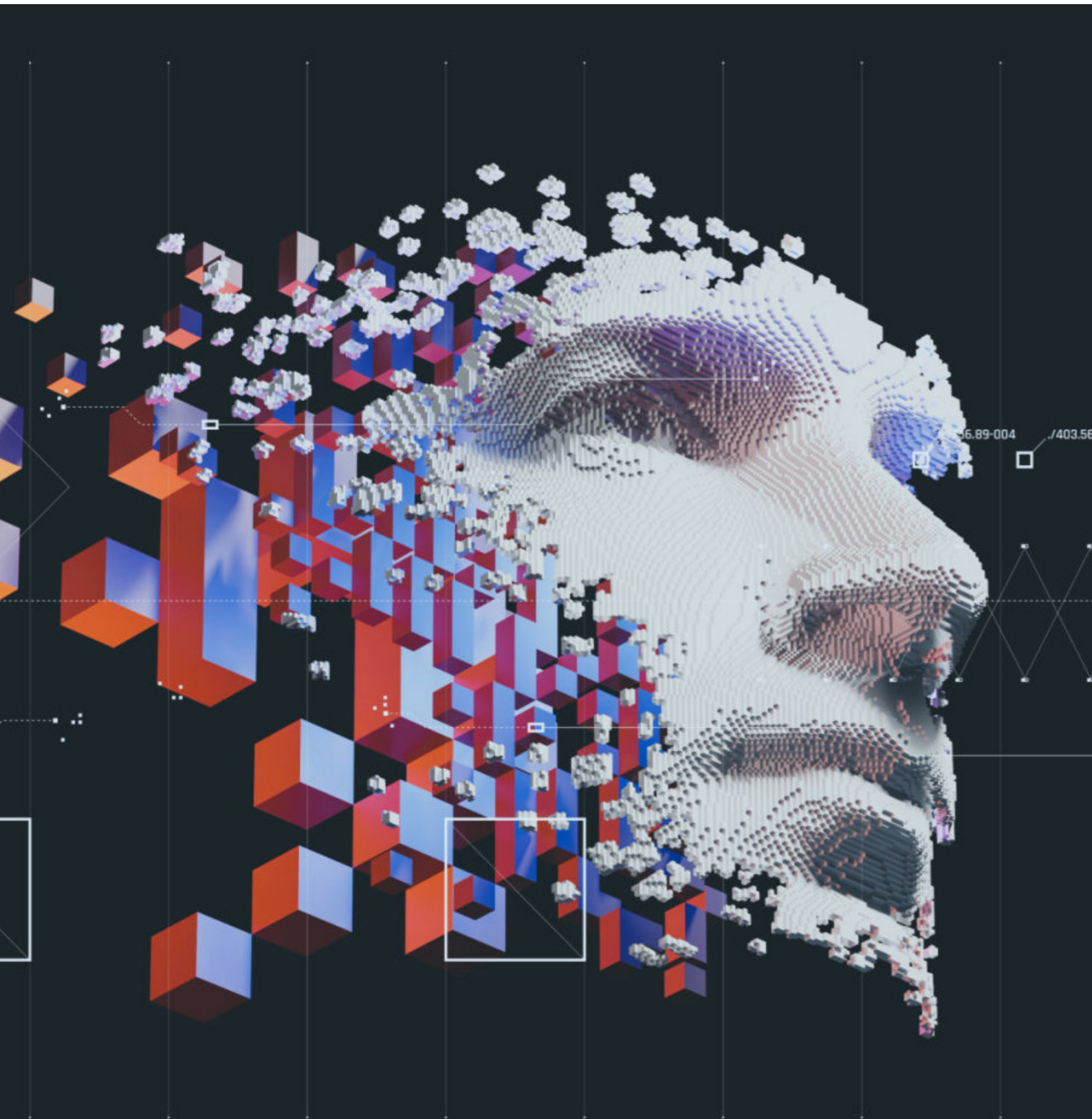
Recommended stakeholders to participate – Preferably in collaborative session:

- SC/Logistics GM/Director
- IT Assigned PM
- Sales/Mktg VP
- Engineering Director
- SCR&R Director/Mgr
- Procurement GM
- OPEX Director
- Ops GM/Director
- Strategy Dir
- Finance GM

Appendix A4: Initiative Charter Development Helpful Hints



5. Scoping (Needs Assessment): Voice-of-the-Customer (VOC)



Understanding the Voice-of-the-Customer (VOC) to uncover the Critical Customer Requirements (CCRs) to Establish a SCR&R Platform

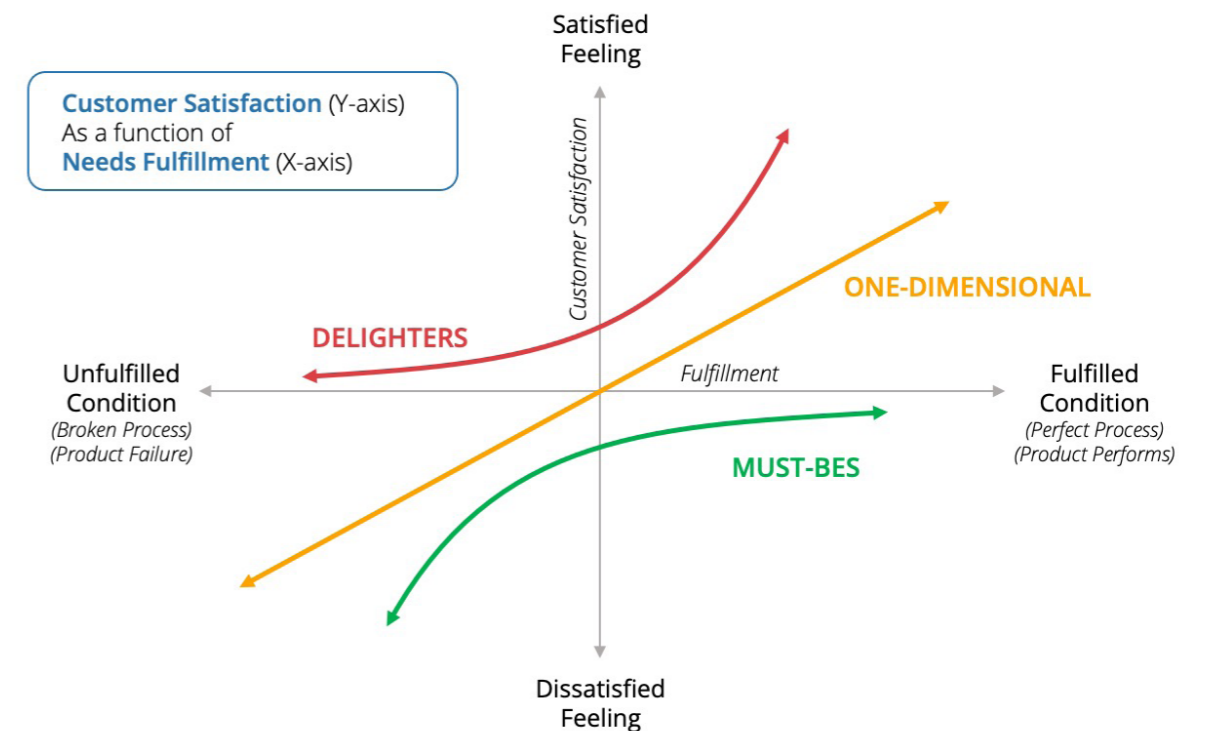


Figure 5.1: Voice-of-the Customer (VOC) Kano Diagram:
Aligning Stakeholders to the Critical Customer Requirements (CCRs)

5.1. Voice-of-the-Customer (VOC) Description (Figure 5.1)

Developing the Supply Chain Risk & Resiliency (SCR&R) platform requires a clear understanding and alignment on the Critical Customer Requirements (CCRs) or User Requirements. Agreed upon prioritized CCR definitions are needed to ensure that the platform meets each pilot's expectations. Without CCRs definitions, the technology stack will be focused on functionality that does not provide value to the pilots. One of the most common tools used to support the development and prioritization of CCRs is the Kano Model, which assesses the CCRs on the following axes:

- Customer Satisfaction: Dissatisfied to Satisfied Feelings.
- Fulfillment: Unfulfilled (Broken Process, System Failure) to Fulfilled Condition (Perfect Process, System Performs).

Through cross-functional collaborative workshops and structured assessment surveys, the Kano model categorizes the CCRs into one of the three major categories:

5.1.1. Must-Bes:

CCRs that are aligned to meeting the stakeholder's minimum expectations. Without

these CCRs being fulfilled to a minimum level of performance (threshold value), it would not be worthwhile for the Pilot to move forward with the SCR&R Platform. This is often tied to Return-on-Investment Criteria and/or On-time-in-Full Performance and/or Asset Utilization Maximization. This criterion should be established at the onset of the initiative, understanding that this criterion will need to be refined as the initiative progresses.

CCR examples may include Single Customer Portal; ability to ingest live data; integrated internal alerts; Pilot customizable Risk Weightings; providing visibility of Risk Register; ability to ensure that the data is secure; Pilots data are on separate secure platforms; Open platform to load different types of BOMs; Ability to customize Risk Alert sources and the prioritization of incoming alerts.

5.1.2. One-Dimensionals:

CCRs that are evaluated to be proportional to customer satisfaction (e.g., smaller is better, faster is better). CCR examples may include data refresh rate; Number of External Risk Alert Sources; Number of BOM Levels; Cycle Time to Run Discrete Event Simulation; Time to set up a New Scenario, Decision Response Time, Gap Difference between planned and executed performance.

5.1.3. Delighters:

CCRs that are evaluated to be deemed as nice-to-have at this juncture of the project. Most often, these would not be included in the contract. However, if these were placed in scope within the contract, it may be worthwhile to confirm their value relative to the Must-Be CCRs. Delighter Examples may include a Flexible Single user interface that everyone in the company can enter risks and evaluate risks, automatic approvals, utilize prescriptive analytics to provide suggestions for risk scenarios based on the results of past risk events.

Note: As the CCRs are defined, it is worthwhile to build a CCR hierarchy to show the relative value of the CCRs aligned to the STO Hierarchy. Furthermore, these prioritized CCRs are the foundation for building the Technology roadmap. This ensures that CCRs are transformed into functionality in the right order aligned to customer expectations. These CCRs should be aligned to the Functional Requirements covered in Section 13.

5.2. WHY do this?

One of the main reasons to define and prioritize CCRs is to ensure that the Providers are focusing on what will provide the most significant impact to the Pilots. Furthermore, performing the Kano Model exercise confirms the original MxD contract to what is realistic given the contract budget. This will ensure that the Pilots and Providers have productive discussions on the scope and align to the MxD contract. This ensures alignment between MxD (Contractor), Provider and Pilot; minimizing confusion.

Most importantly, this ensures that everyone is aligned on what the SCR&R platform will and will not do.

Note: It is not unusual for project scope to change after this exercise (CCR identification, definition and measurement, establishment of design specification limits). This exercise can be performed before the Supply Risk Mapping of the SC. However, suggest that very often, it is best performed (or updated) after the Pilots have completed the other tools

(SC Risk Mapping, Risk Identification, Scenario Planning, BCP Table-Top Simulation). It is through practicing and completing these tools that the CCRs will become more apparent for the Pilots.

5.3. Estimated Time Duration

The process of developing a first draft CCRs can take anywhere between 3-8 weeks, depending on the availability of the key stakeholders and the Pilot's project's scope and scale. It is primarily dependent on the completion of stakeholder cross-functional meetings and alignment to the SCR&R Governance Team with the support of the Senior Leadership Team.

5.4. Completion Milestones

You know you are done when your CCRs are continuously measured and reported aligned to the Pilot's scope and the overall MxD technology roadmap. Furthermore, scope creep has ceased, and the punch-list open-item backlog related to achieving CCRs has essentially stopped.

5.5. Future State

Upon completion of the VOC Kano Model, the project scope and technology roadmap are integrated and driven by the current CCRs (including specification limits) and newly developed CCRs. A well-integrated CCR to technology roadmap helps define the future extension of the SCRA2 contract.

5.6. Challenges & Hints

The typical steps and Challenges that need to be overcome include:

- I. Gaining senior leadership support and prioritization amongst the organization's other initiatives.
- II. Dedicated time for the cross-functional personnel resources is often a significant obstacle to develop the CCRs to support the functionality of the SCR&R Platform.
- III. The establishment of a CCR Business intelligence (BI) Platform with stakeholder confirmed Specification Limits aligned to action planning.
- IV. Development of a Business Intelligence (BI) dashboard to track progress; integrating with current data sources and BI dashboards, as required.

Caution: The project lead should not develop the CCRs by themselves or by their close associates and then present them to the cross-functional team. At a minimum, it should be developed by all the stakeholder groups in a facilitated workshop. Understanding that this may be a challenge initially, ensure that all stakeholders are aware and keep them informed of the progress and provide them every opportunity to participate.

Note: People (Resources), Process (End-to-End Scope), Data (IT System Access, Enterprise Information Management (EIM) aligned to the CCRs are the core requirements before launching a Technology-Based Solution.

5.7. Practitioner Day-in-the-Life:

Provide the expected role(s)/position(s) and their related activities to support/execute VOC capability.

5.7.1. Give

Personnel Resources Time for Cross-Functional Stakeholder (Senior Leadership and GM-Level Personnel) to support the development of CCRs to be used to defined the requirements to align to the Pilot's ROI criteria.

5.7.2. Get

Aligned Program CCRs that link to the Program's technology roadmap.

5.7.3. Process Owner (Accountable)

- SC Risk Manager/Director/VP
- Supply Manager – Ops or Supply Chain

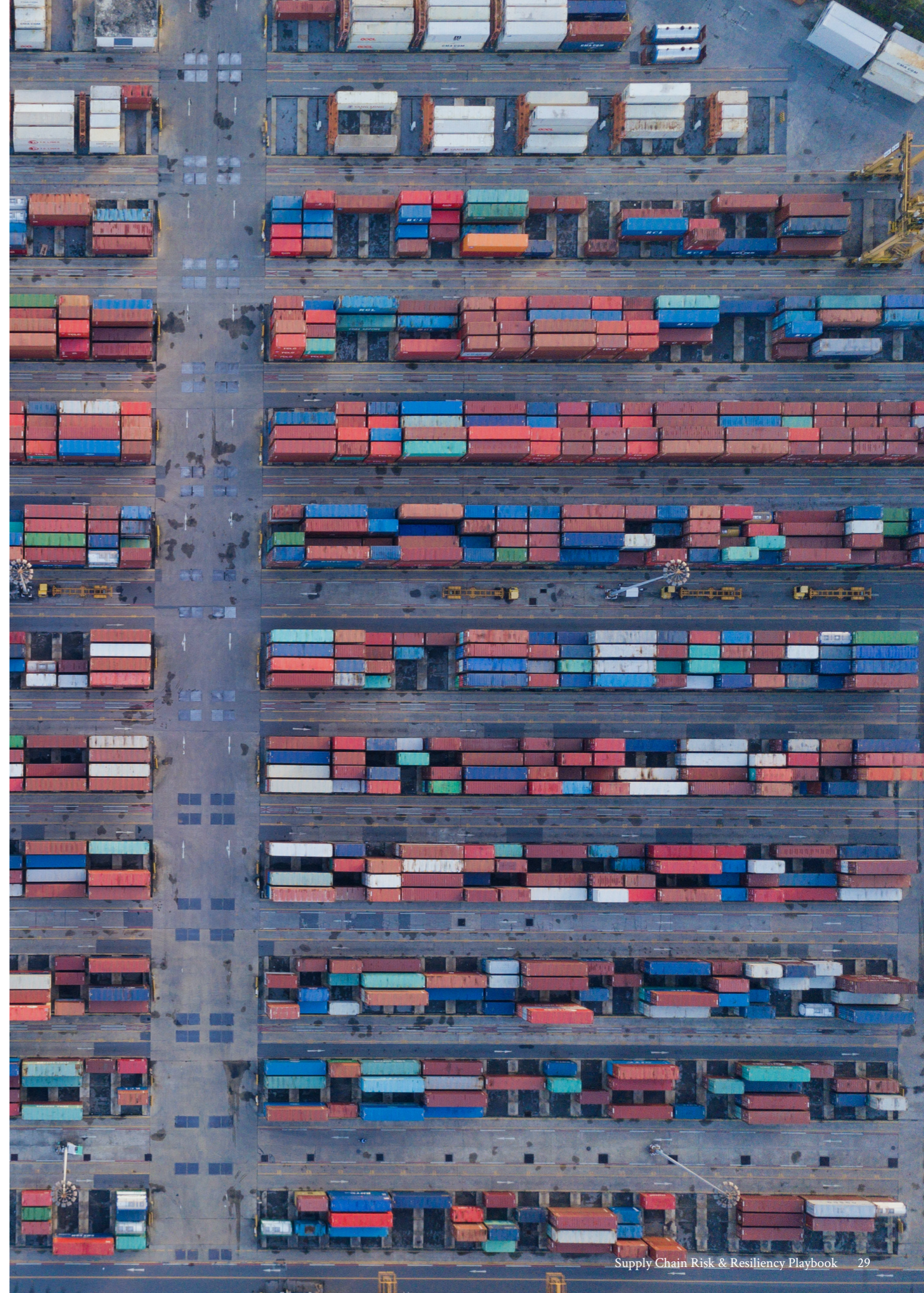
5.7.4. Process Implementer (Responsible)

- Running the development of the VOC-CCR exercises
- Experienced Master-Black-Belt | Marketing Manager | Change Management Facilitator | Project Leader or who has developed VOC-CCR in the past

5.7.5. Process Evaluator (Recipient of the output of the process):

Recommended stakeholders to participate in the CCR Kano Survey and CCR Validation

- | | |
|----------------------------|-------------------|
| • SC/Logistics GM/Director | • OPEX Director |
| • IT Assigned PM | • Ops GM/Director |
| • Sales/Mktg VP | • Strategy Dir |
| • Engineering Director | • Finance GM |
| • SCR&R Director/Mgr | • Legal |
| • Procurement GM | |



6. Identify Risks/Pain Points in the End-to-End Supply Chain



Figure 6.1: Wearables Value Chain SCR&R Landscape

Identify all Existing and Possible Risks for your E2E Supply Chain

6.1. Description (Figure 6.1)

We advocate identifying risks, especially in the early portion of our second stage, Visibility. During this brainstorming exercise, the cross-functional team identifies risks in your supply chain; we advocate starting small. Take a small product line, possibly 5-10 Stock Keeping Units (SKUs), and first classify them into risks that have occurred within this product line and then secondarily, risks that could happen. Then, start to further classify the risks at Strategic, Tactical and Operational levels. Strategic risk levels that you cannot control, such as weather, geopolitical risk, etc. Tactical risks generally revolve around your suppliers and customers. Operational risks are typically the risks you can control, such as your supply chain processes, assets, talent, and systems.

6.2. Why do this?

“Because what you don’t know about your supply chain CAN and WILL hurt you!” Visibility of the risks within your End-to-End Supply Chain (Customer to your Supplier’s Supplier) provides insight into where risks can occur. Therefore, visibility into vulnerabilities is the first step on the journey of developing proactive risk mitigation tactics. It also becomes a building block process for subsequent risk management tools, techniques and tactics.

6.3. Estimated Time Duration

Assemble your business leads from marketing, finance, operations, manufacturing, supply chain, procurement, and logistics. Gather them into a virtual meeting/conference room and pick a small product line and begin the process of brainstorming. Many

veteran colleagues from different disciplines will have stories about risk events that many other newer colleagues know nothing about. This is usually an excellent start to bring the risk management dialogue into the lexicon of all disciplines, especially for this product line. We recommend using a facilitator and manual or digital post-it notes. Maintaining a small manageable scope of a product-line will support this effort will not take more than two (2) hours.

6.4. Completion Milestones

When you have spent the time brainstorming, telling stories about the risks that have occurred for this product line and the risks that could occur, you can then begin to classify and categorize them, as we mentioned above. To mark the completion, someone in the group should act as the scribe and either take pictures of the risks/or enter them into a stored document and categorized them as strategic, tactical or operational. You are then ready to move forward.

Strategic Risks

Strategic risks are those risks that are the most consequential to an organization's ability to execute its strategy, achieve its business objectives, and build and protect value. These risks are those current and prospective impacts on earnings or capital arising from adverse business conditions, improper implementation of decisions or a lack of responsiveness to industry changes or forces. And they include an array of external events and trends that can devastate a company's growth trajectory and shareholder value in seven major classes encompassing industry, technology, brand, competitor, customer, project and stagnation. Strategic risks are those that capture the attention of the board of directors.

Examples of events which are covered under strategic risk include the current COVID pandemic (existential threat to businesses,) the ongoing global shortage of semiconductor chips (volatile impact resulting in production shutdowns,) the BP Oil spill in 2010 (environmental disaster siphoning profits for cleanup expenses and bringing environmental regulations requiring supply chain upheaval,) and Maersk shipping lines' cyber attack in 2017 (all ships, loading and unloading operations, temporarily suspended.)

Tactical Risks

Tactical Level Risks relate to mainly external issues with your suppliers or customers. They include quality problems, late deliveries, service failures due to poorly managed inventory, customer or supplier fires, compliance issues, financial difficulties and more.

Operational Risks

A disproportionate set of supply chain risks will be categorized as operational since this category includes mainly internal processes that the company has control over, such as quality, computer issues, problems related to poor forecasting, personnel issues, poor planning systems and many other events related to operational failures.

6.5. Future State

Once compete, we advocate supply chain mapping. This risk identification manual exercise supports the small product line you picked and is coupled with the next action item, supply chain mapping. Upon completing of this action item and supply chain mapping, we recommend assessing the risks identified within the supply chain, calculating Value-at-Risk (VaR) and prioritizing those risks in descending order. This is coined, "Risk Response Planning" and resides in our SCRA2 education slide decks and our SCRA2 Benchmark Report. As you move beyond the Visibility Stage and into Predictability, we advocate attempting to digitize this small product line, meaning, develop a digital model or Digital Twin. This methodology is the mainstay of the third stage, Predictability.

6.6. Challenges & Hints

Acquiring the cross-functional personnel (e.g., SC/Logistics, GM/Director, Operations GM/Director, Procurement GM, IT Assigned PM, Finance GM, Sales/Mktg VP, OPEX Director) for the virtual meeting/conference room exercise could be problematic. Time to completion could draw out and result in personnel attrition. HINT— If you have a solid SCR&R Lead and a strong sponsor, you have a good chance of completing the exercises. We can discuss this during the four 90-Day Action Plan Tool checkpoint calls if this seems daunting.

6.7. Practitioner Day-in-the-Life

Provide the expected role(s)/position(s) and their corresponding activities to support/execute the Identification of all Existing and Possible Risks for your E2E Supply Chain capability.

'Give and Get' Summary

6.7.1. Give

2 hours of time with Cross-Discipline Key Decision-Makers

6.7.2. Get

Awareness & Alignment Exercise to Identify the SC Risks for the scoped Product-Line (Outside-in Perspective)

Roles and Responsibilities Summary

6.7.3. Process Owner (Accountable)

- SC Risk Manager/Director/VP
- Supply Manager – Ops or Supply Chain

6.7.4. Process Implementer (Responsible)

- Running the development of the Identify Risks/Pain Points in the End-to-End Supply Chain exercises
- Experienced Facilitator such as a Master-Black-Belt | Change Management Facilitator | Project Leader or who has developed Risks/Pain Points in the End-to-End Supply Chain in the past

6.7.5. Process Evaluator (Recipient of the output of the process)

Recommended stakeholders to participate in the identification of E2E SC Risks that affect decision-making aligned to your priorities and success factors:

- SC/Logistics GM/Director
- IT Assigned PM
- Sales/Mktg VP
- Engineering Director
- SCR&R Director/Mgr
- Procurement GM
- OPEX Director
- Ops GM/Director
- Strategy Dir
- Finance GM
- Legal

Appendix A6: WHERE are the Risks; The 4 Spheres



7. Supply Chain Risk Process Mapping



Map the Supply Chain, Manually or Digitally. Think BIG, start small & implement quick.

- TOP 12 RISKS**
- 1 Trade Wars
 - 5 Environmental Regulation
 - 9 Border Battles
 - 2 Raw Material Shortages
 - 6 Economic Uncertainty
 - 10 Cyber Threats
 - 3 Recalls/Safety issues
 - 7 Government Stability
 - 11 Lead Times
 - 4 Weather/Climate
 - 8 Hazardous Transport
 - 12 Hazardous Transport

Where do these top 12 risks fit in your supply chain?

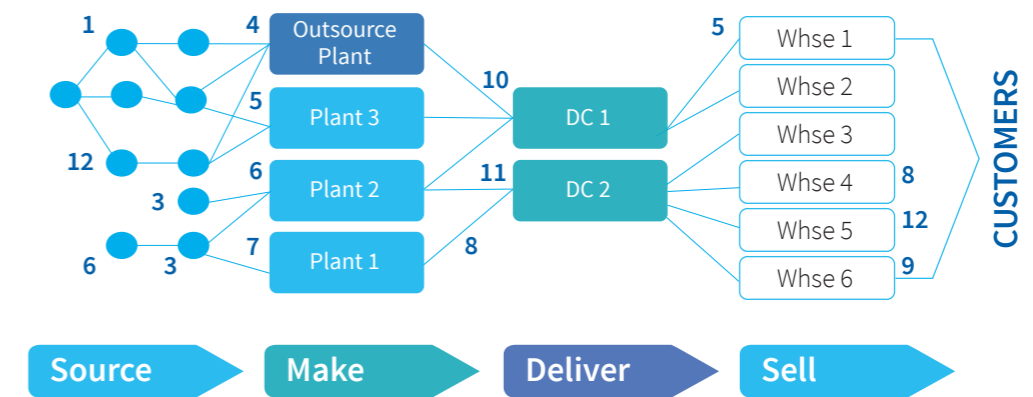


Figure 7.1: Supply Chain Risk Management Mapping

7.1. SCR&R Mapping Description (Figure 7.1)

We advocate mapping the supply chain, especially if you are in the early portion of our first stage, Visibility. When we say map the supply chain, we advocate starting small. Take a small product line, possibly 5-10 Stock Keeping Units (SKUs), draw a map of that product line starting with customers, and move upstream to the suppliers and everything in between. This includes warehouses, distribution centers, manufacturing facilities. Depending on your product outsource strategy, contract manufacturers and key supplier's suppliers could be included.

7.2. WHY do this?

“Because what you don’t know about your supply chain CAN and WILL hurt you!” Visibility of your End-to-End Supply Chain (Customer to your Supplier’s Supplier) provides insight into the where risks can occur. Therefore, visibility into vulnerabilities is the first step on the journey of developing proactive risk mitigation tactics.

7.3. Estimated Time Duration

Gather leads from marketing, finance, operations, manufacturing, supply chain, procure-

ment, and logistics. Assemble them into a conference room (or Virtual Meeting) and map the nodes using any visualization tool. Guidelines on this process reside in all the online courses, the book, and many of our articles. If you begin small, this should not take more than 3-5 hours.

7.4. Completion Milestones

- I. Mapped all the nodes (e.g., warehouses, distribution centers, manufacturing facilities)
- II. Connected the nodes with lines denoting material flow through the nodes
- III. Identify all the risks that have occurred or could occur in the scoped (5-10 SKUs) supply chain
- IV. Superimpose the identified risks on top of the nodes affected (Figure 7.1)

7.5. Future State

Once complete, we advocate assessing the risks identified within the supply chain, calculating Value-at-Risk (VaR) and prioritizing those risks in descending order. This is coined, “Risk Response Planning” and resides in the SCRMC’s courses and book.

7.6. Challenges & Hints

Acquiring the cross-functional personnel (e.g., SC/Logistics, GM/Director, Ops GM/Director, Procurement GM, IT Assigned PM, Finance GM, Sales/Mktg VP, OPEX Director) for the virtual meeting/conference room exercise could be problematic. Time to completion could draw out and result in personnel attrition. HINT—IF you have a solid SCR&R Lead and a strong sponsor, you have a good chance of completing the exercise. If this seems daunting, we would advocate you contact the SCRMC Consortium.

7.7. Practitioner Day-in-the-Life

Provide the expected role(s)/position(s) and their corresponding activities to support/execute SC Risk Mapping capability.

7.7.1. Give

3 hours of time of key decisions-makers

7.7.2. Get

Alignment and awareness across organization on E2E and identify and assigning potentials Risks across the scoped SC.

7.7.3. Process Owner

- SC Risk Manager/Director/VP
- Supply Manager – Ops or Supply Chain

7.7.4. Process Implementer

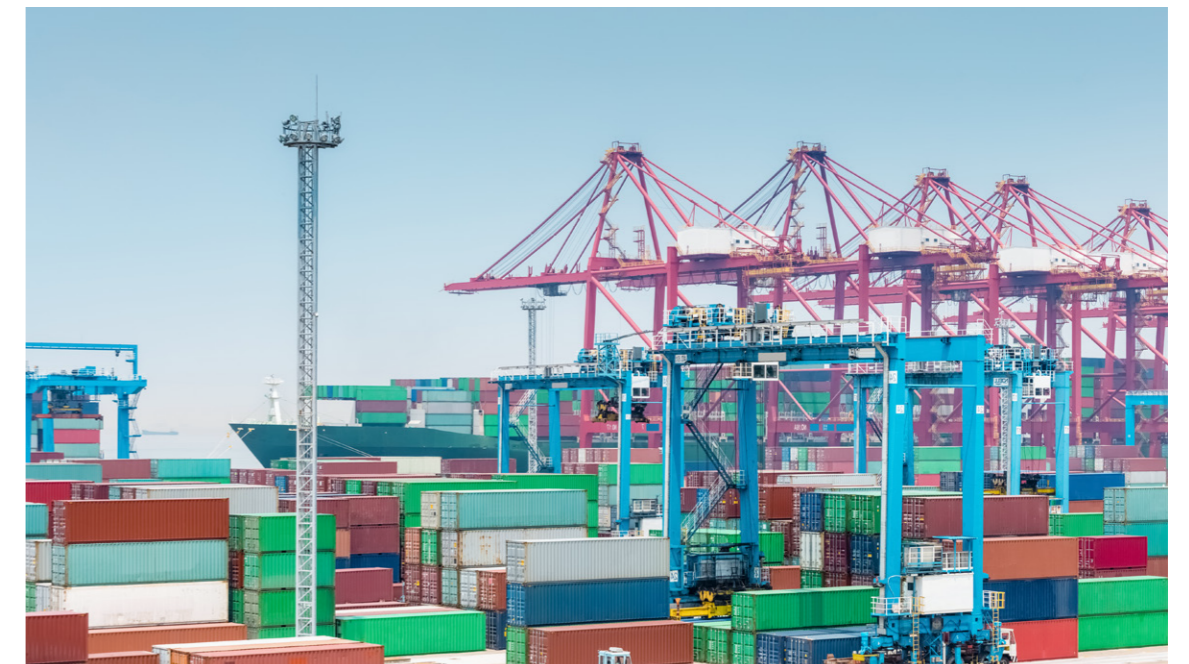
- SC Manager with Strong Facilitator Skills or
- Team Up with a experienced MBB | Change Management Leader or
- Leverage outside consulting to support

7.7.5. Process Evaluator

Recommended stakeholders to participate in the identification of E2E SC Risks that affect decision-making aligned to your priorities and success factors:

- | | |
|----------------------------|-------------------|
| • SC/Logistics GM/Director | • OPEX Director |
| • IT Assigned PM | • Ops GM/Director |
| • Sales/Mktg VP | • Strategy Dir |
| • Engineering Director | • Finance GM |
| • SCR&R Director/Mgr | • Legal |
| • Procurement GM | • HR |

Appendix A7.1 Supply Chain Risk Mapping



8. Develop Scenario Planning & Build Response Plans



Begin to assess your identified and prioritized risk with Risk-Priority-Number, Value-at-Risk, Time-to-Recovery, and Time-to-Impact.

Scenario/Risk Response Planning

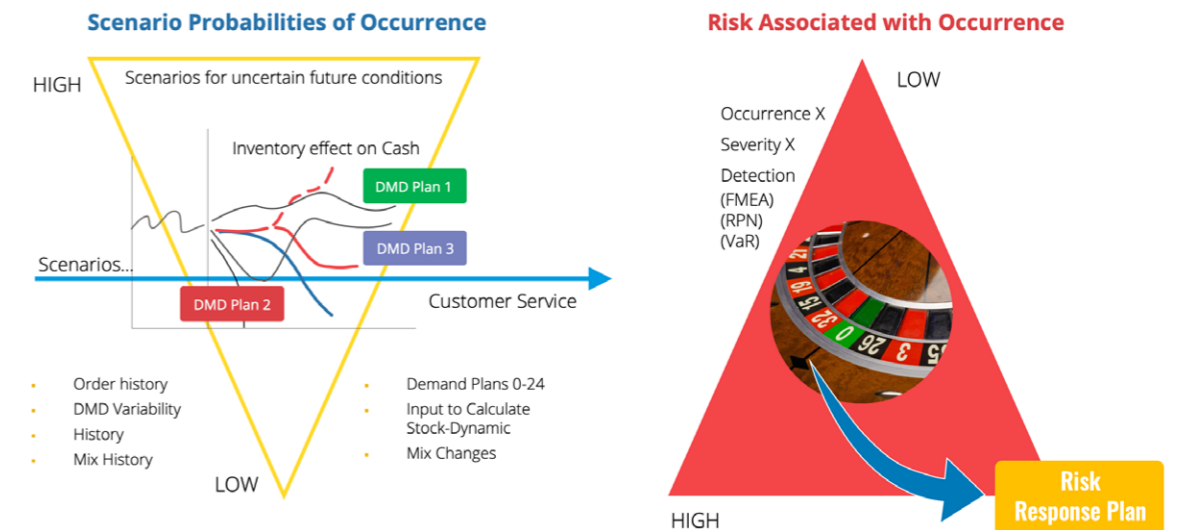


Figure 8.1: SCR&R Scenario Risk Mapping

8.1. Scenario Risk Planning & Response Planning Description (Figure 8.1)

The prerequisite to this action item is identifying your risks and SC Risk Mapping (Sections 6 and 7). Once Scenario Planning and Response Plans have been completed with the recommended Supply Chain Mapping exercise, the next step is to quantify the risks. We advocate starting with “Qualitative” consensus-building approaches (e.g., Risk Priority Numbering with Failure Modes & Effects Analysis, Delphi Methods). Then to validate the team’s opinions integrate data-based Key Risk Indicators (KRIs) such as Value-at-Risk (VaR), Time-to-Impact, Response Time and Time-to-Recovery (Section 10). The goal is to let the data drive the assessment and priority of scenario planning and response plans.

8.2. Why do this?

Because we know that different people have different perspectives on the same risk for ONLY two reasons.

1. Their actual experience with risk
2. Based on where they sit in the company hierarchy and what department.

We always advocate the qualitative and quantitative approaches, so at the end of the day you can pose the same risks to everyone involved and begin a very robust conversa-

tion about why the two assessment values don't match up in terms of priorities. It will be a very "spirited" discussion!

8.3. Estimated Time Duration

The process of assessing every identified risk will take some time. We advocate developing a survey document for the qualitative approach, and that way, the individuals can provide their perspective in the privacy of their own office. If you choose to utilize FMEA, it can be performed with a bona fide Continuous Improvement Team by capturing the data from your cross-functional team and operations systems. Suppose you decide to use Value-at-Risk (VaR). In that case, we advocate you hire/or utilize a bona fide "Delphi-Method Facility Instructor" and follow the VaR scenario approach we have highlighted in our Education Workshops and The SCRM Consortium's Benchmark Report. This process from start to finish can take a few weeks to complete.

8.4. Completion Milestones

You know you're done when you have your risks quantified using a qualitative and quantitative approach and have ranked them in descending order, compared them side-by-side and profiled them to all who participated in the exercises.

8.5. Future State

Upon completion of assessing your identified risks, you are ready to move forward with building out Mitigation Plans for the TOP Ranking Risks. Developing mitigation plans is another "Delphi-Method" approach that we have broached in our Education Workshops and Benchmark Report. Developing Mitigation Plans will be a critical element and deliverable in the SCRA2 project for every pilot.

8.6. Challenges & Hints

The first challenge will be to achieve a quorum of the right colleagues. This will take some time and you may need assistance from your sponsor, considering many of the colleagues will not be in your domain and will not report to you. Another obstacle will be securing a "Delphi-Method" instructor. We would highly recommend you do this to ensure a successful outcome. If you have someone with this capability on staff, please leverage them.

8.7. Practitioner Day in the Life

Provide the expected role(s)/position(s) and related activities to support/execute the Development of Scenario Planning & Build Response Plans capability.

'Give and Get' Summary

8.7.1 Give

Multiple Sessions at 2 hours per Session with key decisions-makers

8.7.2 Get

Qualitative Risk Priority Number (RPN) Assessment of your top SC Risks for the scoped Product-Line (Outside-in Perspective) leveraging frequency of Occurrence of captured risks, if available. Risk Impact and detectability is estimated from an agreed upon scales. Additionally, the outcome of Value-at-Risk (VaR) calculation is money at risk (\$) for all of the identified risks. The time-to-recovery is estimated based on how long it takes an entity in a supply chain to reach full volume or full operating status after a major disruption.

8.7.3 Process Owner (Accountable)

- SC Risk Manager/Director/VP
- Supply Manager – Ops or Supply Chain

8.7.4 Process Implementer (Responsible)

- SC Manager with Strong Facilitator Skills
- and/or Team Up with a MBB | Change Management Leader
- and/or Delphi-Method Instructor Level

8.7.5 Process Evaluators (Accountable)

Recommended stakeholders to attend

- SC/Logistics GM/Director
- IT Assigned PM
- Sales/Mktg VP
- Engineering Director
- SCR&R Director/Mgr
- Procurement GM
- OPEX Director
- Ops GM/Director
- Strategy Director
- Finance GM
- Legal
- HR

Appendix A8: Develop Scenario Planning & Build Response Plans

9. Business Continuity Planning (BCP) “Table-Top”



Face-to-Face Collaboration Meeting Preferred but can be performed Virtually

A life cycle approach to managing crises fortifies an organization's ability to avoid crises by focusing proactively on detection and risk management as well as on readiness and response. It also recognizes that crises can present opportunities for organizations to emerge stronger, enabling them to build more effective capabilities at all stages of the crisis life cycle



Source: Deloitte analysis.

Deloitte Insights | deloitte.com/insights

Figure 9.1: The Crisis Management Life Cycle

9.1. Description (Figure 9.1)

The objective of a business continuity plan is to assure the availability, reliability, and recoverability of business processes servicing an organization's customers, partners, and stakeholders. It must be an integral part of the business planning life cycle for business continuity to be effective. Whenever a business changes the impact of a process or function, business continuity considerations must be evaluated and adjusted as necessary to understand the effect they have on existing recovery strategies and plans.

9.2. Why do this?

Research to support Business Continuity Planning's involvement in Supply Chain Risk Management:

1. Business Continuity Management (BCM) is positively related to reputational damage containment of major Supply Chain Disruptions (SCD)
2. Supply chain involvement in BCM is positively related to operational damage containment of major SCDs.

3. Supply chain vulnerability amplifies the effects of BCM on containing the reputational damage of major SCDs.
4. Supply chain vulnerability amplifies the effects of supply chain involvement in BCM on containing the operational damage of major SCDs

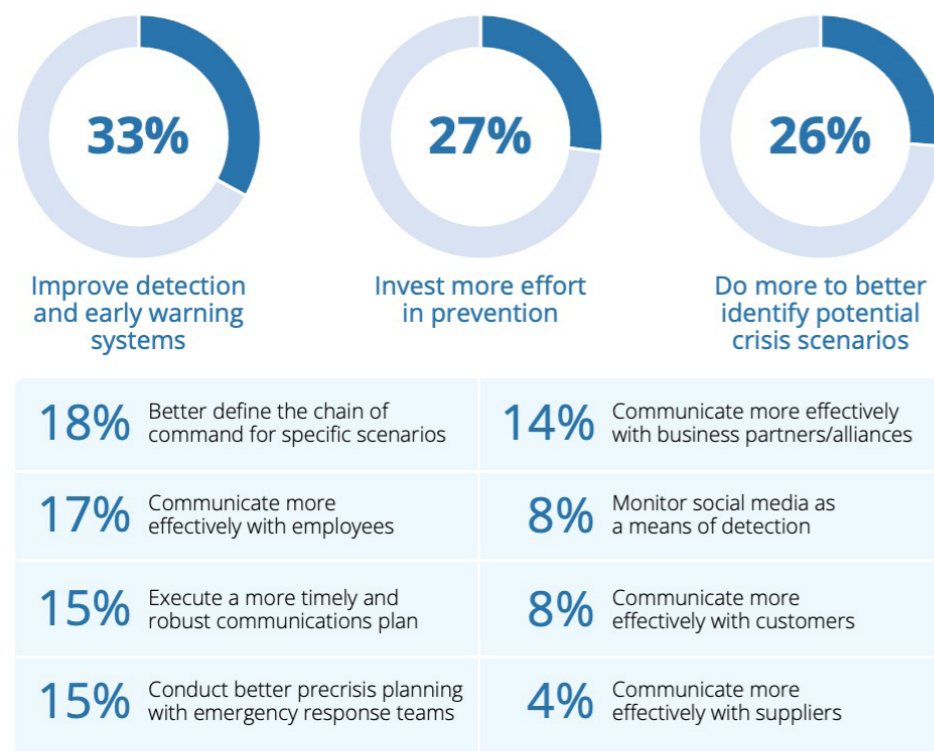
Reference © 2021 Discenza Business Continuity Solutions

According to Deloitte’s 2018 Risk Report, (Figure 9.2), crises drive organizations to focus on steering clear of them. From the 2018 report, nearly 90 percent of organizations have conducted reviews, mostly internally, following a crisis. The significant insight uncovered from these examinations is that, although recent crises were not always foreseen, they might have been averted. This appears to prompt organizations to take action to forestall future crises.

The top three lessons learned from their organization’s most recent crisis (Figure 9.2) are:

1. Respondents identified the need to improve detection and early warning signals
2. Respondents need to invest more effort in the prevention
3. Respondents need to do more to identify potential crisis scenarios

Thinking about a crisis you experienced within the past two years, what, if anything are the lessons that your organization learned or that you would do differently?



Base: All respondents who experienced a crisis in the past two years (n=421)
 Source: Deloitte 2018 global crisis management survey. Deloitte Insights | deloitte.com/insights

Figure 9.2: Lessons Learned from Experiencing a Crisis

9.3. Estimated Time to Duration

The process of a Business Continuity Planning session can take on two complexions.

First: The TABLE-TOP approach.

This involves running crisis simulations as part of the organization’s crisis management program. A crisis simulation, or Table Top session, will quickly reveal an organization’s strengths and where it needs to improve. The simulation should be set in the company’s own market and reflect its internal structure and operations. It should accurately simulate the crisis’ impact on lines of business and functions across the enterprise. Simulations should be carefully prepared. If they are not, the exercise can turn into a perfunctory event. The simulation also needs to test everyone in the organization who would be involved in a real crisis, including those who would be expected to support the crisis management team. Thus, simulations should ideally not be created and run by people who will need to take part in the simulation, but instead be managed by an independent group.

For most types of crises, effective simulations typically last between **four to six hours**, and much can be learned in that time. However, for complex issues that are likely to play out over many months or even years, allowing a longer time frame for a simulation, such as two days, is often beneficial. This does not mean that senior executives are solidly tied up for the entire period, but it does mean that they need to be alert and ready to respond during that time—just as in a real crisis.

Second: Business Continuity Planning (BCP).

As Deloitte’s Figure 9.1 profiles, this must be considered a long-term commitment. Building out an enterprise-wide BCP approach **takes years**. This is due to a couple of major reasons:

1. BCP must remain rigorous and relevant.
2. Risks change and evolve everyday situations with people, colleagues, partners and customers change jobs, positions and external sources, such as electronic grid contacts, emergency agencies contacts change and much more. Therefore, BCP must be embedded into the standard operating procedures to endure and maintain rigor and relevancy.

9.4. Completion Milestones

The following steps are followed in setting up a BCP Table Top Event:

- I. Set Objectives & Identify the scope of the scenarios to be addressed
- II. Create the scenario and exercise structure
- III. Identify aligned stakeholders
- IV. Confirm logistical Details
- V. Define the top scenarios with a small team and share before the Table top

event

- VI. Conduct the Table top event with applicable stakeholders
- VII. Debrief on Scenarios and lessons learned
- VIII. Create/Update response plans for continuous improvement

9.5. Future State

When completing the first BCP Tabletop session, the team gains an appreciation for what is involved and the complexity and uncertainties. It's normally an excellent education exercise for awareness. Once completed, we and Deloitte advocate that BCP Tabletop exercises become a formal process, as depicted in Figure 9.1 of the Deloitte Risk Report. Therefore, similar to fire, tornado, and earthquake drills, the company should always be performing BCP drills to keep abreast of the latest scenarios and recovery plans.

9.6. Challenges & Hints

Challenges.

Figure 9.4 provides a host of challenges in terms of being well prepared for and exercising solid Business Continuity Planning.

Helpful Hints.

To support leaders apply their craft successfully in a crisis, companies should consider the following:¹






Proactively Organize Leaders.

The most advanced organizations have created a leadership structure for crisis management, usually in three tiers: Strategic, Tactical and Operational. Senior leaders must determine beforehand how they want to organize themselves and define their various roles and responsibilities.

Train Leaders with the Tools and Techniques that can Support them through a Crisis.

Specific tools and techniques can help leaders cut through the noise during a crisis and work decisively and collaboratively through all the event stages. For example, tools such as agendas and checklists may sound mundane, but they help leaders to focus on the challenges ahead rather than worrying about whether they have covered the basics. Such tools help leaders find valuable time and space, guiding them through the necessary process to focus on more complex issues. Techniques needed for effective crisis leadership, such as communicating with stakeholders, should also be practiced and honed (e.g., communicating in a crisis is very different from day-to-day communications). For example, during a new product launch: The organization and its leaders may

Thinking specifically about organization, what are the most significant challenges to effective crisis response?
Which of these is the most significant challenge?

	Significant challenges	Most significant challenge
 Effectiveness of leadership and decision-making	24%	13%
 Effectiveness of teamwork	22%	9%
 Familiarity with crisis structure and process	20%	12%
 Clarity of roles and responsibilities	20%	8%
 Information sharing and management	19%	6%
 Employees communication	18%	7%
 Alignment and relationships with external parties such as key partners and major suppliers	16%	5%
 Stakeholder engagement	11%	3%
 Don't know	3%	3%
 None of the above	1%	1%
 Other	28%	25%

Base: All respondents(n=5223)

Source: Deloitte 2018 global crisis management survey.

Deloitte Insights | deloitte.com/insights

Figure 9.4: Challenges to Effective Crisis Response

well be cast as the villain, requiring extra outreach efforts to address the challenges that may ensue during a risk event.

Identify, Improve, and Counterbalance for Leadership Tendencies and Styles

In the high-stakes, high-pressure environment of a crisis, leaders will tend to rely heavily on their most natural leadership style—which, if that style is not what the situation calls for, may well stand out and cause trouble. For example, specific strengths, such as being quick to action, may be seen as rash if overdone in a crisis. Conversely, if an executive is

prone to taking a long time to make decisions, he or she may not be able to act quickly enough to contain any potential damage. The countermeasure? Leaders should be aware of their “go to” leadership styles and seek to address any weaknesses in them—and, in a crisis, surround themselves with others who have complementary skills.

The barriers to providing more leadership development often center on an intuitive but faulty assumption—namely, that a leader with a strong performance under normal circumstances will probably be effective in managing a crisis as well. This, however, may not be at all true. Keeping this in mind, organizations would be well served to prepare their leaders to effectively steer their organizations through a crisis, no matter how well they lead in the ordinary course of business.

Resources for BC Professionals

- “A Supply Chain Management Guide to Business Continuity” by Betty A. Kildow, 2011, published by AMACOM
- “Supply Chain Risk Management: An Emerging Discipline” by Gregory Schlegel and Dr. Robert Trent, 2014, published by CRC Press
- “Supply Chain Management for Dummies” by Daniel Stanton, 2018, published by John Wiley & Sons
- “The Power of Resilience” by Yossi Sheffi, 2015, published by MIT Press
- <https://hbr.org/2014/01/from-superstorms-to-factory-fires-managing-unpredictable-supply-chain-disruptions>

9.7. Practitioner Day-in-the-Life

Practitioner Day-in-the-Life – provide the expected role(s)/position(s) and their corresponding activities to support/execute the BCP capability.

‘Give and Get’ Summary

9.7.1 Give

Multiple Sessions at 2 hours per Session with key decisions-makers

9.7.2 Get

The Team gains an appreciation for what is involved and the complexity and uncertainties of risks and response plans that are needed to reduce strategic, tactical and operational risks during a crisis. The Team understands that time and money can be saved if proactively prepared for risk events.

9.7.3 Process Owner (Accountable)

Gain an appreciation that they need to behave differently in a crisis than day-to-day operations.

- Senior Leadership (Operations VPs)
- Senior Leadership SC Risk Manager/Director/VP
- Supply Manager – Ops or Supply Chain

9.7.4 Process Implementer (Responsible) – Runs the Exercise (Figure 9.5)

- SC Manager with a 3rd Independent Party with Strong Facilitator Skills such



Figure 9.5: Role of the BC Professional in SC Risk Management

as a Change Management Leader or Continuous Improvement Seasoned Facilitator or Delphi Instructor

- and/Or Leverage outside BCP consulting to support.
- Corporate Communications Leader

9.7.5 Process Evaluator (Recipient of the Output of the Process)

Recommended stakeholders to attend aligned to BCP scenarios and associated roles

- SC/Logistics GM/Director
- SCR&R Director/Mgr
- Strategy Dir
- IT Assigned PM
- Procurement GM
- Finance GM
- Sales/Mktg VP
- OPEX Director
- Engineering Director
- Ops GM/Director
- Legal
- HR

Appendix A9: Develop Scenario Planning & Build Response Plans

10. Develop Key Risk Indicators (KRIs) for pilot and/or Illumination



SCRMC KRI Development Framework

- Balance Scorecard Framework
- Key Risk Indicators (KRIs)
- Risk Areas within SC
 - Supply
 - Demand
 - Processes
 - Environment
- 3 Levels: Strategic, Tactical, Operational

VOC ROI Roadmap

- User Interface KRI Trigger and Action plan
- User Dashboard
- Risk Decision Tolerancing
- Learning System through AI/ML
- RT Informed Decision-making

It provides a balanced set of measures in four perspectives

- Financial perspective
- Customer perspective
- Internal business process perspective
- Growth & learning perspective

Figure 10-1: SCR&R KRI Hierarchy Framework Overview



Figure 10-2: KRI Integrated Balanced Scorecard

KEY MEASURES OF SUCCESS (METRICS):

Quality, Time, Cost & Capacity perspectives to “Tell the Story”

 STRATEGIC	 TACTICAL/OPERATIONAL: Key Risk Indicators (KRIs)
<ul style="list-style-type: none"> Disruption = Revenue Lost, Customer Loss, Profit Degradation Revenue Growth & Customer Satisfaction can be achieved IF better prepared and more responsive PRODUCTIVITY: \$, % Overtime both will increase 5-10% LOGISTICS Impact of a Major Cat Event WORKING CAPITAL : Current Assets & Liabilities CASH CONVERSION CYCLE Revenue Growth due to SCR&R 	<ul style="list-style-type: none"> Value-at-Risk Risk Priority Number Altman Z Score Time-to-Recovery Time-to-Impact Risk Mitigation %, over time # of Risk Responses Cost of the Risk Program \$ Risk Avoidance

Figure 10-3: KRI Integrated Balanced Scorecard

10.1. KRI Hierarchy Framework Overview Description (Figure 10-1)

A Key Risk Indicator (KRI) is defined by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) “as a metric used by organizations to provide an early signal of increasing risk exposures in various areas of the enterprise.” Critical in this definition is the concept of KRIs providing “early warning” to a potential future risk event or exposure.

KRIs differ from a Key Performance Indicators (KPIs) in that KPIs are generally designed to measure performance against an established goal, target, or objective while KRIs are generally designed to measure or indication of a potential future negative or adverse impact or consequence to the organization. Well-designed KRIs should help provide early warning of a potential event or threat to the organization. The distinctions between KPI’s and KRI’s are below:

- Key Performance Indicators (KPIs): Monitor changes in business performance in relation to specific business objectives / strategy (e.g. revenue, business volume). Measures how well something is being done or performed.
- Key Risk Indicators (KRIs): Related to specific risk and demonstrates a change in the likelihood (frequency) or impact (consequences) of the risk event

10.2. KRI Hierarchy Framework Dimension

10.2.1 Balanced Scorecard Description

The SCRM Consortium plans to take a Balanced Scorecard approach to become the VOC for manufacturers during the MxD SCRA2 project to accelerate the pilot manufacturers’ and their customers’ capability to gain compelling ROI’s from the new SCR&R technology-driven, real-time solution.

The Balanced Scorecard approach will allow the SCRM Consortium to align Supply Chain Risk & Resiliency Key Risk Indicators (KRIs), best practices, and ROI’s across four major stakeholders, including Finance, Operations, Workforce and Customers. Focusing on these four perspectives with a new and dynamic set of SCR&R tools, techniques, methodologies and solutions, will, in our minds, produce a compelling set of bottom-line value propositions across the entire enterprises of each of the five pilot manufacturers.

The Balanced Scorecard, was originally defined by Dr. Robert Kaplan of Harvard University and Dr. David Norton (The Balanced Scorecard: Translating Strategy into Action, January 1992). According to their established Balanced Scorecard Institute (Founded in 1997): <https://balancedscorecard.org/bsc-basics-overview>, the name “balanced scorecard” comes from the idea of looking at strategic measures in addition to traditional financial measures to get a more “balanced” view of performance.

The balanced scorecard concept has evolved beyond the simple use of perspectives and is now a holistic system for managing strategy. A key benefit of using a disciplined framework is that it gives organizations a way to “connect the dots” between the various components of strategic planning and management. Therefore, there will be a visible connection between the projects and programs that people are working on, the measurements being used to track success (KPIs), the strategic objectives the organization is trying to accomplish, and the mission, vision, and strategy of the organization.

The Balanced Scorecard has the following dimensions:

- 1. Financial (or Stewardship):** views an organization’s financial performance and the use of financial resources (Financial, Volume, Productivity)

GOALS	MEASURES
Survive	Cash Flow
Succeed	Quarterly sales growth and operating income by division
Prosper	Increased Market share and ROE

- 2. Customer/Stakeholder:** views organizational performance from the perspective of the customer or key stakeholders the organization is designed to serve. Critical Customer Requirements (CCRs) – [VOC Section 5](#)

GOALS	MEASURES
New Products	Percent of Sales from New Sales Percent of Sales from Proprietary Products
Responsive Supply	On-time Delivery (Defined by Customer)
Preferred Supplier	Share of Key Accounts' Purchases Ranking by Key Accounts
Customer Partnership	Number of Cooperative Engineering Efforts

3. Internal Process: views the quality and efficiency of an organization's performance related to the product, services, or other key business processes (End-to-End Value Steams).

GOALS	MEASURES
Technology Capability	Manufacturing Geometry Vs. Competition
Manufacturing Excellence	Cycle Time Unit Cost Yield
Design Productivity	Silicon Efficiency Engineering Efficiency
New Product Introduction	Actual Introduction Schedule Vs. Plan

4. Organizational Capacity (or Learning & Growth): views human capital, infrastructure, technology, culture, and other capacities that are key to breakthrough performance. Talent Management - Employee and Learning

GOALS	MEASURES
Technology Leadership	Time to Develop Next Generation
Manufacturing Learning	Process Time to Maturity
Product Focus	Percent of Products that Equals 80% of Sales
Time to Market	New Product Introduction vs. Competition

10.2.2 Cascaded Balanced Scorecard

The Balanced Scorecard metrics should be cascaded through the organization (Figure 10-4). Cascading a balanced scorecard means to translate the corporate-wide scorecard (referred to as Tier 1) down to first business units, support units or departments (Tier 2) and then teams or individuals (Tier 3).

Cascading strategy focuses the entire organization on strategy and creating line-of-sight

between the work people do and high-level desired results. As the management system is cascaded down through the organization, objectives become more operational and tactical, as do the performance measures. Accountability follows the goals and actions, as ownership is defined at each level. This alignment step is critical to becoming a strategy-focused organization (Reference The Balanced Scorecard Institute: <https://balanced-scorecard.org/bsc-basics-overview/>).

First, the Organization's Vision and Mission need to align with the overall company's Vision and Mission. Then every year, goals are developed to drive the organization's imperatives aligned to the Balanced Scorecard's four dimensions. The most commonly accepted approach is to follow the Hoshin Kanri ("compass management") strategic planning system originated from post-war Japan.

The Balanced Scorecard helps translate the strategy of the enterprise into day to day tangible measures.



Figure 10-4: The Balanced Scorecard Flow Down

Deploying the Balanced Scorecard requires skilled resources by a 3rd impartial party to build the cascade. Although the cascade appears to indicate that it is a linear process, it is actually more of a circular process involving catch-ball. The process also should ensure that the SCR&R deployment is small enough to drive visible success (Figure 10-5). Since many disciplines are involved, and the development of the KRI Hierarchy is complex, it is essential to scope to a manageable level. Skilled coaches should be consulted to ensure that the scope is manageable and will lead to meaningful results that feeds the expansion of your E2E Supply Chain.

Our experience designing and implementing Balanced Scorecards in enterprises has taught us the common pitfalls

COMMON PITFALLS & TRAPS	CHARACTERISTICS OF SUCCESSFUL IMPLEMENTATION
Perfection	Progress
Measurement	Management
Many measures	Few measures
Tactical/operational and bottomup	Strategic and top down
Independent CSFs/objectives	CSFs/objectives part of a cause & effect chain
Measures that reflect past performance	Good blend of leading and lagging measures
Unbalanced (eg.information about the customer)	Balanced (eg. Information from the customer)
Middle management task-force	Owned and driven by the senior management team
Set of metrics	A balanced scorecard
Lengthy to cascade	Exploiting the '90 day window'
Measures that 'can' be measured	Measures that 'should' be measured
Focus on tool selection	Focus on business issues and information requirements
Objectives and measures in silos	Objectives and measures spanning process interfaces
Data dumps	Traffic lights and exception reporting

Figure 10-5: Common Challenges Vs. Successes in Deploying SCR&R Balanced Scorecards

**Outcome:
Understand Risks that have Occurred & Could Occur and WHY they Occur with Your Selected Pilot Supply Chain**



Figure 10-6: The Four Spheres of Risk

10.2.3 Sources of Supply Chain Risk (The Four Spheres)

One way to think about supply chain risk is to consider the origins or sources of risk. Figure 10-6 presents The Four Spheres Model of Supply Chain Risk. These categories are not entirely independent of each other. A risk that occurs in one area can easily spill over and cause risks or unwanted consequences in other areas.

Supply Side:

These are risks that originate with your supplier base. They emanate from companies you rely on for goods and services and historically have minimal direct control over the supplier and the risks.

Demand Side:

These are risks that originate with your customers and their customers. A customer could go bankrupt; have a production facility destroyed by fire; forecast demand incorrectly, causing a cancellation of orders; or switch to a different supplier. The frequency and magnitude of these risk events are similar in nature to the supply side.

Processes:

This includes supply chain and operations processes that occur internally. These are areas that an organization controls, and includes people, processes, procedures, systems, measures, and programs.

External Environment:

These are risks that are external to an organization. While an organization does not control these risks, they certainly can be affected by them. Environmental landscape risks include events such as natural disasters, macro-economic changes, port strikes, logistical, and geo-political risks.

10.2.4 KRI Definitions (Figure 10-2)

Strategic KRIs:

Strategic Risk Indicators can be quantitative and qualitative and are typically considered external, or outside the company's control. At times, "qualitative signals" in the marketplace become available that suggest a deeper investigation is in order.

The following presents a checklist that might provide hints that a supplier or customer is struggling from a financial perspective:

1. A supplier or customer is overly dependent on (1) sales to a single industry, (2) sales to customers in depressed or declining industries, (3) or sales to other customers who are financially distressed
2. A supplier cannot meet agreed-upon lead times because of problems placing a purchase order for materials to its suppliers
3. A supplier is shipping early due to a lack of business
4. A key executive at a supplier becomes ill
5. A supplier or customer hints at or announces facility shutdowns, closings, and/or layoffs
6. A supplier has reduced its investment in R&D, IT, equipment, or resources
7. Unusual turnover occurs at the executive level
8. A supplier or customer's payables period is lengthening

9. A supplier's quality is deteriorating
10. Additional discounts are offered by suppliers for early payment or payments are required in advance
11. A supplier or customer is restating negatively financial reports and projections
12. A supplier has absorbed upfront research and development and tooling costs on
13. New products that are delayed in getting to the marketplace
14. An unusual amount of company stock is being sold by executives
15. A supplier or customer becomes the subject of an investigation due to accounting irregularities
16. Rumors of problems begin to emerge "on the street" or in Social Media
17. Loss of substantial customer contracts

The following Tactical and Operational KRIs are used to develop a proactive indication of potential issues. If these are tracked over time regularly, these KRIs can become leading indicators to support your organization from SC Risk Events.

This concept is now being applied to supply chain risk scenarios.

The exercise starts with department heads assembled in a virtual meeting/conference room with a professional facilitator to assess risk scenarios that have occurred or could happen. The facilitator coaches the team through each scenario, one at a time. The participants discuss each scenario in terms of (1) monetary risk exposure, (2) time to recover (TtR), and (3) probability of occurrence. When complete, the participants rank the VaR calculations, which are in dollars, in terms of descending order and develop risk plans accordingly.

Note: if monetary exposure is not a priority, adjustments to the VaR calculation can be made to accommodate to the organization's needs.

Tactical/Operational KRIs

Value-at-Risk (VaR):

VaR represents the most significant loss likely to be suffered on a portfolio position over a holding period with a given probability (confidence level). VaR is a measure of market risk and includes three components:

- a time period,
- a confidence level or percentage,
- loss amount or percentage attached to a risk.

This concept is now being applied to supply chain scenarios.

Risk Priority Number (RPN):

quantitative models that consider multiple factors to arrive at a single risk indicator score

- Severity (1 low-10 high)
- Probability of Occurrence (1 low-10 high)
- Likelihood of Early Detection (1 high-10 low)
- Risk Index Score (Sev x Occ x Det)

Note: It is critical to have the team develop the definitions for the 1-10 rating scales

Altman Z-Score:

The Z-Score combines a series of weighted ratios for public and private firms to predict the likelihood of financial insolvency. Over time the Z-Score has demonstrated almost 90 percent accuracy in predicting bankruptcy one year in advance and 75 percent accuracy in predicting bankruptcy over two years.

Time-to-Recovery:

measures how long it takes an entity in a supply chain to reach full volume or full operating status after a major disruption. This does not have to mean full recovery at a specific facility.

Time-to-Impact:

Measures the time it will take a risk event to impact an organization, once detected. This measure usually is associated with natural disasters, such as hurricanes, wildfires and other weather-related disruptions, and is also utilized in computer systems.

Risk Mitigation %, over time:

Percentage of risk management/mitigation initiatives executed successfully in the past 12 months

of Risk Responses:

Simply a dashboard depicting the number of risks identified, assessed and mitigated over 12 months.

Cost of the Risk Program:

Costs associated with managing a company risk program. Typically includes, personnel, tools, techniques and insurance premiums.

\$ Risk Avoidance:

The codified dollar amount of risks that were identified, assessed and mitigated or eliminated before they occurred.

Risk Probability of Occurrence:

In risk management, it's a weighted factor based on a subjective analysis of the probability that a given threat or risk is capable of exploiting a given vulnerability or a set of vulnerabilities, thus negatively impacting an organization.

Key Benefits of KRIs

1. Enable timely monitoring of potential future risk exposures
2. Help provide the organization with an increased understanding of risks and controls
3. Provide the ability to track trends in KRI performance over time
4. Provide understandable and measurable early warning signals
5. It helps add objectivity to the risk management process
6. Enables reporting by exception to help facilitate timely and effective remediation

10.3. WHY do this?

1. Provides connectivity and visibility from top to bottom

2. Align metrics to employees actions.
3. Embed Risk-based metrics in to daily workflow and decision-making processes
4. Aligning the KRIs to the balanced scorecard (Financial, Process, People, Customer, Supplier) at Strategic, Tactical and Operational Levels
5. Acts as accelerator to the overall cadence of the organization.

10.4. Estimated Time Duration

Generally, setting up an actionable KRI Hierarchy takes the cross-functional team a minimum of one quarter to set up the structure and reporting. Building trustworthy automated KRIs is the key to establishing the first pass framework with a substantiated baseline of KRIs. These KRIs should also be affiliated with SC and Operational KPIs aligned to the Balanced Scorecard to integrate them into daily operations. Since this is a journey, it generally takes a couple of years to accelerate the overall cadence of the organization.

10.5. Completion Milestones

- I. Stakeholder alignment
- II. Identifying KRIs at Strategic, Tactical and Operational Levels aligned to the balanced scorecard (Tree Hierarchy)
- III. Prioritization of KRIs and create Mach-up dashboard
- IV. Baseline the KRIs and create new data collection systems with governance
- V. Confirm that KRIs are Leading and Actionable
- VI. System integration to build dashboard
- VII. Validate KRI cascade scorecard (tree hierarchy) with Specification Limits
- VIII. Align Value-based metrics to performance gaps
- IX. Reconfirm Strategic, Tactical and Operational KRIs
- X. Align KRIs to operational meetings for stakeholders Strategic, Tactical and Operational KRI Dashboard
- XI. Embed into daily operations driving action planning following to Identify, Assess, Mitigate and Manage risks..

10.6. Future State

1. KRI Baselines are well established on an active dashboard where all stakeholders have access covering strategic, tactical and operational levels
2. KRI Targets are proactively managed aligned to SCR&R Strategic Planning
3. KRIs are changing aligned to the business needs
4. KRIs are automated with data governance
5. Adding or adjusting KRIs has a standard procedure
6. KRIs are embedded in personnel development (ownership, accountability)
7. KRIs are not managed centrally but are part of normal business operations

10.7. Challenges & Hints

The Challenges and aligned Hints are summarized in Table 10.1.

CHALLENGES	HINTS
Management paradoxes around risk are not understood.	Education and Commitment to the journey
Lack of Policy on how to react to KRI value	Map your E2E operational processes from tactical to operation levels; Inject/Embed the Risk processes to establish SCR&R SOPs
The system to capture KRIs are insufficient	Manually track KRIs to establish data collection methods (e.g., Excel and data collection sheets). Integrate data collection with current IT systems. Purchase IT System capable of collecting the data and integrate through a flexible BI dashboard (e.g., Power BI and Excel – Central Repository – e.g., Sharepoint).
KRIs are not integrated into the existing SCR&R Framework	Establish KRI Framework at Strategic, Tactical and Operational Levels aligned to the Balanced Scorecards and then align KRIs.
KRIs Reporting Systems are weak and do not provide easy drill-down to area of concern	Build a tree drill-down structure of the KRIs linked to actionable decision-making.
Relationship between an KRI and a Risk Event is Uncertain	Proactively map out scenarios (e.g., FMEA) to address latency and assess the relative impact of when the risk event occurs and when the action is taken. Generally, the latency in inaction has an exponential impact.
KRI Modeling is not Robust	Proactively track the data that will provide the ability to create predictable Risk models via a KRI Hierarchy Tree structure. Continually confirm regression models for validity.
Expectation of Residual Risk after Remedial Action plan is uncertain	Follow through on ensuring that the remediation plan actually performs to the original expectations. Develop a plan to continually monitor the residual value of risk relative to your current risk appetite.
KRI Systems are rarely back tested for viability and veracity	Periodically audit the process by modeling past and/or potential scenarios to validate that the action plan are robust.
There are no leading indicators that are actionable	Develop KRIs at the tactical and operational level. Adjust current KRIs to track the difference between planned and actual. Move from percentage based metrics to actuals.
Risk Appetite for accepting or rejecting indicators is missing (Efficacy) <i>Over time, does the KRI continually provide the insight that was originally conceived?</i>	Continually evaluate the KRIs to ensure that they are providing insight. If not, reprioritize your KRIs that you are focused on and/or adjust the targets accordingly.

Table 10.1: Challenges and Hints to Support the Development of KRIs

10.8. Link to PPDT Discussion

PPDT Framework Section 2 describes the PPDT | STO Framework. It was through the melding of the concepts of PPDT, STO and KRI Hierarchy that the KRI Hierarchy was developed. The power of leveraging this framework is one of the keys to standing up a successful SCR&R program. Aligning the cross-functional stakeholders to each perspective and enabling technology enabled automated visibility – predictability – resiliency – sustainability through decision-making as a foundation will support the indoctrination of the program to identify, assess, mitigate and manage risks for sustained company performance – outpacing your competition.



11. Supply Chain Risk & Resiliency Best Practices



11.1. Description

The Supply Chain Risk & Resiliency (SCR&R) BEST PRACTICES section presents an array of tools, techniques, approaches, and methodologies supporting supply chain risk and resilience efforts. When implemented and utilized correctly, they represent a set of best practices.

The Best Practices were described in detail within MxD SCRA2 1.1 Benchmark Report. The following matrix layout aligns these best practices to the KRI Hierarchy and People, Process, Data and Technology Framework.

Benchmarking clients over the past 10+ years, we have verified that the quickest way to deploy SCR&R within an organization is to follow the PPDT process in order. Therefore, always start with People (Leadership, Organization) followed by Process review and SCR&R development, collecting and build data collection systems so that the automated Technology to identify, assess, mitigate, and manage risks will be incorporated within the fabric of your organization.

11.2. WHY do this?

Leveraging SCR&R best practices ensures a successful launch and journey. The challenge of deploying practices is deciding which best practice should be performed in what order. Aligning the best practices to PPDT and Strategic Tactical Operational (STO) provides a framework for deploying.

11.3. Estimated Time to Completion

Indoctrinating SCR&R into your company is similar to the indoctrination of Enterprise Financial Controls. This is a journey and it is about integrating SCR&R Best Practices within your organization’s culture.

11.4. Completion Milestones

Initially, the SCR&R leadership reports to the C-Suite and is deployed across the organization aligned to Product Lines. Eventually, the SCR&R will be decentralized as each organization indoctrinates SCR&R within its core competencies.

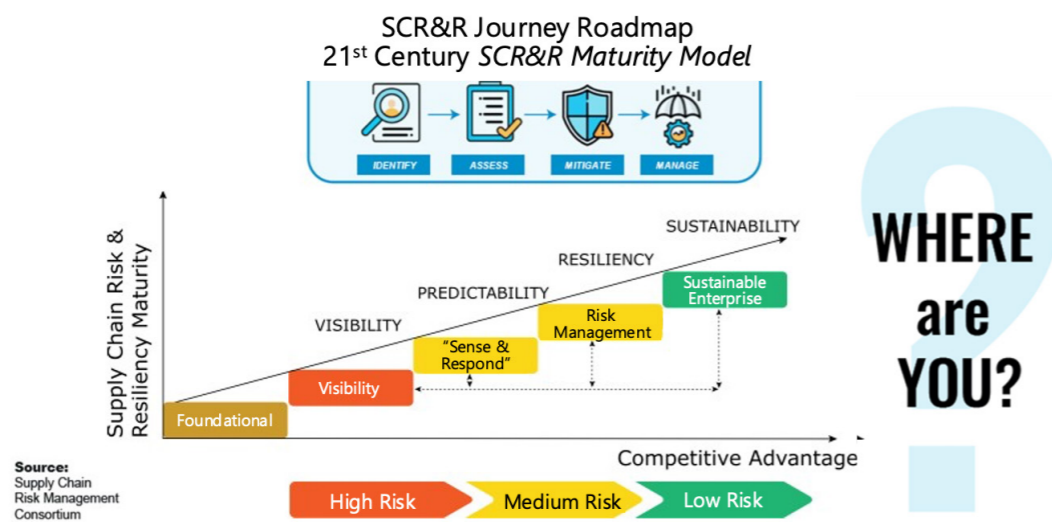


Figure 11.1: 21st Century Supply Chain Risk and Resiliency Maturity Model

11.5. Future State

The 21st Century Supply Chain Risk and Resiliency Maturity Model is an evolutionary journey toward best-in-class risk management. Recognition that VISIBILITY is required to make informed decisions is the key turning point to move from **Foundational** to **Visibility**.

Visibility relates to knowing, preferably in real-time, pertinent information such as the location of materials and assets. Some refer to this as transparency. Many companies begin their risk journey using emerging tools such as 3rd party supplier assessment tools and web-based heat maps that evaluate risk across the entire supply chain. Supply Chain leaders are also mapping their supply chains to manage disruptions and risk events faster than competitors. An ability to respond more quickly than competitors to unexpected risk events will become a critical success factor defining excellence. This cannot happen without supply chain visibility.

Foundational: This stage involves companies with little or no awareness of risk management or formal education relative to the tools, techniques, methodologies, best practices and solutions that are available today. WHY Foundational? You have to start somewhere!

Visibility: Visibility and awareness of risk across the supply chain is an important first step in risk management. This also relates to knowing, preferably in real-time, the location of materials and assets, such as inventory. This provides transparency across the supply chain, meaning upstream to your suppliers and downstream to your customers. Becoming aware and responding more quickly than your competitors to unexpected risk events is a critical success factor defining global excellence.

WHY visibility 1st? “What you don’t know about your supply chain CAN & WILL hurt you!”

Predictability: As companies progress in their journey, they leverage their visibility capabilities to test their supply chains in terms of “what-if scenario planning.” These exercises, utilizing network optimization and probabilistic modeling and mapping tools, provide a view into how supply chains might react to risk events, including demand and supply disruptions.

This insight helps companies create risk response plans. For Exemplar SCR&R companies, this has led to the development of supply chain risk war rooms. These rooms, supported by sophisticated tools and techniques, allow a company to be more proactive by identifying risks through alerts, assessing them using digital Twin models of their supply chains, mitigating them through new risk methodologies, managing risks, and even turning risk into an opportunity.

WHY Predictability? Exemplar companies want to understand how their supply chains will react to risk stimuli before it occurs!

Resiliency: Here, risk management leaders embed new risk tools, techniques, methodologies, and key risk indicators such as Time-to-Recovery, Value-at-Risk, and Resiliency Indexes, into their daily supply chain decision-making processes.

WHY Resiliency? These frameworks, protocols, metrics, and organizational structures provide a foundation for operational excellence in risk management and a resilient enterprise.

Sustainability: Companies in this stage build upon their organizational infrastructures through corporate frameworks such as Enterprise Risk Management (ERM), Governance, Risk, and Compliance (GRC), and ISO Risk Standards. Companies in this stage are creating a risk-adjusted culture that includes risk considerations during decision-making. In this stage, leaders continually assess their risk profile, regularly evaluate their risk appetite, and leverage their risk knowledge database to update their supply chain risk management portfolio.

WHY Sustainability? The supply chain risk management journey is one of the small steps. Supply chain leaders operating in this maturity model stage understand that each stage in the journey corresponds to several years and continuous effort.

11.6. Challenges & Hints

Acquiring the cross-functional personnel (e.g., SC/Logistics, GM/Director, Ops GM/Director, Procurement GM, IT Assigned PM, Finance GM, Sales/Mktg VP, OPEX Director) could be problematic. Time to completion could draw out and result in personnel attrition.

HINT—IF you have a solid SCR&R Lead and a strong Executive sponsor, you have a good chance of maintaining momentum.

Another challenge will be developing the value proposition to subscribe to a risk alert solution. We have touched on a couple of benefits within this report. Many more ROI's reside in our online courses and book.

Finally, the funding for a Proof-of-Concept Trial is required. The good news is that most of these solutions are cloud-based and subscription, meaning you pay-as-you-go. Lastly, embedding the output of the alert system into a continuous SCR&R protocol to identify, assess, mitigate and manage risks.

11.7. Practical Day-in-the-Life

Provide the expected role(s)/position(s) and their corresponding activities to support/execute the Best Practice capability.

'Give and Get' Summary

11.7.1 Give

Personnel Resources Time for Cross-Functional Stakeholders at all levels, starting with the top and Respected SMEs to understand the SCR&R best practices through education.

11.7.2 Get

Qualitative Risk Priority Number (RPN) Assessment of your top SC Risks for the scoped Product-Line (Outside-in Perspective) leveraging frequency of Occurrence of captured risks, if available. Risk Impact and detectability is estimated from an agreed upon scales. Additionally, the outcome of Value-at-Risk (VaR) calculation is money at risk (\$) for all of the identified risks.

11.7.3 Process Owner (Accountable)

- C-Suite Alignment
- SC Risk Manager/Director/VP
- Supply Manager – Ops or Supply Chain

11.7.4 Process Implementer (Responsible)

- SC Risk Manager/Director/VP
- and/or 3rd Party resources to provide the examples that apply to the current business environment and culture.

11.7.5 Process Evaluators (Recipients of the Output of the Process)

Recommended stakeholders to participate:

- SC/Logistics GM/Director
- SCR&R Director/Mgr
- Strategy Dir
- IT Assigned PM
- Procurement GM
- Finance GM
- Sales/Mktg VP
- OPEX Director
- Legal
- Engineering Director
- Ops GM/Director
- HR

11.8. Best Practice PPDT | STO Matrix Description

The following PPDT | STO matrix has four columns and reviews 38 Best Practices that are provided within the SCR&R Benchmark Report (published June 2021).

1. Best Practice Title Description
2. PPDT: Alignment of one or more PPDT dimensions of People, Process, Data and Technology
3. STO: Level in the organization who owns the execution of the best practice:
 - a. (S) Strategic: Senior Leadership (C-Suite and VPs)
 - b. (T) Tactical: Mid-Level Leadership (GMs, PMs)
 - c. (O) Operational: Front-Line Personnel
4. Why is this Important?

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
Application of Big Data and Predictive Analytics	Data	Tactical	Trustworthy Data is at the core of SCRA2 systems
Artificial Intelligence Systems	Technology	Operational	To develop AI applications that can support sophisticated decision making that meets your ROI criteria for sustainable solutions.
Assess Risk Management and Resilience Capabilities and Maturity	Process	Strategic	To clearly understand WHERE you are on your journey and WHERE the organization is seeking to move aligned to proven journey so that minimize rework in the development of new capabilities.
Blockchain Technology to Support Risk Management	Technology	Operational	To create an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually anything of value.

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
Buffer Stock to Mitigate Supply Chain Disruptions or Variability	Process	Tactical	Proactively managing buffer stock (safety stock) maintains the stock level necessary to mitigate risk due to uncertainties or events affecting either the demand or supply side of the supply chain
Business Continuity and Recovery Planning	People, Process	Strategic, Tactical	BCP ensure continuity of business operations in the event of a serious incident. Adopting BCP begins the journey that ensures continuous operations of critical processes and expands to include critical suppliers as the program matures.
Calculating Environmental Impact	Process, Data	Tactical	Calculating Environmental Impact decreases the likelihood of various negative outcomes including: government-imposed penalties and fines, civil penalties, increased public pressure and scrutiny, and reputational and brand risk.
Central Risk Command and Control Centers	Technology	Tactical	Executive led Centralized & Regionally Command Centers provide visibility and enables communication across widely dispersed supply chains with economic uncertainty combine to make risk more rather than less critical so that near real-time visibility searches and captures around the world so that decision-making can enhance response time to risk events.
Cluster Analysis	Process, Data	Operational	Prevent the overdependence of current assets, suppliers and/or customers that are physically (e.g., single port, country) or commercially linked together through a cluster analysis by identifying and developing risk de-clustering SC risk management strategies.
Collaborative Planning Forecasting & Replenishment (CPFR)	People, Process, Data, Technology	Tactical	CPFR seeks the cooperative management of inventory through joint visibility and replenishment of products throughout the supply chain. The primary objective of CPFR is to make consumer demand information available across the supply chain. This supports effective planning due to the availability of a common demand signal coming from the customer to

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
			support products being ordered arrive on time in FULL to the customer's expectations.
Commercially Available Products for Identifying, Assessing, and Scoring Risk	Technology	Tactical	With the speed and complexity of new technology, it more worthwhile to allow companies that have the SaaS or 3rd Party expertise to support your internal efforts. The ability to integrate technology has evolved significantly with the past 3-5 years is expected to accelerate in the next five years.
Complexity Reduction	People, Process	Strategic	Unhealthy complexity does not have to be the norm across a supply chain. Various creative ways exist to excessive battle complexity, including simplified product designs; standardized and reused components; supply chain rationalization; standardized and redesigned processes; use of information technology; streamlined legal review processes; empowered employees; modified organizational designs development of simple decision rules. Some companies survey suppliers, customers, and employees to identify and then act upon areas where they experience unhealthy complexity.
Digital Twins	Technology	Tactical, Operational	Real-time digital twins (DTs) provide the capability to analyze end-to-end supply chains leveraging computer models using predictive, prescriptive analytics and cognitive analysis (learning systems). DTs integrate the ERP, Internet of Things, artificial intelligence, machine learning, and software analytics with spatial network graphs to create living digital simulation models that update and change as their physical aspects change providing the ability to develop, test, augment and integrate risk management technique into event-based decision-making.
Early Involvement of Customers and Suppliers	People	Strategic, Tactical	To provide support during strategic planning, demand and supply planning, continuous improvement projects, project planning, and new product and technology development.

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
Flexible Supply Chains	Process, Data	Strategic, Tactical	Flexible Supply Chains increases recovery time and resiliency by allowing a company to respond effectively to risk events. As a company masters supply chain flexibility, it can more confidently engage in thoughtful risk-taking rather than facing an irrational fear of risk. It is not unreasonable to conclude that a company's flexibility capabilities can become a source of competitive advantage when managing supply chain risk.
Geographic Avoidance	Process, Data	Strategic	As supply chains become increasingly global, the likelihood that supply chain professionals will encounter unethical demands or corruption by public officials increases. Knowledge of a country's corruption index is one more piece of information that supports the identification of geographic risk.
Lean Six Sigma Methodologies and Tools	Process, Data	Tactical, Operational	The mastery of Lean and Six Sigma has direct risk and resiliency implications, although the supply chain trade-offs that sometimes result can affect risk management negatively. LSS methodologies provide many of the tools to identify, assess, mitigate and manage risk both quantitatively and qualitatively. Furthermore, there are many tools to manage constraints and tradeoffs. The basic statistics learned are instrumental in establishing risk probability ratings.
Multiple Supply Sources	People, Process	Strategic, Tactical	To assess the cost/benefit tradeoffs of having multiple suppliers with another source of supply so that there is faster recovery from a disruption or another risk event. Speed to recovery versus your competitors will not only satisfy your customers but can lead you gaining market share from your competitors.
Pre-Established Risk Response Teams	People, Process	Tactical	Risk event will occur, no matter what we do to make our processes robust. Therefore, no matter what we do, risk events will occur. It is only a matter of how severe these events will be. During a crisis, every second matter,

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
			making pre-established risk management crisis teams something that should be on every organization's agenda.
Probabilistic Modeling and Stress Testing	PPDT	Tactical, Operational	As companies progress in their SCR&R journey, many exemplars leverage their visibility capabilities to test their supply chains in terms of 'what-if scenario planning'. Using network analysis, probabilistic modelling and mapping tools, provides a view into how their supply chains might react to risk events, including demand and supply disruptions. This insight helps companies create risk response plans.
Process and Value Stream Mapping	People, Process	Tactical, Operational	Key supply chain processes include customer order fulfilment, supplier evaluation and selection, new product development, and demand estimation. Supply chains contain many different, but often interrelated processes that affect how well an enterprise operates. Often these processes are plagued by different kinds of risks. At a minimum, processes should be evaluated to identify continuous improvement opportunities. Process and value stream maps help address potential risks and support pursuing continuous improvement opportunities.
Registers for Submitting Risks for Formal Review	PPDT	Tactical, Operational	A risk register is a formal tool for documenting risks along with actions to manage each risk. It is widely used as a way to manage risks in project management and is defined by PMI (2017) as a document that contains all the results of risk analysis and where risk response plans are recorded. As risks are identified they are logged into a register and actions are taken to respond to the risk. Many exemplar companies use risk registers as a record of the significant risks faced by an organisation, the controls currently in place, additional controls that are required and accountability for mitigation activities.

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
Risk Assessment during New Product Development	People, Process	Strategic, Tactical	In many new product development projects, particularly at higher technology companies, engineering teams work as fast as possible to develop new products or technologies. Only at a later point do supply chain professionals become involved and suppliers are selected to support a design. Unfortunately, this approach limits a company's ability to consider the impact of supply chain risk or early supplier involvement. Integrating the product development team and supply chain, early, will produce an estimate of the probability of each risk and its impact on product launch. Priority is then given to evaluating the higher risks to determine what action can be taken to reduce their probability and impact, thereby turning something that is a higher risk into a lower risk prior to launch. Just like with the development of commodity or category strategies, supply chain risk management must become an embedded part of the product development process.
Risk Identification during Sourcing Strategy Development	People, Process, Data	Strategic, Tactical	A supplier audit or assessment is an objective examination and evaluation by a customer of a supplier's performance and practices to ensure they are in conformance with various requirements, including those relating to ethics, laws, and standards. Supplier audits have traditionally assessed supplier performance in areas such as cost, quality, and delivery. While these are certainly worthwhile, audits and assessments are increasingly considering a supplier's commitment to standards related to ethics, labour practices, health and safety, and the environment. In particular, the treatment of employees, particularly for suppliers outside of Europe and North America, is receiving careful scrutiny from customers. These audits and assessments are performed to ensure members of the supply chain adhere to sound business practices.

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?												
Risk Leadership	People	Strategic	<p>Governance describes the overall management approach through which senior executives direct and control the entire organisation, using a combination of management information and hierarchical management control structures. Governance activities ensure that critical information reaching the executive team is sufficiently complete, accurate, and timely. It also supports decision making and provides the control mechanism to ensure that strategies, directives, and instructions from management are carried out systematically and effectively. Governance includes the frameworks and tools, policies, procedures, controls and decision-making hierarchy employed to manage the business. Governance is also important for ensuring a coherent and consistent reward structure across the organisation to drive behavior.</p> <p>Executives are increasingly viewing effective compliance and risk management as opportunities for corporate growth, keeping in mind that customers and partners should prefer doing business with companies that present fewer risks and liabilities. Furthermore, by having an effective risk management structure in place, a company can essentially be more confident in addressing new market opportunities.</p>												
Risk Performance Metrics	Process, Data	Tactical, Operational	<table border="1"> <thead> <tr> <th>GRC Metric</th> <th>GRC Measurable Values</th> </tr> </thead> <tbody> <tr> <td>Year-over-year change in risk value</td> <td>Percentage change in risk value in the past 2 years (risk value is defined as monetary equivalent of the liability)</td> </tr> <tr> <td>Year-over-year change in compliance-related cost</td> <td>Percentage change in compliance-related cost in the past 2 years (e.g. cost of delayed production, recalls, stop-shipments, fines, penalties incurred from non-compliance)</td> </tr> <tr> <td>New-market revenue</td> <td>New-market revenue, as a result of compliance, as a percentage of total revenue in the past 12 months</td> </tr> <tr> <td>Compliance audit success rate</td> <td>Percentage of compliance audits that yielded positive results in the past 12 months</td> </tr> <tr> <td>Governance effectiveness</td> <td>Percentage of management directives executed successfully in the past 12 months</td> </tr> </tbody> </table>	GRC Metric	GRC Measurable Values	Year-over-year change in risk value	Percentage change in risk value in the past 2 years (risk value is defined as monetary equivalent of the liability)	Year-over-year change in compliance-related cost	Percentage change in compliance-related cost in the past 2 years (e.g. cost of delayed production, recalls, stop-shipments, fines, penalties incurred from non-compliance)	New-market revenue	New-market revenue, as a result of compliance, as a percentage of total revenue in the past 12 months	Compliance audit success rate	Percentage of compliance audits that yielded positive results in the past 12 months	Governance effectiveness	Percentage of management directives executed successfully in the past 12 months
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BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
Risk Priority Numbering (RPN) Indexes	Process	Operational	<p>Risk indexes are quantitative models that consider multiple factors to arrive at a single risk indicator score. Risk Priority Numbering (RPN) examines specific risks from three dimensions: severity of the risk, the probability of the risk occurring, and the probability of early risk detection. The severity or impact of a potential risk event is given a score (on a scale of 1-10), as are the probability of that event occurring, and the company's ability to detect the risk (a higher score means less ability to detect the risk). The three scores are multiplied together to arrive at an overall risk index, with higher scores representing higher risk exposure. Companies that use this approach identify, evaluate, and then rank the possible risks, which are then addressed in terms of priority. The virtue of this approach is its simplicity – it is easy to understand and use.</p>
Risk Severity and Probability Maps, including Heat Risk Maps	Process, Data	Operational	<p>A widely-used tool to prioritise risks is the Risk Severity and Probability matrix. A matrix is constructed as follows:</p> <ul style="list-style-type: none"> Form cross-functional teams of senior individuals who have a thorough understanding of the supply chain risks faced by a company. Teams identify the broad categories of risks that the company chooses to use in its risk topology. Next, participants brainstorm possible risks that could occur. Risks are then categorised according to their relative severity – their negative impact on the business – and their probability of occurrence. Where each risk falls within the matrix will determine the time and effort and the amount of resources that will be spent in developing risk management plans and managing these potential risks. <p>Risk severity and probability matrix</p> <p>This mapping exercise will help to develop appropriate responses based on the probability and severity of the risk event. In addition, it helps to ensure that risks receive differing amounts of management attention according to their relative importance.*</p>

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
Sales & Operations (S&OP) Planning	PPDT	STO	<p>Sales and operations planning (S&OP) – sometimes known as aggregate planning – is a process where internal managers meet and review projections for demand, supply, and the resulting financial impact of a chosen S&OP plan. S&OP is a decision-making process that helps align tactical plans in every business area. The S&OP process leads to a single operating plan that identifies the allocation of company resources, including time, money and employees. S&OP is concerned with matching supply and demand over a medium time frame. The process involves developing monthly, quarterly, or even yearly production requirements for broad product groups or families that will meet the estimates of demand.</p>
Standardized Approaches for Managing Supply Chain Risk	Process	Strategic, Tactical	<p>Mitigating and Managing Risk refers to actions taken either to reduce the likelihood of a risk occurring, or to minimize the impact after occurrence. Steps can be taken to reduce the probability or impact of a risk event that might occur at some future date, or to minimise the impact of a risk event that has occurred. Risk mitigation can occur before and after an event. A more thorough view of mitigation is that it involves a systematic reduction in the extent of exposure to a risk and/or the likelihood of its occurrence. Based on risk assessment and prioritisation, mitigation involves developing an action plan, including the risk description, cause, likelihood, costs, and proposed responses. Mitigation strategies can be modelled and tested using robust, flexible 'what-if' or scenario analysis capabilities. This can also be called risk reduction.</p>
Supplier and Customer Bankruptcy Predictors	Process, Data	Tactical	<p>These tools consist of algorithms that use financial data to score and predict the likelihood that a supplier or customer will enter bankruptcy in the future, typically within the next year or two. The Altman Z-Score is just one example. This methodology takes into account data from Income Statements and Balance Sheets and can predict, with over a 90% accuracy rate, the probability of a company going bankrupt 12-15 months into the future. This type of outside financial health risk identification is critical to solid SCR&R.</p>

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
Supplier Audits	Process, Data	Tactical	A supplier audit, usually conducted on an annual basis, is an objective examination and evaluation by a customer of a supplier's performance and practices to ensure they are in conformance with various requirements, including those relating to ethics, laws, and standards. Supplier audits are different from supplier scorecards. Scorecards (also called report cards) are issued more frequently (usually monthly) and typically focus on supplier performance. Annual audits are increasingly focusing on topics that are beyond the scope of performance scorecards, such as a supplier's adherence to social expectations and requirements, particularly in the area of fair labor practices.
Supplier Satisfaction Measurement	People, Process	Tactical	Supply chain leaders understand that the link between positive relationships with suppliers and reduced supply chain risk is a strengthening rather than weakening one. Companies that fail to develop positive relationships may find their suppliers allocating limited capacity to other firms, sharing their most innovative ideas with other customers, or exiting an industry segment altogether, all of which lead to increased risk. As research clearly shows, becoming a preferred customer (customer of choice) to suppliers offers advantages that are not as readily available to other customers, advantages that could lead to future competitive advantage and reduced risk. A survey also indicates where the customer (i.e. the buying company) faces risk due to poor performance as a customer. Do not discount the connection between becoming a preferred customer to suppliers and reduced supply chain risk exposure. The linkages between supplier satisfaction, preferred customer status, preferential treatment from suppliers, and reduced supply chain risk are clear.
Supply Chain Insurance Coverage	Process, Data	Tactical	Insurance is the main form of risk transfer. When insurance is purchased, a premium is paid to move a risk to the insurance company. In any insurance policy, the first party is the insured individual. The second party is the insurance company. The third party is another individual who is not the policy holder or the insurance company. Supply

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
			chain risk related insurance relates to first- or third-party issues. With supply chains expanding globally, many companies are entering into indemnity and other types of partner agreements to mitigate risk through risk pooling, risk sharing, and disruption insurance. There are now various kinds of supply chain insurance coverages designed specifically to mitigate supply chain risk through risk transfer.
Supply Chain Mapping	Process, Data	Tactical, Operational	One of the major challenges within a supply chain is knowing where goods originate or where they go downstream, especially in multi-tier supply chains – supply chains with multiple buyer-supplier relationships. While most companies know their first-tier suppliers and customers fairly well, visibility of sub-tiers in multi-tier chains is often very much less clear, and these supply chain sub-tiers are proving to be a major source of supply chain risk. A supply chain map is a graphical representation of a multi-tier supply chain. Better maps will also include the downstream portion of the supply chain, meaning customers are also part of the mapping process. Intuitively, supply chain mapping makes sense from a number of perspectives. Actual company maps will include geographic location of entities such as suppliers, distribution centres, production sites, etc.
Total Cost Modeling	PPDT	Tactical	Because soft risks, nature disasters, systems disruptions, etc are usually present to some degree, they increase the overall probability of risk occurrence but in ill-defined or imprecise ways. An analogy here involves total cost models. Some costs are easily identifiable and quantifiable (transportation costs and unit price, for example) while other costs are 'hidden' and difficult to calculate (the cost of communication and time-related problems when dealing with geographically remote suppliers). These hidden costs (which are analogous to soft risks) increase the true total cost, although in ill-defined or imprecise ways.

BEST PRACTICE	PPDT	STO	WHY IS THIS IMPORTANT?
3D Printing Capabilities	Process, Technology	Strategic, Tactical	3D printing combines design software with a physical printer to make three dimensional solid objects. 3D printing can produce complex shapes using less material than traditional manufacturing methods and in lower quantities. 3D printing is probably not what comes to mind when thinking about approaches to managing risk. This technology, however, has the potential to be a game changer. The risk management benefits of 3D printing include: Rapid prototyping, Improved time-to-recovery, Lower inventory costs and Improved product cost competitiveness.
24/7 Supply Chain Risk Alert Systems	PPDT	STO	There are several companies providing alerts about risk events around the globe. These SaaS, Soft-as-a-Service companies make use largely of public data sources and AI and Machine Learning to deliver alerts, 24/7 around the globe to their subscribers. One of the oldest companies is NC4, now called Everbridge. They, like several others, provide real-time 24x7 incident information and analysis, the tools to coordinate complex data streams from multiple sources, and a common secure collaboration platform. Within the supply chain space, these companies view risk visibility to be a key differentiator for creating a resilient supply chain. Everbridge's Risk Center™ along with other providers, streamlines an organisation's ability to monitor and analyze worldwide incidents to improve a company's ability to prepare and respond to local and global risks that threaten the supply chain.

*** Risk Severity and Probability Matrix**

Impact from Occurrence	High	Develop Crisis Management/Continuity Plans		Take High-Level Risk Management Actions	
	3				
	2	Manage Risk Events as Required		Develop Contingency and Back-Up Plans	
	Low	1	2	3	4
		Probability of Occurrence			
		Low			High

Appendix A11: SCR&R Benchmark Report (attached)



12. Change Acceleration Process Best Practices

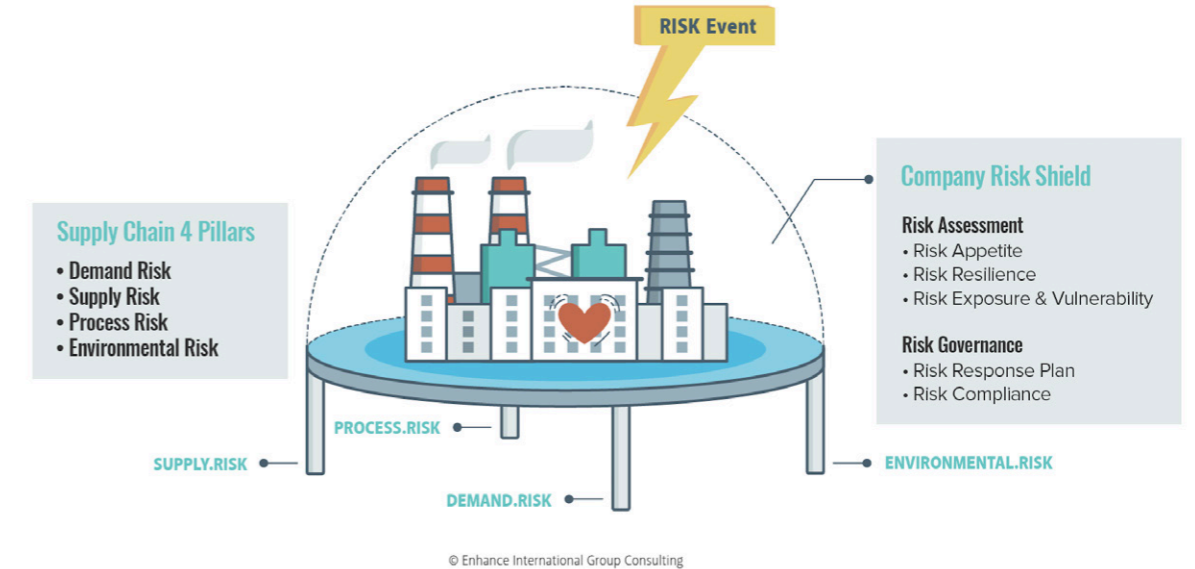


Figure 12.1: SCR&R Culture Transformation: Recognizing that Change Matters

Change Acceleration Process Best Practices to Establish a SCR&R Platform

12.1. Description (Figure 12.1)

Creating change in the organization is often overlooked. The most common reaction to embarking on a Change from the SCR&R perspective is that the organization is concerned about changing the culture of the organization. However, organizations still strive to improve performance but within the bounds of the current culture. This is a challenging paradox: can we make improvements without changing the way that we work?

A way to address this paradox moves the focus from the people to the processes of the work to be done. Most people go to work with the goal of accomplishment. Therefore, we need to be honest with ourselves that we are executing may not be the best way and that we need to develop processes that enable our co-workers.

In terms of indoctrinating risk management into the organization, we must accept that we are embarking on this journey to reduce the SC risks that make our jobs more complex over the long term. Therefore, we are focusing on developing improvements in how we interact and communicate to get the job done when there is a risk event. This can be counterintuitive to getting the job done -quickly. If we conduct these actions (Identity, Assess, Mitigate, Manage) proactively and orderly, we will reduce our propensity to react to changes resulting in sub-optimal results.

“Risk - Are you Comfortable in discussing RISK within Your Company?”

12.2. WHY do this?

It has been demonstrated that initiatives are more effectively completed on time and on budget when Change Acceleration Process practices are leveraged to gain alignment across the organization. By involving stakeholders through the implementation, there is a much higher likelihood that the new initiative can be indoctrinated on a timely manner with the program's benefits (e.g., SCR&R).

People have a natural tendency to avoid "RISK" due to their survival instincts. However, most RISKS occurring in your SC are also occurring in your competitor's, customer's, and supplier's SCs. Therefore, you are not alone in dealing with the RISK, and whoever responds quicker with a better plan will gain a competitive advantage. RISK should be viewed as an opportunity to differentiate yourself from the competition. If achieved, you will slowly take over where your competitor could not deliver to meet the customer's expectations – resulting in increased revenue and margin ("gaining your unfair market share from your competitor").

12.3. Estimated Time to Duration

The process of setting up a change program before launching the initiative publicly is generally 1-4 weeks, depending on the relationship between the stakeholders, culture, leadership and other initiatives. Interviews and Stakeholder analysis should be performed to confirm the direction of the SCR&R initiative. Change Management practices should be incorporated throughout the evolution of the initiative and into the final transition. The common mistake in deploying Change Acceleration Processes is the belief that everyone is aligned. Once you take your focus off of ensuring stakeholder alignment is the time when issues will start rising and sidelining the initiative.

12.4. Completion Milestones

You know you are done when there is an alignment of the Cross-functional SCR&R Governance Team, Operational Stakeholders and SCR&R work-to-be-done has been incorporated into daily work routines. Additionally, when there is not only an overall increased cadence in execution for day-to-day but increased cadence in managing risk events. Everyone knows what they need to do to execute the remediation plan and then transfer it back to standard operating procedures.

12.5. Future State

The blame game is over and employees are truly working together to resolve the highest risk areas proactively without strong governance. Therefore, when governance is transformed from centralized to localized support, the stakeholders are now speaking the same language of SCR&R execution.

12.6. Challenges and Hints

The first challenge is gaining senior leadership support for taking the time for Change and Alignment activities. People not showing up to meetings is often a significant challenge. The next area to address is employee's attitude toward the program. If the naysayers are influencers to the organization and leadership does not reinforce the program due to their execution capabilities (giving them a pass), this will lead to silent involvement sabotage on the program.

Actions to proactively address include stakeholder analysis, rewards, bonuses, recognition and communication. The worst action to take is to not trust/involve the personnel that are going to end up taking action. Alignment of personnel is crucial, and never assume that there is complete alignment to the initiative.

Caution: The local initiative lead cannot effectively be the change leader for the project. The stakeholders and personnel will become confused. When in doubt, no matter the skills of the Initiative Leader, bring in a fresh outside-in view. Also, ensure that the stakeholders are keenly aware of how they are being perceived as supporting or not supporting the initiative. Sometimes leaders come across as negative without realizing it, and everyone else in the organization thinks they are not aligned or vice versa. Again, when in doubt, have a one-on-one discussion followed by a group discussion to confirm alignment.

Note: People (Resources), Process (End-to-End Scope), Data (IT System Access, Enterprise Information Management (EIM)) are the core requirements before launching a Technology-Based Solution. Without people's alignment, the initiative will fail. Be sure to address "what's-in-it-for-me" for all major stakeholders and their subordinates. Use visibility and communication as tools to support the initiative to drive alignment.

12.7. Practical Day-in-the-Life

Provide the expected role(s)/position(s) and their corresponding activities to support/execute the Change Acceleration Process (CAP) capability.

'Give and Get' Summary

12.7.1 Give

Personnel Resources Time for Cross-Functional Stakeholders at all levels, starting with the top and Respected SMEs to support the initiative.

12.7.2 Get

Aligned executable SCR&R Platform at an increased cadence driving faster decision-making during risk events than your nearest competitor to garner an increase market share.

12.7.3 Process Owner (Accountable)

- SC Risk Manager/Director/VP
- Supply Manager – Ops or Supply Chain

12.7.4 Process Implementer (Responsible)

- Certified Tenured Change Manager
- Performs all change management activities working closing the Initiative Leader, Process Owner and Human Resources

12.7.5 Process Evaluators (Recipient of the Output of the Process)

Recommended stakeholders to participate:

- SC/Logistics GM/Director
- SCR&R Director/Mgr
- Strategy Dir
- IT Assigned PM
- Procurement GM
- Finance GM
- Sales/Mktg VP
- OPEX Director
- Legal
- Engineering Director
- Ops GM/Director
- HR

Appendix A12: "Risk": Are You comfortable in discussing RISK within your Company?



13. Architecture/Schematics for each Demo through the end of the SCRA2 Project (2021)

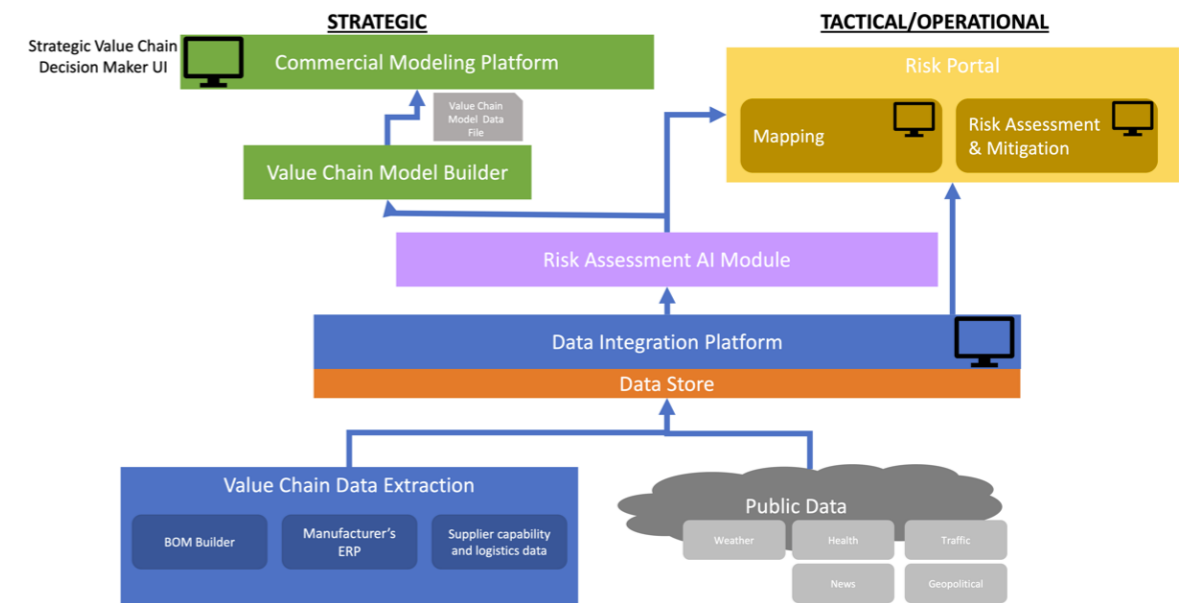


Figure 13.1: SCRA2 Architecture (2021-09-25: Subject to Change)

13.1. SCRA2 Architecture

The development of SCRA2 Architecture to build a single platform (Figure 13.1) for pilots (clients) is an ongoing collaboration between the following Providers: Supply Dynamics (supply chain data ingestion and validation), Software AG GS (Integration Platform and UI/UX), RAAD360 (Risk Management Models, Registers and Scenario Plans) and Coupa (AI Risk Alerts and Network Model Optimization). Details of the providers are provided in Sections 14 (Overview) and 15 (Details).

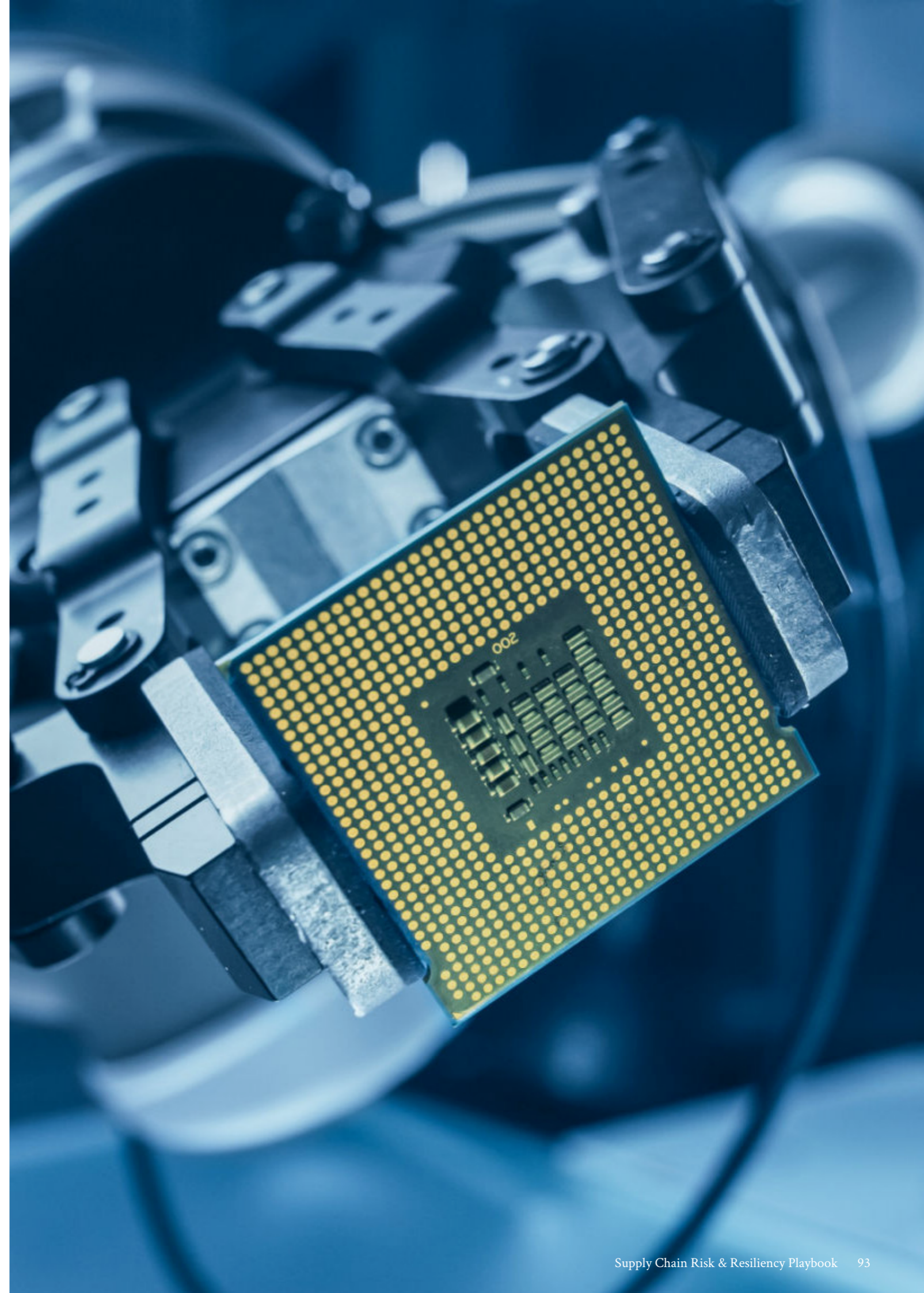
The SCRA2 Platform allows each pilot to load BOM into the systems and identify, assess, mitigate, and manage risk events aligned to materials flow from Supplier through Manufacturing to Customer.

SDX provides the visibility and analytics platform for multi-tier supply chains. Software AG Government Solutions (SAGGS) provides an integration platform for the SCRA2 program. The SAGGS team is also creating a central User Interface Dashboard. The RAAD360 application in the SCRA2 Platform will provide pilot users a multi-faceted, intelligent risk command center from which to perform vital risk management tasks. Coupa provides Network Modeling capability (discrete event simulation) and an AI Risk Alert Engine.

The data flow comprises (1) network data, (2) mitigation planning, (3) output scenario, and (4) risk event alerts. The network data (1) comprises the following supply chain data: BOM, facility/shipping location nodes, shipping lanes for supplier inbound, customer intracompany and customer outbound freight. This supply data provides core data that flows through all of the Provider's systems to give the Pilot's user functionality. The mitigation plan data (2) flow originates within RAAD360's system and is made available to the users. The users have the option to push the mitigation plans

to Coupa's network modeling tool. Once Coupa completes the analysis, the scenario results (3) are sent back to RAAD360's Risk Register. The data transmissions between RAAD360 and Coupa are managed through SAG GS.

Risk alerts (4) can come from several possible sources (e.g., SDX, external public, SAG GS UI/UX, Pilot's data collection systems, Transportation Management Systems). These alerts are managed through Coupa's AI Alert Risk Engine submitted according to rules set up by the Pilot to be used by RAAD360 and Coupa for Risk Mitigation Planning and Execution.



14. Narrative of SCR&R Systems Features and Functions



14.1. Supply Dynamics (SDX) Capabilities Overview



SDX is a visibility and analytics platform for multi-tier supply chains. SDX will provide pilot users of the SCRA2 platform the following features:

1. Data ingestion & transformation for the pilot's BOMs, materials, and tier-n suppliers
2. A dedicated live SDX environment for each pilot to manage & update their data
3. Validation, a process where pilots can invite their suppliers to log into SDX and validate the data and provide missing information
4. Integration with external sources of curated data to enrich the pilot provided BOM data
 - Risk
 - Alternative parts
 - Counterfeit risk
 - etc.

14.2. SAG GS Capabilities Overview



Software AG Government Solutions (SAGGS) will provide an integration platform for the SCRA2 program. The SAGGS team will also create a central User Interface Dashboard. The dashboard will show high level risk alert data, notifications, and will allow the user to access the partner sites.

1. The integration platform will have the ability to connect directly to pilot manufacturer systems (ERP, MES, etc.), or to private supply chain data (i.e., Supply Dynamics). The platform will also have the ability to retrieve public data such as John's Hopkins COVID related data and weather data (i.e., World Meteorological Organization). The data will be used to create risk alerts and will be transmitted to downstream applications, as needed.
2. The Central Dashboard will be the user interface to allow the user to have a high-level view of risk alerts and notifications which pertain to the individual pilot sites. The user can view risk alerts on a map as well as in tabular views and will be able to drill down on risks by automatically being routed to the partner sites. The user will be able to enter internal risks on the user interface, these risks will then be propagated to downstream systems.

14.3. RAAD360 Capabilities Overview



The RAAD application in the SCRA2 platform will provide pilot users a multi-faceted, intelligent risk command center from which to perform vital risk management tasks:

1. Establishment of risk methodology & risk appetite into a configurable technological toolset
2. Identification of organizationally relevant risk dimensions, elements, responses for assessing the full range of risk exposures
3. Integration of internal and external data sources that illustrate the comprehensive organizational value chain and supply chains and the risks posed by internal and external factors
4. Combination of human and AI insights into risk assessments and recommendations
5. Navigation of visualized risk via risk metrics, network flows, geographical maps, and where-used relationship models
6. Contextual assessment of risk impacts using dimensions and risk factors explicitly tailored to the organization, its subunits, regions, and products to ensure maximum accuracy and relevance
7. Risk Mitigation planning and execution in the risk command center to drive integrated, action-oriented risk management
8. Integration with Coupa supply chain digital twins to evaluate pros & cons and cost/benefit of competing mitigation plan options
9. Mining and leveraging past mitigation planning over time across the organization to reduce duplication of effort or inconsistency of approach to risk management

14.4. Coupa Capabilities Overview



Coupa's deliverables as part of the SCRA2 are categorized into two main categories:

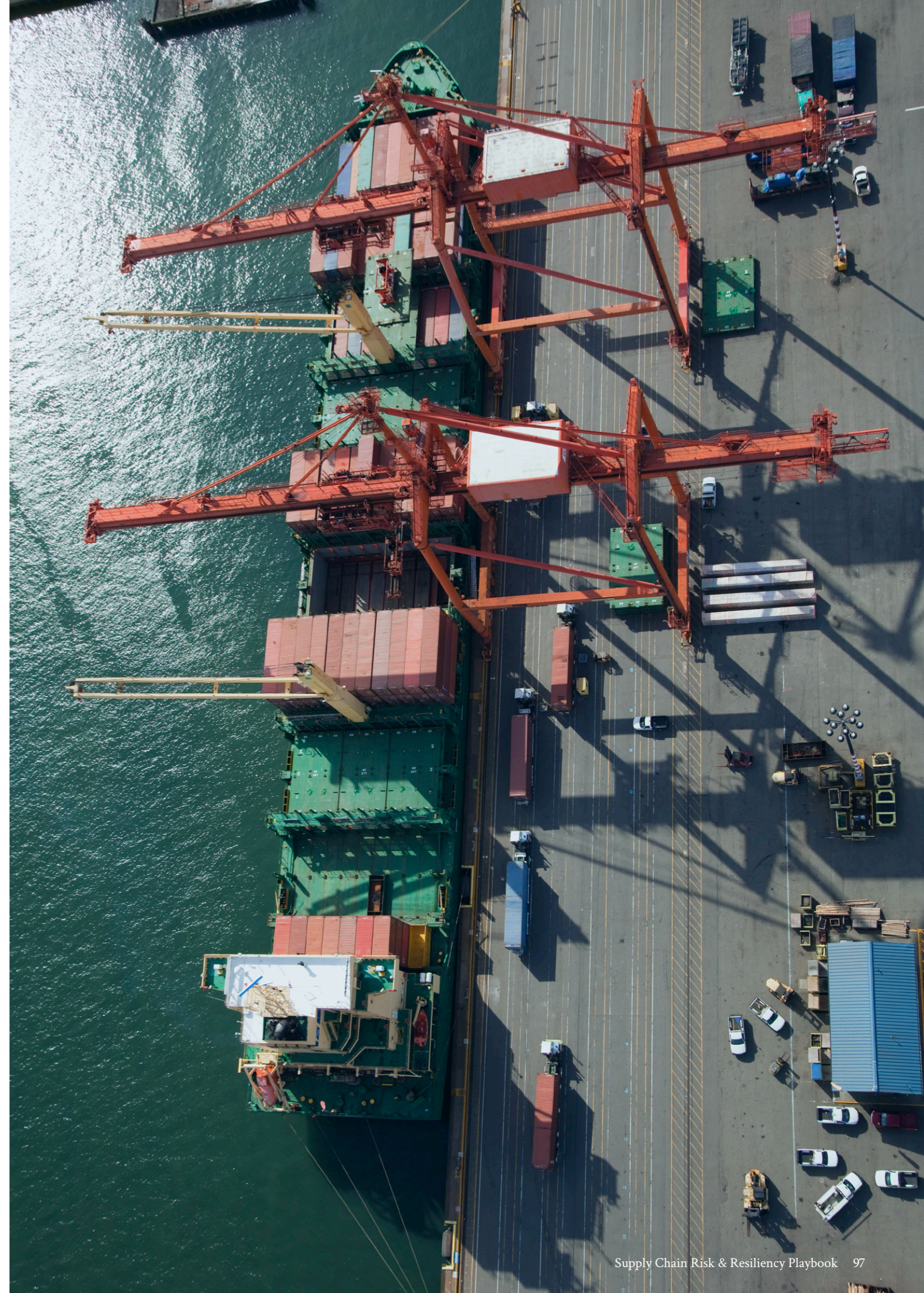
I. Network Model**

- Digital Twin of manufacturer's complete supply chain network as a living baseline
- Baseline supply chain network and KRI visualization
- Enable what-if scenario planning and evaluate impact.

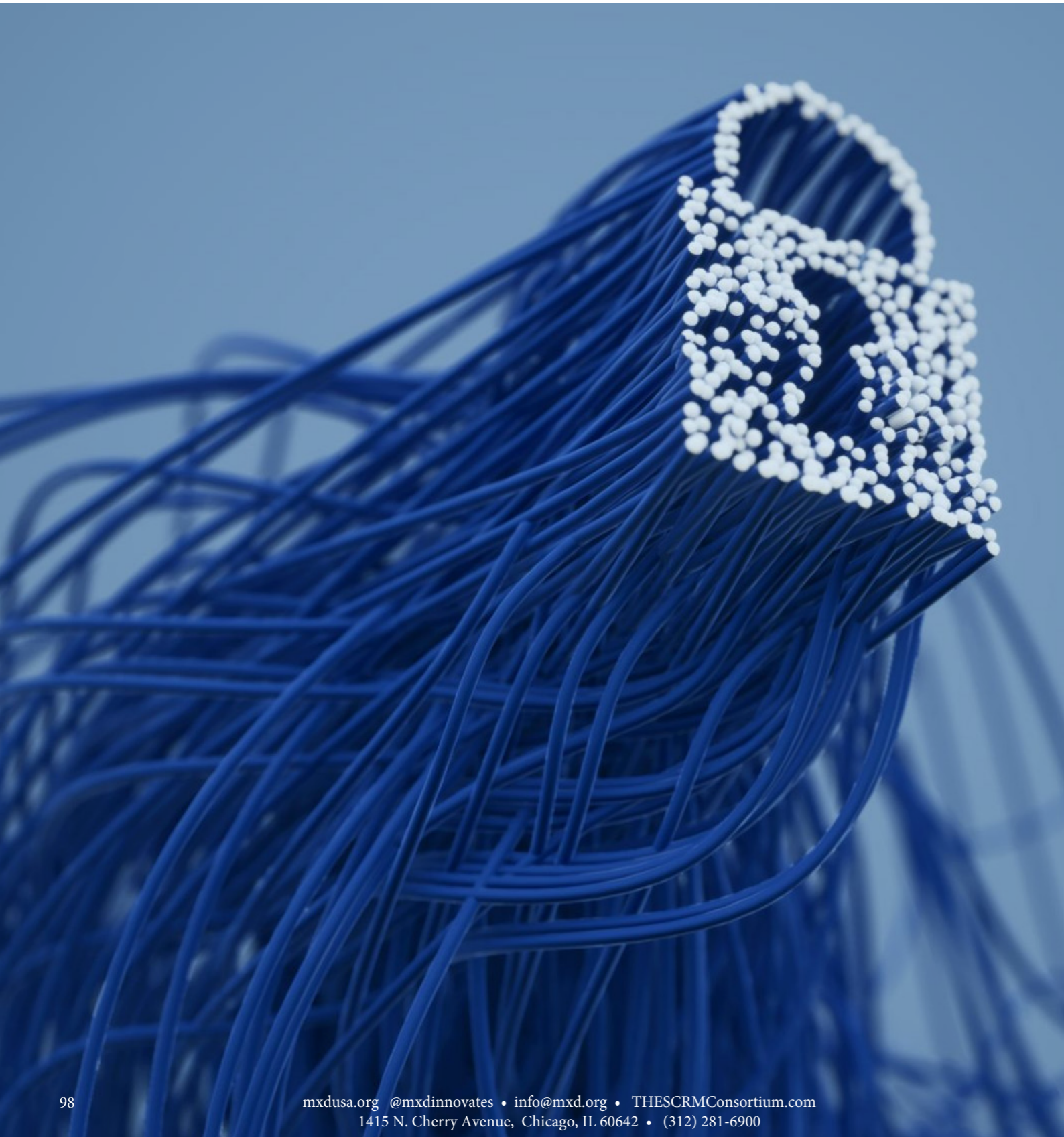
II. AI Risk Alert Engine**

- Newsfeed based risk alert system
- Proof of concept for strategic AI-driven risk prediction based on use cases

***Highly dependent on scope and data availability and time taken to obtain all the relevant data.*



16. Secure Data Exchange Best Practices



Objective:

Generate a report that details available secure data exchange tools, their capabilities, and type and structure of information for “ease of use” assessment for different worker competencies.

Background:

A key challenge experienced by manufacturers in the digital transformation of the supply chain is developing a culture of trust for sharing data between suppliers. In response to the widespread fear of sharing proprietary data, it is vital to establish and adopt secure data exchange methods between nodes in the supply chain. This project seeks to demonstrate successful, secure data exchange methodologies to break down cultural mistrust and barriers to adoption by supply networks. This task will not only examine the technical and cybersecurity issues impacting the secure exchange of data among supply chain elements. Still, it will also look at the impact of worker competency on tool use. Including the human element as part of the assessment will help guide the development of a technologically sound solution and ensure proper use by the appropriate workforce to mitigate one of the most significant factors of cybersecurity risk: humans.

Appendices



Appendix A3: SCR&R Leadership Overview

A3.1: MOVING FROM IDEAS TO ACTION

Future supply chain and even corporate success will correlate closely with a company's risk management capabilities. The following builds on this by presenting a set of actions that provide guidance in terms of developing an organization that is proficient at managing supply chain risk.

A3.2: Establish Risk Leadership

Becoming a risk management leader will not happen without individuals who demonstrate leadership and have the authority to make risk management investments. Some companies have established executive councils or committees to manage company-wide efforts within supply management. Figure 7.1 illustrates the responsibilities of one such council at a high tech company. Notice that responsibility for overseeing risk is one of this committee's major responsibilities.

Leadership is not the exclusive domain of executive leaders. Whether an individual is a buyer-planner, commodity team leader, supply chain manager, logistic specialist, or vice president, each will have an important role to play in the evolution of supply chain risk management. Each must demonstrate risk leadership at the appropriate level.

Wherever decision-making exists in the corporate hierarchy, the opportunity presents itself to embed risk management responsibilities. And, it is equally important to establish the channels of communication as they relate to risk. If an employee at a lower organizational level identifies a potential risk, how does that employee effectively convey this information to the appropriate managers and executives? The idea of a supply chain risk register is one possible way to establish a risk channel of communication.

Appendix A3.3: A RISK MANAGEMENT FRAMEWORK



Figure 4: Supply Leadership & Organization

A widely applied risk framework has been developed by the **Committee of Sponsoring Organizations of the Treadway Commission (COSO)**, a well-known group formed to help businesses develop their internal control systems. In response to a heightened awareness of global risk, COSO partnered with PricewaterhouseCoopers to develop a

framework that would enable organizations to evaluate and improve enterprise risk management. Thousands of organizations have incorporated COSO's **Internal Control Integrated Framework** to help manage their ERM activities.

The original COSO risk management framework includes eight interrelated elements. These components are derived from the way management runs an enterprise and are integrated within the management process. In 2017, COSO issued an updated enterprise risk management (ERM) framework, titled **Enterprise Risk Management — Integrating with Strategy and Performance**, to help business leaders understand and prioritize the risks their organizations face and to measure how these risks impact business performance.

The COSO ERM framework now consists of 20 principles that support one of five components: governance and culture; strategy and objective-setting; performance; review and revision; and information, communication and reporting. The components and their underlying principles support how the board of directors and top leadership can evaluate their ability to clearly link strategy, performance and risks. 13 Even though COSO has revised its ERM framework, many companies have not adjusted to this new set of principles and still follow the original framework.

Although most risk frameworks were first developed to support ERM, no logical reasons exist why they cannot also be applied to SCR&R. Figure 2.6 illustrates a general ERM framework that also supports SCR&R. Many leading companies use this type of framework to guide their risk management efforts.



Figure A3.1: The Basic ERM Model

A3.4: CONCLUDING THOUGHTS

This discussion began our supply chain risk management journey. Something to remember as you progress is that companies that are effective at managing supply chain risk are supported by a corporate culture and a foundation that promote a company-wide approach to risk management. A culture that stresses risk awareness and management must be supported by a set of enablers and sophisticated tools and techniques, and perhaps most importantly, the ability to quantify the value of risk management efforts. When the right corporate culture is supported by effective tools, techniques, measures, frameworks, and skills, a company can engage in thoughtful risk taking rather than being paralyzed by an irrational fear of supply chain risk. The reality is that many companies are still making strategic supply chain decisions without consider risk adequately.

A3.5: Enterprise Risk Management (ERM) Framework

Section II discussed the COSO ERM framework, a framework that many companies use to address enterprise risk. COSO's Mission is "To provide thought leadership through the development of comprehensive frameworks and guidance on enterprise risk management, internal control and fraud deterrence designed to improve organizational performance and governance and to reduce the extent of fraud in organizations."³ Eight interrelated components comprise the original 2004 COSO framework. These components are derived from the way management runs an enterprise and the way they these components are integrated within the management process:

- **Internal Environment.** The internal environment sets an organization's tone, including how risk is viewed and addressed by an organization's people, including its risk management philosophy, risk appetite, integrity, and ethical values
- **Objective Setting.** Enterprise risk management ensures that management has a process to set objectives and that the chosen objectives support the entity's mission and are consistent with its risk appetite
- **Event Identification.** Internal and external events affecting the achievement of objectives must be identified, distinguishing between risks and opportunities. Opportunities are channeled back to management's strategy or objective-setting processes
- **Risk Assessment.** Risks are analyzed in terms of their likelihood and impact. This is used as a basis for determining how to manage risks
- **Risk Response.** Management selects various risk responses, including sharing or shifting, preventing, accepting, avoiding, and managing risk. (Recall the discussion of SPAAM earlier). A set of actions are developed that align risks with the entity's risk tolerances and risk appetite.

Appendix A4: Initiative Charter Development Helpful Hints

A4.1 Plant or Function where Process Resides:

a. Functions:

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> SCR&R | <input checked="" type="checkbox"/> Logistics | <input checked="" type="checkbox"/> Finance |
| <input checked="" type="checkbox"/> Procurement | <input checked="" type="checkbox"/> Supply Chain | <input checked="" type="checkbox"/> Marketing/Sales (<i>connected pilot</i>) |
| <input checked="" type="checkbox"/> IT | <input checked="" type="checkbox"/> Operations | <input checked="" type="checkbox"/> Other |

b. Product Name (BOM): Business Unit - Location – Product-Line

A4.2 Team Vision (WHERE are we going?) Statement

1. Where do we want to be?
2. What does success look like in 5-10 Years?
3. What does success look like in 1-3 Years?
4. Ideal Final Result to Win in the industry.
5. Target 12-20 words

Sample Corporate Level: Leverage BIC solutions (e.g., SCRA2) to integrate within the Standardized DT roadmap.

Sample SCRA2 Level: BIC SCR&R examples of how it could work.

A4.3: Mission (WHAT)

1. Rallying Cry – within 8-14 months:
2. Target 5-8 words; Drives alignment in the short term
3. Generally, 3-8 Mission Statements (Foundation and Enabling)

Rallying Cry Example: “SCR&R provides value-added insights to support your CX/EX daily efforts”

Internal Customer Example: Every customer (employee) understands what they need to do in the most efficient manner when a risk event occurs.

- I. SCR&R stakeholders provide meaningful follow-up to maximize the likelihood of executing in the most efficient and effective manner while building internal, supplier and customer trust.
- II. Outside SCR&R Stakeholders are able to execute quickly and efficiently

PROCESS Example: known for providing competitive, timely and trustworthy execution solution scenarios.

PEOPLE Example: Employees work together in the most efficient manner to serve our customers and suppliers.

A4.4: Strategy/Means (HOW)

1. What does success look like in 6, 18, 36 months?
2. Reference Multi-Generational Plan
 - a. 2021 Q3: Complete Future State Definition with Role Definitions aligned to

process.

- b. 2021 Q4: Pilot New Roles Standards and Documentation with new org structure.
- c. 2022 Q1: NA Launch of Standards and Documentation with new org structure.
- d. 2022 Q2: Finalize Metrics and Reporting

A4.5: Problem Statement

Provide context of the “pain” that is currently occurring. Provide data, if available; utilize placeholders, if not available.

1. “We are not able to provide meaningful SCR&R meaningful information to the operations level.
2. Do not have the ability to relate the logistics issues to the operations?
3. There are too many sources and identifying and filtering issues that are impactful and meaningful risk alerts.”
4. “Anytime it takes more than x hours to respond to a SC Risk Alert.”
5. “Currently, there are too many unprioritized risk alerts coming from an overwhelming number of sources. This results in unresponsive off-target SC actions. Therefore, we do not have the ability to adjust the daily logistics with impactful timely actions to support internal/contracted Operations. This results in lost productivity (internal and contracted) and delayed/incomplete delivery to our customers.”

Include defect, object, extent, impact (monetary)

- a. Defect: What is the specific defect that you are seeing? Describe your pain, issue, challenge or headache?
- b. Object: What “thing” is the problem/headache affecting? What should be happening that isn’t, or what is happening that shouldn’t be?
- c. Extent: To what extent does the problem reside? What core processes and who is involved?
- d. Impact: What is the business impact of this problem (“So What?”)? What is the consequence / impact of that (e.g., risk, waste, annoyance for the customer, business, asset)

Structured Problem Statement

As a company, we are experiencing a problem with: _____

The area where this problem is occurring is: _____

The problem has existed over what timeframe: _____

The magnitude of the problem is: _____

and the expected performance is: _____.

The effect this problem is having on our business is: _____.

This is costing us _____\$ per month and _____\$ per year

A4.6: Objective Statement(s)

1. From x to y performance in z timeframe
2. Can be at the mean (average) level

Example: Maintain or increase productivity per Team SCR&R Team member while streamlining the process to enable decreased touches of employees (suppliers, contractors) from x to y; x to y; x to y time to perform reactive evaluated scenarios.

Increase market share from x% to y% by product.

Decrease time-to-recovery from x to y by product BOM.

A4.7: Key Measures of Success (Metrics)

- Quality, Time, Cost & Capacity perspectives to “Tell the Story”

Strategic Key Performance Indicators (KPIs):

1. Disruption = Revenue Lost, Customer Loss, Profit Degradation
2. Revenue Growth & Customer Satisfaction can be achieved IF better prepared and more responsive.
3. PRODUCTIVITY: \$,% Overtime both will Increase 5-10%
4. LOGISTICS Impact of a Major Cat Event
5. WORKING CAPITAL: Current Assets & Liabilities
6. CASH CONVERSION CYCLE
7. Revenue Growth due to SCR&R

Tactical & Operational: Key Risk Indicators (KRIs)

1. Value-at-Risk
2. Risk Priority Number
3. Altman Z Score
4. Time-to-Recovery
5. Time-to-Impact
6. Risk Mitigation %, over time
7. # of Risk Responses
8. Cost of the Risk Program
9. \$ Risk Avoidance
10. Variance-to-Plan (Time, Cost, Quality, Capacity)

A4.8: Key Business/Functional Stakeholders NEEDS

- Internal Example: SCR&R VP/GM, Procurement, Logistics, VP, Business GMs
- End Customer Example: SCR&R Communications plan to Suppliers & Customers, & Partners

A4.9: Dependencies/Linkages to other initiatives:

Other projects/initiatives that can enhance this project such as Reorganization, Enterprise Information Management, Supply Chain Demand Planning, Digital Transformation, Transportation Insourcing/Outsourcing, Network Transformation, Consolidation, Mergers & Acquisitions, etc.

A4.10: Proposed Initiative Start & Completion Dates: Align these dates to the strategic planning initiatives.

A4.11: Scope Boundaries:

1. This is the portion of the process (identified previously) that the team will focus
2. This is necessary to maintain ‘boundaries’ for the team to focus
3. Review E2E Process Maps including Process Steps and Segmentation
4. Confirm Key Stakeholders to manage targeted scope
 - a. In-scope: List major areas, data sources, process steps
 - b. Out-of-Scope: Identify areas that are asked about when presenting
 - c. Key Boundaries: These are borderline areas in which hand-offs or transitions occur. Generally, these areas that may be scope in subsequent projects/initiatives.

A4.12: Constraints:

- d. Major Concerns, Roadblocks: Waterfall vs. Agile, Prerequisites to do the next improvement

A4.13: Team Members:

- e. Insert name, role on team, job title
- f. Indicates a resource availability constraint

A4.14: Team Milestones Dates

Key Milestones: Capture the absolute “must haves” to launch Aligned Activities with dates.

- I. Current State Documentation (1st Pass)
- II. Needs/Gap Analysis (business and customer perspectives)
- III. Finalize Scope (Aligned scope)
- IV. Execution Roadmap (Gantt Charts with 2nd | 3rd tier projects, deliverables aligned to milestones).
- V. Draft proposal to Executive Team

Appendix A6: WHERE are the Risks: 4 Spheres

In 2009, Dr. Robert Trent, Lehigh Supply Chain Management Department Chair, and I began to discuss supply chain risk in terms of how it was negatively impacting companies around the world. This dialogue led to capturing as much information available on the subject, codifying, classifying, and developing a framework which became a graduate class in supply chain risk management and ultimately a new book, just launched, entitled - Supply Chain Risk Management: An Emerging Discipline.

Gregory L. Schlegel, Founder, The Supply Chain Risk Management Consortium, and Adjunct Professor, Supply Chain Risk Management, Lehigh University

A6.1: The Four Spheres

The four spheres of supply chain risk began to take shape during our years of research, classroom and workshop activities along with client engagements, worldwide. As the data began to solidify, we formulated a matrix encompassing a level of maturity from 0 to 100 and a scale depicting a level of activity by sphere. Our sneak peek regarding the spheres and a supply chain risk discipline adoption is below:

- **Supply:** The complexion of this sphere encompasses areas such as supplier continuity, strategic sourcing, supplier financial viability and capability, material pricing, assessments, fraud, corruption and counterfeiting. Inherent risks are disruptions caused by poor delivery, quality issues, financial failure, non-compliance and communication failure. This pillar has the highest maturity level to date and the most extensive solutions activity.
- **Demand:** This sphere covers new customers, market trends, sentiment analysis, demand management, distribution, product integrity, service and scenario planning. Inherent risks are disruptions caused by distribution issues, competitor actions, product reputation, brand management, social media and outbound logistics. This sphere is the second-highest in maturity and maintains the second-highest level of activity.
- **Process:** This sphere includes IT systems, mergers, marketing strategy, organization structure, governance frameworks and metrics, supply chain strategy and execution, manufacturing and quality, organizational risk assessments, heat maps and war rooms,. Inherent risks are disruptions caused by quality issues, inventory shortages, late deliveries, capacity issues, equipment breakdowns, IT outages and misaligned strategies. This sphere is the third in maturity and third in activity.
- **Environmental Landscape:** By the far the largest in scope, this sphere encompasses government regulations, taxes, economic volatility, currency exchange, natural disasters and compliance. Inherent risks are geopolitical and energy risks, port security, logistics, war, pandemics, and civil disobedience. This sphere is far the lowest in terms of maturity level and activity level.

The SCR&R Consortium expects that companies will be embracing the four spheres of supply chain risk management along with many more solution providers coming online enabling more and more companies to effectively manage supply chain risk within the spheres. In our research within our book, coupled with the spheres, we also developed a Supply Chain-as-a-Discipline Adoption Curve. We classified the company population into Early Adopters, Industry Average and Laggards.

A6.2: The Outlook

From our Discipline Adoption Curve work we came to the conclusion that about 10 percent of companies are early adopters actually exercising good SCR&R practices. About 20 percent more are talking about and developing good SCR&R practices and the bulk of the company population or 70 percent are reacting to supply chain risks as an ad-hoc event-driven approach. We have a lot more work to do to help companies effectively identify, assess, mitigate and manage supply chain risk.

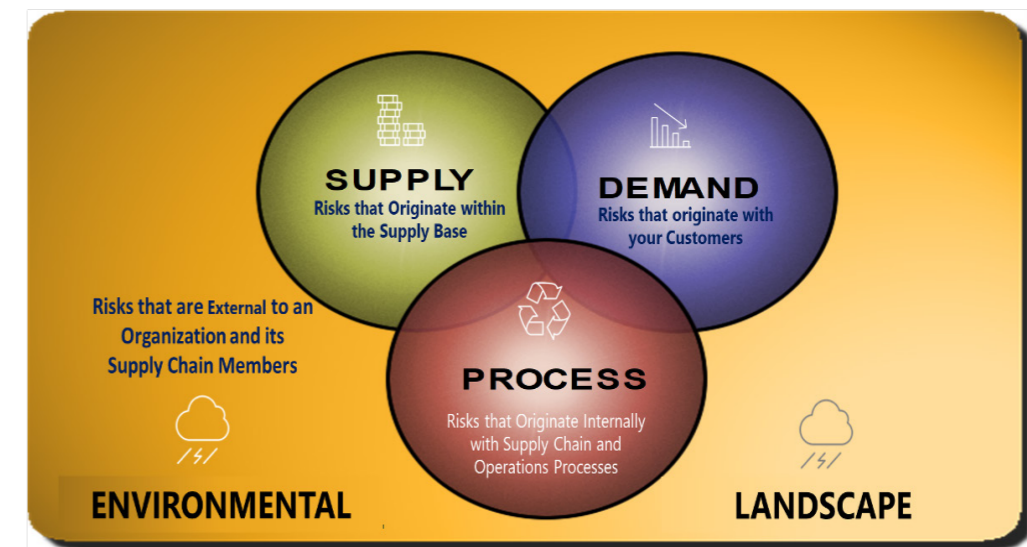


Figure A6.1: The Four Spheres of Risk

Appendix A7.1 Supply Chain Risk Mapping

One of the major challenges within a supply chain is knowing where goods originate or where they go downstream. While most companies know their first-tier suppliers and customers fairly well, they do a much poorer job understanding the sub-tiers of their supply chain. Unfortunately, the supply chain sub-tiers are proving to be a major source of supply chain risk. An executive at a major aerospace company commented, “There is always some small supplier out there that is going to cause us problems. We just don’t know where they are until it happens.” Almost all companies would benefit from supply chain mapping.

A **supply chain map** is a graphical representation of a firm’s tier-one and sub-tier suppliers and customers for any purchased item or end products. Better maps will also include the downstream portion of the supply chain, meaning customers are also part of the mapping process. Intuitively, supply chain mapping makes sense from a number of perspectives. Unfortunately, mapping is still an emerging risk management technique at most firms. Figure 1.1.1-3-C provides a basic example of a supply chain map with risk included within the map. Actual company maps will include geographic location of entities such as suppliers, distribution centers, production sites, etc.



Where do these top 12 risks fit in your supply chain?

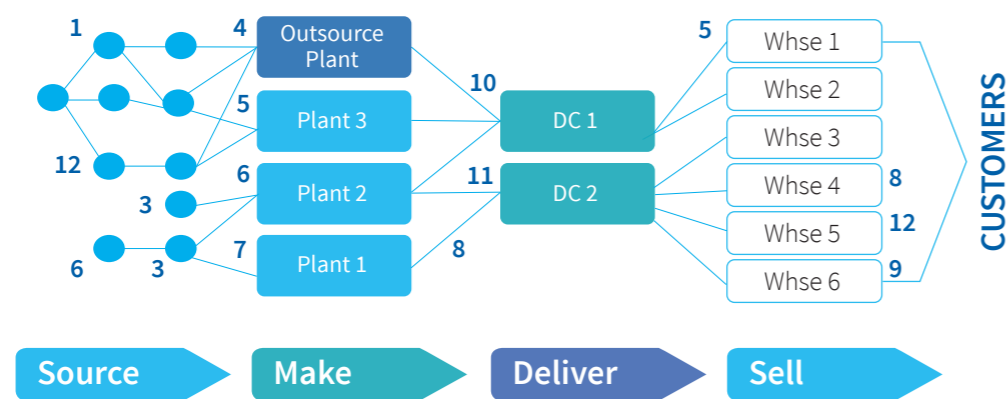


Figure 7.1: Supply Chain Risk Management Mapping

No standard nomenclature specifies what a supply chain map should contain or look like. This is in contrast to project management or lean management where the tools and techniques are well established. Different kinds of maps exist, many of which are best described as the homegrown variety. Because supply chain risk management is an evolving discipline it will take time to converge on a set of tools and approaches, some-

thing that is characteristic of mature disciplines, or for third-parties to enter the market with mapping products that become the industry standard. Third-parties are starting to base their standards using Google Maps, Here maps, or Open Street.

A popular mapping technique is the **links and nodes** approach. Nodes are the entities within a supply chain, such as supplier locations, distributors, customers, other channel members, and the focal company. Links (also sometimes known as arc or edge) represent flows and are represented by solid or dotted lines. Flows include material, services, funds, and information.

The growth of supply chain mapping as a risk management technique faces some challenges. For companies with a large supply base or complex product structures the maps become intricate very quickly. A supply base with hundreds of tier-one suppliers will have thousands of tier-two and three suppliers. The same holds true for the downstream supply chain entities. Filtering logic is being used by some commercial providers to overcome this challenge.

Taking supply chain mapping beyond tier 1 is an intensive work process. Also some suppliers are not willing to release their bill of material data to customers or reveal their supply sources, making it difficult to identify sub-tier suppliers. This can however be made a requirement at the contracting stage.

Another challenge involves determining the right kind of maps to develop. Some maps are so high level, such as industry level maps, that they lack the insight required to use them for effective risk management. At the other extreme, a supply chain map may contain so many connections, nodes, and information that they become difficult to understand. The map may look like something an energetic three-year old created using a box of crayons. The development of technology and filtering is largely addressing this problem. A final challenge is that supply chains constantly evolve. This requires a disciplined work effort to keep the maps current. Table A1 provides some guidelines when engaging in supply chain mapping. There are an increasing number of commercially available tools that support supply chain mapping and continue to evolve their capabilities. Within an organization a group needs to own the mapping process with regular updates performed to the maps.

There are an increasing number of companies such as DHL Resilience360 (<https://www.resilience360.dhl.com>), RiskMethods (www.riskmethods.net), and Resilinc (www.resilinc.com) that provide interesting suites of mapping-related applications and risk assessments.

TABLE A1. SUPPLY CHAIN MAPPING GUIDELINES

The following guidelines will help when developing supply chain maps, regardless of the mapping technique used.

- Don't forget the demand chain. Most supply chain maps focus on suppliers because the supply group is often responsible for developing supply chain maps. The mapping process should include the supply, including in-house production and demand sides of the supply chain since risk can appear anywhere along a supply chain
- Include geographic locations. Companies should include the geographic locations of supply chain entities within the map
- Suppliers and sites should be different entities in supply chain maps. When supplier corporate, production and shipping locations are different entities, special designations should treat them separately. Logistical providers, critical shipping lanes and their sites should also be part of the map. It can be a challenge to find out the manufacturing location but often the quality control/procurement functions have visited so a number of companies have achieved this for their Tier 1 suppliers
- Insert hyperlinks in the map to connect to additional information and data. Hyperlinks will help simplify maps while providing access to detailed data and information about supply chain entities
- Use a product's Bill of Material (BOM) as a guide when developing supply chain maps. BOM's are an excellent source of data when developing a supply chain map
- Include more than material flows in the map. Maps should also include information, financial, and service flows. This can be accomplished by different designations that represent these flows within the supply chain
- Don't ignore interrelationships among firms. A supply chain entity may be part of a supply chain map for another product or business unit within your company. Or, your customer's customer may also be a critical supplier. These interrelationships turn supply chains into networks
- Capture risk attributes against the relevant node or lane, for example, natural catastrophe risk or geopolitical risk.
- Gain visibility to sub-tier supply chain entities. Insisting on visibility to a tier-one supplier's suppliers should become an accepted part of the supply chain relationship
- Share the work burden. Part of the evaluation process of tier-one suppliers can be an assessment of how well these suppliers map their supply chain. And, if tier-one suppliers insist that their tier-one suppliers (your tier-two suppliers) map their supply chain, your company will gain visibility downstream into your supply chain

A8 Appendices:



Appendix A8: Supply Chain Disruption Impacts-- A Day-in-the-Life Simulation 102119.pdf



Appendix A8: SCR&R Consortium Risk Scenario Planning Primer-Digital Sandbox Roadmap 040421 JAD.pdf

Appendix A9: Develop Scenario Planning & Build Response Plans

Scenario/Risk Response Planning

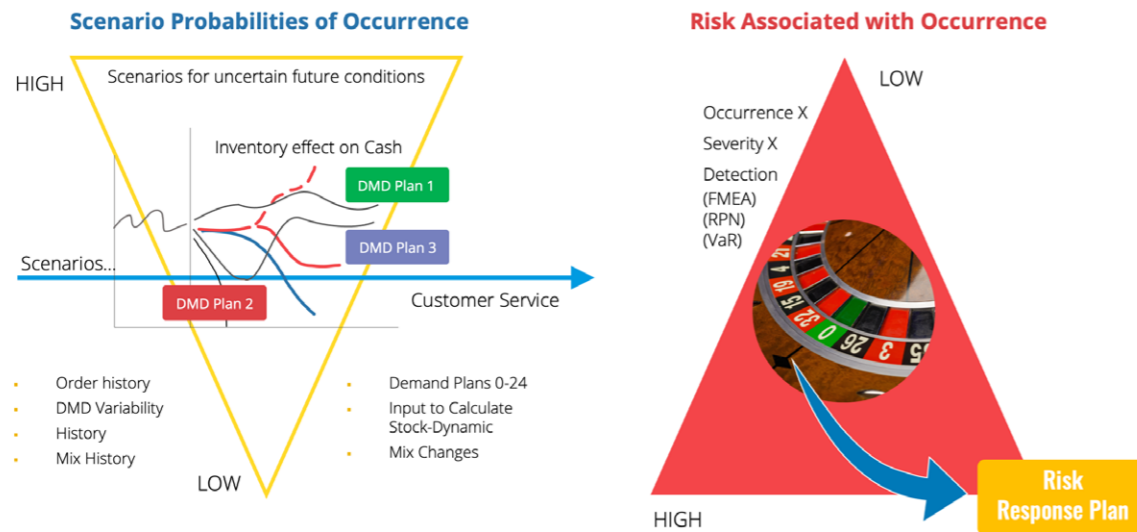


Figure A9.1: Scenario/Risk Scenario Mapping

Begin to assess your identified and prioritized risk with Risk-Priority-Number, Value-at-Risk, Time-to-Recovery, and Time-to-Impact.

A9.1: Definitions

Strategic Planning Horizon. This horizon relates to long-term decisions and decisions that change the inherent structure of the business. This horizon normally includes network design, network analytics, capacity planning, business planning, and now risk management. Risk management includes risk identification and assessment, scenario planning, and “what-if” supply chain modeling. This horizon normally looks 1-5 years into the future.

A9.2: Tactical Planning Horizon

This horizon relates to short-term decisions that reflect needs and activities in existing structures and processes. This horizon normally includes demand planning, inventory planning, distribution resource planning, and transportation planning along with risk assessment, risk response planning, and risk mitigation. The horizon tends to look out 1-18 months into the future.

A9.3: Operational Planning Horizon

This horizon relates to near-term decisions that reflect committing supply, resources, and funding to support immediate requirements. This horizon includes master schedules, material requirements planning, scheduling, capacity management, quality control, transportation and risk mitigation and management. This horizon looks out about

0-45 days into the future.

A9.4: Predictability – When to get Started

As companies progress in their journey, they will leverage their visibility capabilities to test their supply chains in terms of “what-if scenario planning.” These exercises, utilizing network optimization and probabilistic modeling and mapping tools, provide a view into how supply chains might react to risk events, including demand and supply disruptions. This insight will help companies create risk response plans.

Companies will also rely on 3rd party tools that include fraud and corruption methodologies and real-time alerts within this stage. For some companies this will lead to the development of supply chain risk war rooms. These rooms, supported by sophisticated tools and techniques, will allow a company to be more proactive by identifying risks through alerts, assessing risks using probabilistic tools, mitigating risks through new risk procedures, managing risks, and even turning risk into an opportunity.

A9.5: Delphi Method

The Delphi method, also known as Estimate-Talk-Estimate [ETE] is a structured communication technique or method, originally developed as a systematic, interactive forecasting method which relies on a panel of experts. The technique can also be adapted for use in face-to-face meetings and is then called mini-Delphi or Estimate-Talk-Estimate (ETE). Delphi has been widely used for business forecasting and has certain advantages over another structured forecasting approach, prediction markets. Delphi is based on the principle that forecasts (or decisions) from a structured group of individuals are more accurate than those from unstructured groups. The experts answer questionnaires in two or more rounds. After each round, a facilitator provides an anonymous summary of the experts’ forecasts from the previous round as well as the reasons they provided for their judgments. Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of their panel. It is believed that during this process the range of answers will become smaller and the group will converge towards the “best” answer. The process is stopped after reaching a predefined stop criterion (e.g., number of rounds, achievement of consensus, stability of results), and the mean or median scores of the final rounds determine the results.

The Delphi Method allows participants to comment on the responses of others, the progress of the panel as a whole and to revise their own forecasts and opinions in real time. The person coordinating the Delphi method is usually known as a facilitator or leader and facilitates the responses of a panel of experts, who are selected for a reason, usually that they hold knowledge on an opinion or view. The facilitator sends out questionnaires, surveys etc. and if the panel of experts accept, they follow instructions and present their views. Responses are collected and analyzed, then common and conflicting viewpoints are identified. If consensus is not reached, the process continues through thesis and antithesis, to gradually work towards synthesis, and building consensus.

This methodology has worked well over the years within the risk management arena. Many organizations have exercised this approach to do scenario planning within the supply chain Sales & Operations Planning forums, Business Continuity Planning sessions, and supply chain risk situations. Coupled with several risk assessment techniques, such as Risk Priority Numbering (RPN), Value-at-Risk (VaR) and Risk/Reward Tradeoff

matrix analysis, the Delphi-Conference-Consensus method has produced excellent results in terms of predicting risk scenarios, assessing their magnitude, force-ranking their priority and then fashioning Risk Response Plans. A furniture manufacturer actively utilizes the Delphi Method during their bi-annual risk assessment protocol. This allows the company to systematically identify risk and their probabilities.

A9.6: Stress Testing the Supply Chain

Stress testing, which some users also refer to as scenario planning, is a technique widely used in financial institutions. A primary difference is that stress testing is mandatory for these institutions as a matter of compliance, whereas it is largely voluntary when applied to supply chain risk management unless it is within a relevant regulated industry. When applied to supply chains, stress testing involves computer simulation techniques used to test the resilience of a supply chain or network through scenario planning.

As a concept, stress testing is a sophisticated approach to risk management that also applies to supply chains. Figure 3.9 presents a process to converge on a set of scenarios using statistical analysis. The primary output of these stress tests is a prioritizing of risk scenarios based on Value-at-Risk (VaR). After prioritizing these risk scenarios, a company will develop appropriate risk response plans.

Section VI addresses stress testing in greater detail. Anyone wishing to learn more about stress testing in general should visit <https://www.investopedia.com/terms/s/stresstesting.asp> or www.theirm.org.

A9.7: Risk Registers

A risk register is a formal tool for documenting risks along with actions to manage each risk. It is widely used as way to manage risks in project management. The Project Management Body of Knowledge (PMBOK) guide says a risk register (or Risk Log) is a document that contains all the results of risk analysis and where risk response plans are recorded. As risks are identified they are logged on the register and actions are taken to respond to the risk. One source views a risk register as a record of the significant risks faced by an organization, the controls currently in place, additional controls that are required, and responsibility of control activities.

Management of risk should be continuous with project teams adding risks or bringing forth risks to a risk or project manager, who then logs the risk and identifies actions that can be taken to address the risk. To properly respond to a risk, a risk manager may need to bring in experts to understand the actions that can be taken to reduce the likelihood of the risk occurring or the impact if the risk does occur.

Expanding this concept from its historical roots, the idea of a risk register does not have to apply only to traditional project managements settings. In fact, a risk register approach is ideal for use by product development and supply chain strategy development teams.

A9.8: A risk register generally contains the following:

- Risk ID: A unique identifier for the risk
- Date Raised: The date the risk was identified
- Risk Description: Describes the risk and what might happen of the risk occurs
- Likelihood: How likely is it that the risk will occur? This is usually on some sort of numeric scale.

- Impact or Magnitude: What will the impact be if the risk occurs.
- Severity or Overall Rating: This equals Likelihood multiplied by Impact (LxI), usually on some sort of numeric scale
- Owner: The person who will be responsible for managing the risk
- Mitigating Action: Actions that can be taken to reduce the likelihood of the risk occurring This may also include acceptance of the risk or transference of the risk e.g. insurance
- Contingent Action: What will be done if this risk does occur? Usually actions to reduce the impact on the project (i.e., mitigate)
- Progress on Actions: A regular update on progress of the mitigating actions
- Status: Open, waiting, closed, in-process, accepted within tolerance, etc.

A company that is effective at using Risk Registers is Coca-Cola. The company operates in over 130 countries segmented into nine regions. Each region maintains its own Risk Register, which includes risk events that have occurred and could occur and have been analyzed using scenario planning. Risks are entered into the Risk Register and then analyzed, resulting in an “Inherent Risk Level.” These risks are constantly compared to the company’s risk tolerance levels, per each type of risk. Coca-Cola then applies whatever controls or mitigation tactics that may have been utilized in a prior risk event or they go through a rigorous Risk Response Plan that will profile all the mitigation tasks along with their expected Time-to-Recovery. As the company applies the risk mitigation or “Controls” they continue to evaluate the risk against their tolerance levels. This process continues until all risks are within tolerance. Data are continuously entered into the regional Risk Register and then aggregated to the corporate level on a regular basis.

Submit the phrase “images of risk registers” in Google to see examples of risk registers.

A9.9: Probabilistic/Stochastic Modeling

Probabilistic models (also called stochastic models) are models where uncertainty is explicitly considered in the analysis. This differs from traditional forecasting models do not consider uncertainty, which are called deterministic models. Historically, stochastic models are procedures that represent the uncertainty of demand by a set of possible outcomes (i.e., a probability distribution) and that suggest inventory management strategies under probabilistic demands. Stochastic optimization (SO) methods rely on optimization algorithms, which incorporate probabilistic (random) elements, either in the problem data (the objective function, the constraints, etc.) or in the algorithm itself (through random parameter values, random choices, etc.), or in both.

Probabilistic modeling is increasingly taking place within the context of supply chain risk management. The modeling process starts by digitizing the entire supply chain and building a flow model of the enterprise. Supply chains represent a network with inputs, outputs, and processing times that can be digitized as dynamic flow models. Next, companies populate the model of the enterprise with base case data from their ERP system and by identifying the historical behavior and uncertainty of all relevant factors. These factors include elements such as lead times, capacities, demand, production, inventory, quality, yields, policies, and more.

Companies next develop “what-if” scenarios, or hypotheses, that need to be reinforced or refuted, looking at scenarios such as demand increasing by 30 percent, demand de-

creasing by 30 percent, lead times increasing or decreasing, market share to be gained, supplier disruptions, plant disruptions, complex competitive pricing changes, geo-political changes, oil price fluctuations, etc. Most probabilistic tools maintain a library of tables that indicate the probability distributions utilized within the scenarios.

After assumptions are codified and historical data is input users begin to run discrete-event simulations across the entire supply chain for every scenario in an effort to review the cause and effect outcomes and their statistical strengths. The outcomes normally take the shape of histograms, sensitivity curves with confidence intervals, and probabilities of occurrence along with risk assessments for each scenario. Running of the model, often requiring several hundred iterations for each scenario, can continue until the outcomes for each scenario are considered statistically significant.

The outcomes of the scenarios are prioritized based on their probabilities of occurrence and their associated risk index. This novel approach is accelerating supply chain risk management. By combining powerful tools, such as probabilistic methods, digital modeling, and discrete-event simulation, coupled with risk assessments for every scenario, these techniques are providing professionals the ability to better manage risk. The final step in this powerful new process is to eventually develop a risk response plan (RPP) for the scenarios deemed critical to the enterprise covering the strategic, tactical, or operational horizons. This approach to supply chain risk management can have significant benefits and is being facilitated more and more by lower cost of IT processing and the increasing digitization of supply chains. Be aware, however, that the quality of these models is highly dependent on the quality of the data used to populate the model.

A9.10: Evolving Predictive Analytic Approaches Supporting SCR&R

The use of Big Data and Predictive Analytics is constantly evolving. What follows is a set of dynamic tools, techniques, and approaches that allow predictions of various kinds. These predictions support SCR&R directly by enabling users to assess and mitigate risk.

A9.11: Digital Twins and Digital Modeling of the Supply Chain utilizing Discrete-event Simulation

With new Cloud-based software, which maintains robust capabilities such as “What-if” Scenario Planning analyses, utilizing Discrete-event Simulation, Probabilistic Modeling and Digital Twins to redesign supply networks based on possible scenarios, actual risk events and more, while profiling the “financial bottom line” impacts versus the comprehensive Risk/Rewards for each scenario, is what we’ll discuss next.

Digital twins are a digital replica of a living or non-living physical entity. By bridging the physical and the virtual world, data is transmitted seamlessly allowing the virtual entity to exist simultaneously with the physical entity. Digital twin refers to a digital replica of potential and actual physical assets, processes, people, places, systems and devices that can be used for various purposes. The digital representation can provide both the elements and the dynamics of how an internet of things device operates and lives throughout its life cycle. Definitions of digital twin technology used in prior research emphasize two important characteristics. First, each definition emphasizes the connection between the physical model and the corresponding virtual model or virtual counterpart. Second, this connection is established by generating real time data using sensors or similar

means.

Digital twins can integrate the internet of things, artificial intelligence, machine learning and software analytics with spatial network graphs to create living digital simulation models that update and change as their physical aspects change. A digital twin can continuously learn and can update itself from multiple sources to represent its near real-time status, working condition or position. This system, or Machine Learning System, can learn from itself, using sensor data that conveys various aspects of its operating condition from human experts, such as engineers with deep and relevant industry domain knowledge from other similar machines, from other similar fleets of machines and from larger systems and environments. IBM leverages these methodologies, including Natural Language Programming, NLP, through the Cognitive Computer, Watson. More will be discussed later about how IBM leverages Watson as an SCR&R exemplar.

In various industrial sectors, twins are being used to optimize the operation and maintenance of physical assets, systems and manufacturing processes. They are a formative technology for the Industrial Internet of things, where physical objects can live and interact with other machines and people virtually. In the context of the Internet of things, they are also referred to as “cyber objects”, or “digital avatars”.

A9.12: Digital Twins and Digital Modeling of the Supply Chain utilizing Discrete-event Simulation

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Appendix A11: SCR&R Benchmark Report (attached)

Appendix A12: “Risk”: Are You comfortable in discussing RISK within your Company?

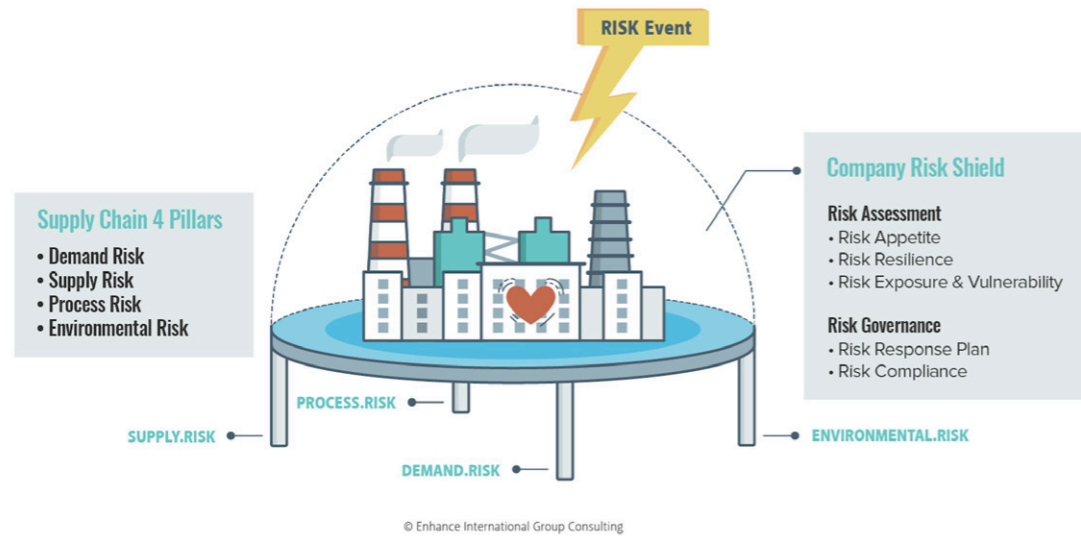


Figure A12.1: SCR&R Culture Transformation: Recognizing that Change Matters

“RISK” is a four-letter word in the phrase “Supply Chain Risk Management (SCR&R)”. Conversations on “RISK” are often avoided in the workplace. If so, there will be some barriers to overcome if SCR&R is going to be embedded into your company’s culture. Making a CHANGE on how “RISK situations” are managed may have its’ challenges (Figure A12.1). “Culture eats Strategy for breakfast!” (a Phrase that Bill Moore and Jerry Rose coined, but is often attributed to Peter Drucker).

Since managing RISK is fundamental to implementing SCR&R, what is the best approach to introduce RISK to your company?

Developing a strategy to best introduce “Risk Management” concepts (Figure A12.2: Level 1) into your company is the first step to initiating your SCR&R journey. This strategy may require a very structured branding strategy within your company to define and create momentum for the SCR&R program.

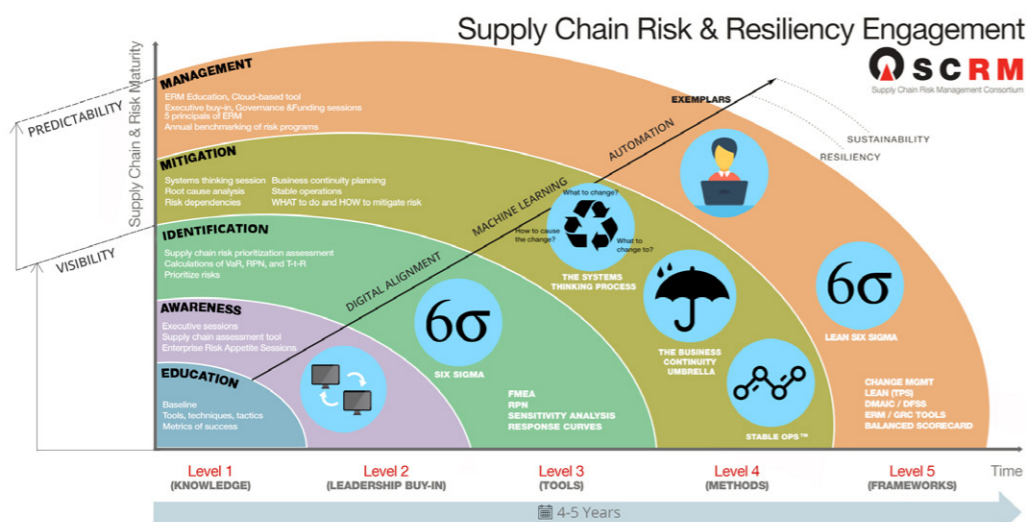


Figure A12.2: Supply Chain Risk Management Development Journey

1. Characterize the Heart ❤️ of Your Company → Gain Culture Understanding

Once the executive team and SCR&R champions have internalized the vocabulary (LEVEL 1: EDUCATION), the first major collaborative activity is to develop a way to integrate SCR&R principles with the “hearts and minds” of the company. Assessing the company’s RISK appetite (where we are today and where we want to go relative to other priorities) is a first major step to initiating Level 2: AWARENESS (Figure A12.3).

It is not uncommon for management to avoid discussing RISKS since it can imply poor performance or decision-making. Common reactions to business challenges include: “it will never happen again”, “we could never foresee it ever happening again”, “we are dealing with unknowns, we should only focus on the knowns (controllable actions)”.



Figure A12.3: SCR&R Culture Transformation Level 2 (Awareness) Recognize Vulnerabilities

This defensive mindset creates vulnerabilities. Therefore, to move forward, we need to understand how to build a protective shield to address these vulnerabilities without adding decision-making complexity proactively. Decision-Making complexity often creates stymied management siloed decisions, resulting in decreased supply chain throughput and increased cost. Therefore, a prudent and practical cross-functional RISK Protection Shield should be developed.

A well-coordinated communications program (branding strategy) will proactively address cross-functional “siloed” stakeholders paradigms and barriers: “the grass is greener on the other side”; “they have it better”; “if they would just do ...”. Openness and candor is paramount in gaining TRUST across the organization.

RISK-based crucial conversations are the first step to identify RISK phrases that are considered too controversial to discuss. Once identified, cross-functional teams will uncover the constraints that prevent the company’s overall success versus their individual siloed goals. These constructive crucial conversations will stimulate opportunities to address previously believed to be unknown knowns (uncontrollable one-of-kind) costly RISKS.

2. Define Current Rules of Engagement → Recognize Supply Chain Vulnerabilities

There are several words that fall into this culture SENSITIVE category, such as: “what is in RED today”, “what are the RISKS in our plan in the future?”, “how do we address our VULNERABILITIES?”.

Therefore, a change in company mindset needs to take place to address compelling questions such as “what are our risks in our supply chain?” “What is the best approach to initiate building an environment where we can start understanding and proactively addressing supply chain risks?”

It is generally accepted that we do not enjoy going through CHANGE (Figures A12.4 and A12.5). CULTURE eats any attempt to CHANGE anything. Your company’s culture needs to find a reason to want to indoctrinate the principles of SCR&R into the hearts and minds of your employees (e.g., “Is it worth the climb?”). Culture adoption often requires taking a step back and looking at the “big picture,” and asking why we care relative to our other priorities and will get rewarded by introducing this new concept called SCR&R.

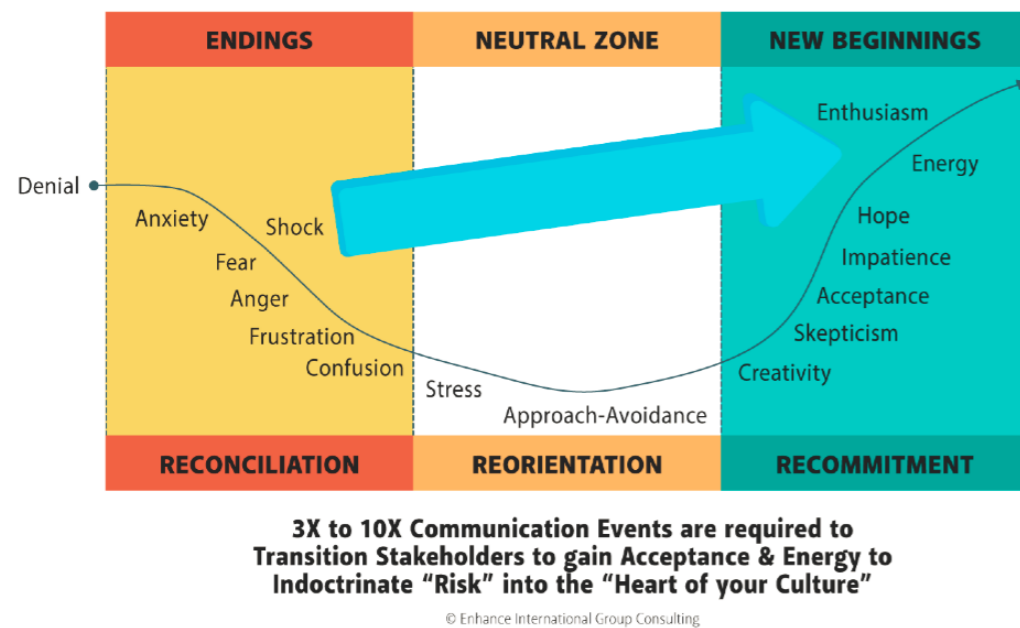


Figure A12.4: Change Transition: Culture Adoption of a New Concept

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1. First, we need to be honest and realistic of current cultural environment’s ability to take on a new idea (program in our company). What is our company’s heartbeat (essence)? Are we currently ready to insert “RISK” into our company’s vocabulary? If not, what are the steps for your culture to begin the SCR&R journey from theory to practice? (EDUCATION)
2. Once we prepare ourselves for the change journey that we will be taking by introducing a new vocabulary into our environment, we need to accept that there are potential Risks that we currently believe are uncontrollable. We need to move our mindset from reacting to eliminating or mitigating in the future. (AWARENESS).

Level	SCRМ Journey	Cultural Transformation Activity
Level 0	No Recognition	SCRМ Appetite
Level 1	Education	Gain Cultural Understanding
Level 2	Awareness	Recognize Vulnerabilities
Level 3	Assessment	Align Enabling Concepts
Level 4	Mitigation	Meld SCRМ Language into Company's Language Identify Barriers to SCRМ Indoctrination
Level 5	Management	Embed SCRМ practices into the Heart of the Company Initiate Resiliency and Sustainability Programs

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Figure A12.5: SCR&R Journey Cultural Transformation Activities

Supply Chain Risk Management Culture Transformation with RISK Management Approaches

Reflection: is your team comfortable openly discussing “RISKS” within your Supply Chain? If we take Supply Chain Risk Management (SCR&R) seriously, should we work to establish a “RISK” branding strategy?

RISK” is your four-letter word to create opportunities and a competitive edge. Developing an adaptive cultural approach for your transition journey will pay dividends for you and your stock-holders.

In the first article, we focused on establishing a foundation for introducing the concept of “RISK” into your company. We also developed strategies for deploying SCR&R with your organization by tapping into the “heart-of-your-company”. Adoption of a new concept (e.g., SCR&R) to become part of the “heart-of-your-company” is one of the most challenging change transitions that a company will encounter. Without a strong and noticeable need for a program like “Safety”, the program will become lost with your many initiatives.

Change is often the most overlooked first step in executing a new program. GE developed Crotonville’s famous leadership and change management practices in 1990’s well before launching major improvement initiatives such as Lean and Six Sigma. We tried to make change last until we were hungry for data-based structured problem-solving approaches. We learned how to collaborate and lead before expecting change to happen “just because it made sense”.

“I used to believe that culture was ‘soft’ and had little bearing on our bottom line. What I believe today is that our culture has everything to do with our bottom-line, now and into the future.” ~ Vern Dosch, Author of Wired Differently with Wally Goulet and Tracy Finneman

If you believe that there is a need to proactively manage risk and make risk an asset that transcribes into a competitive edge, following a structured Organizational Change Management (Figure A12.6) program will significantly increase the likelihood for success to gain the adoption for your tailored SCR&R program.

When addressing the first three steps of the SCR&R adoption roadmap: 1) Appetite; 2) Culture; 3) SC Vulnerabilities, we may encounter pushback from colleagues and stake-



Figure A12.6: Organization Change Acceleration Process

holders. To address this pushback, proactively incorporating OCM methods and tools will increase the likelihood of SRCM adoption. Proactively managing roadblocks before implementing the SCR&R roadmap (Identity, Assess, Mitigate, Manage) will ensure that organizational alignment institutes your SCR&R strategy (Figure A12.7).

Understanding that every organization has different dynamics and constraints, OCM methods can be tailored to your organization’s business strategy. To enable the acceptance of the SCR&R deliverables [1) Risk Dialect; 2) Risk Appetite; 3) Risk Assessment; 4) Value-at-Risk], there is also another set of enabling OCM tools to support OCM execution.

The most common OCM tools provided in Figure A12.8: Create Organizational Alignment support your organization in developing a single voice for your tailored SCR&R program.



Figure A12.7: SCR&R Execution Strategy

Effectively managing this process should be performed by a certified Change Manager. If further interpersonal roadblocks are discovered, Prosci’s ADKAR provides excellent tools to support the Change Manager the support your stakeholders.



Figure A12.8: Create Organizational Alignment: Develop a Single Voice

Aligning the OCM methods and tools to the SCR&R deliverables will ensure that SCR&R implementation is sustainable.



Figure A12.9: Foundational SCR&R Deliverables: Establishing Your SCR&RC Opportunities

“Leadership is not domination, but the art of persuading people to work toward a common goal.” Daniel Golemon, Author of Emotional Intelligence

In summary, the following steps will support your team to navigate the onboarding of the Supply Chain Risk Management journey (Figure A12.10):

1. Establish a RISK DIALECT that enables for meaningful discussion to create your VISION/MISSION and ELEVATOR SPEECH on WHERE your SCR&R Program is going.
2. Utilize the feedback from your RISK APPETITE workout session to provide the messaging and information required to develop your PROGRAM CHARTER. This feedback will ensure that team will align on WHAT your scope and goals for your SCR&R program.
3. Confirm that your STAKEHOLDERS are ALIGNED so that the RISK ASSESSMENT evaluation performed assesses all possible cultural perspectives and ensures that your SCR&R program meets deliverables expectations.

4. Create END-TO-END SC PROCESS MAPS to visualize the scope and utilize this platform to start identifying SC VULNERABILITIES. With today's technology, there are ways to accelerate this insight by modeling your processes utilizing your electronically captured transactional ERP data (e.g., RAAD™). RAAD360™ supports risk assessment, mitigation and what-if analysis on the supply chain data pulled directly from your ERP systems. Data enriched end-to-end SC process mapping will accelerate your visibility to assess and address quantifiable VALUE-AT-RISK SC risks.
5. Transform SYSTEM CONSTRAINTS to identify SC VULNERABILITIES that limit your capabilities from performing at an increased performance level. SYSTEM CONSTRAINTS aligns your end-to-end SC PROCESSES and SYSTEMS.
6. Enable Organization. Suppliers and Customers performance comparisons utilizing FORCE FIELD ANALYSIS so that identified positive capabilities are reinforced and your limitations can be reduced or eliminated. Note: this is very aligned to orchestrating planning across your SC (Planning: Demand, Operational, Tactical, Strategic, Network, Product Lifecycle, etc.). You are only as strong as your weakest link.
7. Collaboratively utilize the THREATS & OPPORTUNITIES MATRIX to frame the need for change as more than simply a short-term threat. Discoveries for framing requires both the identification of threats and opportunities over both the short and long-term. The threat and Opportunities Matrix provide

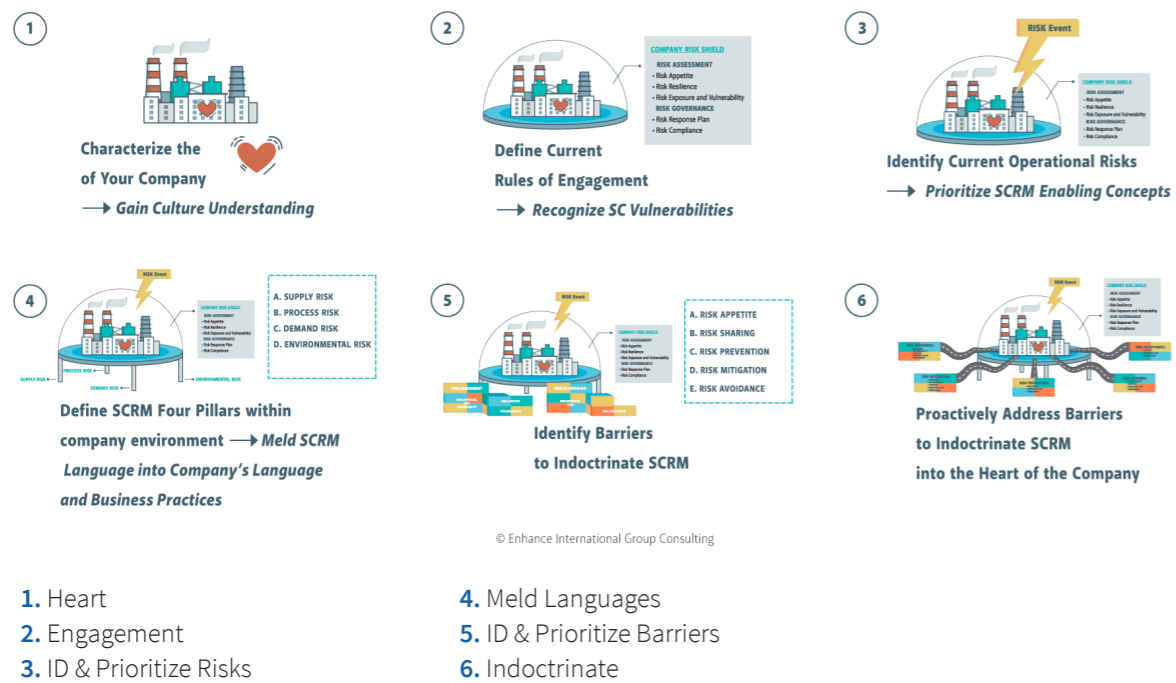


Figure A12.10: SCRM Culture Transformation Journey Transforming Risk into an Asset



