Using Digital Factories to Model Supply Chain Changes

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Speakers

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Sourcing Challenges in the Aftermath of COVID-19

We now live in a world full of disrupted supply chains

Immediate COVID-19 Impact on Manufacturers

1 Supply Chain Disruptions

- “Stay at home” mandates and COVID-19 outbreaks stalled production
- Others were forced to slow or stop production because OEM customers were shutdown and couldn’t take delivery

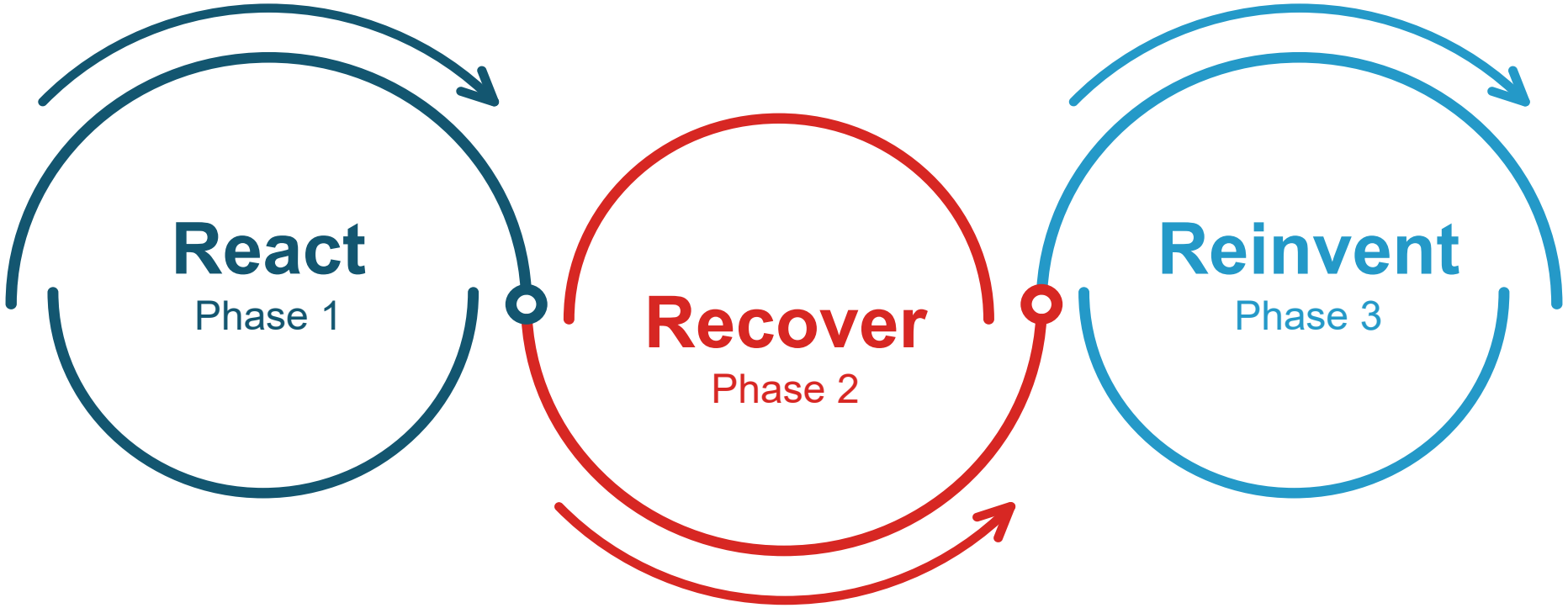
2 Revenue Slowdown

- With suppliers closed manufacturers didn’t have parts – couldn’t fulfill orders impacting revenue
- Business closures of all kinds reduced both business and consumer spending further impacting company revenues

3 Rapid Cost Reductions

- Companies were burning billions of dollars in cash
- Had to immediately reduce expenses to offset revenue reduction – temporary furloughs, salary reductions, spending freezes – but that cash doesn’t come back

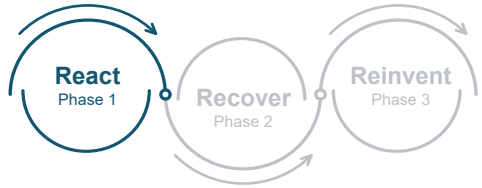
Rebuilding the Business



94% of the Fortune 1000 are seeing supply chain disruptions in the midst of the pandemic
-Fortune, February 2020

48% of the industrial sector plan on diversifying their supply chain over various geographic regions
-Industrial Distribution, April 2020

Mitigating Supply Chain Disruption



Rapidly source missing or limited parts

- Find alternative global regions to source parts when regional plants or logistics routes are closed
- Evaluate other feasible methods of manufacturing to enable other suppliers with different capabilities to make the parts
- Rapidly classify parts based on how they are manufactured to organize commodity-based packages to send to suppliers with those capabilities

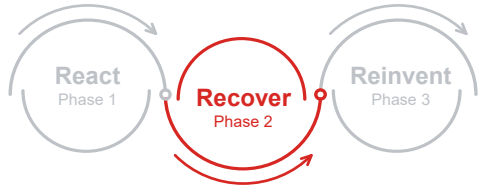
Mitigate material shortages

Rapidly identify equivalent materials that do not require design changes for parts

Make non-invasive modifications to the part design

Make design modifications to the part to enable alternate suppliers to make parts using different manufacturing methods or materials

Getting Back to Full Production



Determine and remedy supply chain “breaks”

- Evaluate, qualify and secure efficient alternate suppliers
- Identify key capacity and capabilities needed from suppliers
- Identify new suppliers through Reverse Auctions

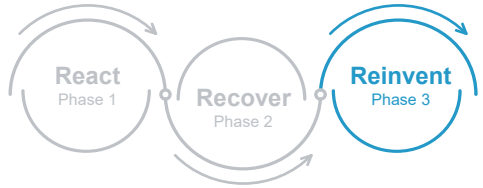
Collaborate with international suppliers while limiting travel

- Collaborate in defining manufacturing processes and cost estimates
- Conduct remote design and production reviews

Develop consistent cost down methods to increase cash flow

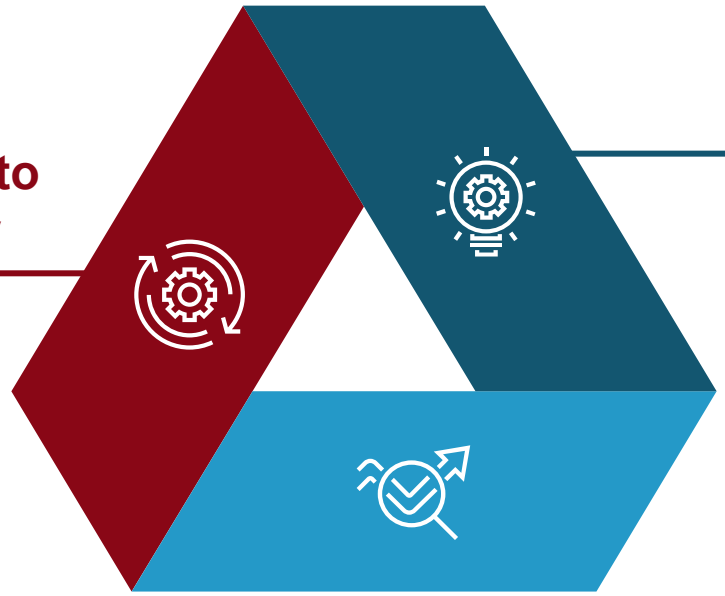
- Identify most cost-effective routings and processes
- Identify design for manufacturing issues
- Identify fair price for both supplier and manufacturer

Creating a Flexible and Resilient Supply Chain



Embrace new business models to increase speed and productivity

- Cloud based collaboration
- Zero RFQ process



Quickly understand impact of design on supply chain

- On demand cost and manufacturing insight while product in design
- Quickly identify costs across multiple zones or suppliers
- Conduct fact-based collaboration and negotiation with suppliers

Optimize supply chain efficiency

- Early manufacturability insight during design to mitigate manufacturing surprises
- Match components with suppliers for capability and capacity
- Design for procurement efficiency

Polling Question #1

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Exploring Supply Chain Options with Digital Factories

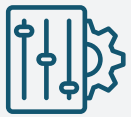
Selecting the Best Supply Chain Options

Digital factory models for the supply chain can make that a lot easier

1. 

   Understand your supply chain options and define TCA elements for each

   - Piece part cost is only one part of the Total Cost of Acquisition (TCA)
   - Numbers do not matter, possible costs do
   - Draw it and socialize it fast, perfect it later

2. 

   Create your digital factory model to cost each TCA element for each supply chain

   - All cost elements need a number
   - Not all elements need the same resolution
   - You one need enough resolution to make a good decision

3. 

   Select SC option(s) based on risk / reward arbitrage and company culture

   - Cost is only one aspect (see also delivery, quality, IP security, etc.)
   - Understand where each supply chain falls on the supply chain curve
   - Understand your company's and industry's unique culture and needs and select option(s) accordingly

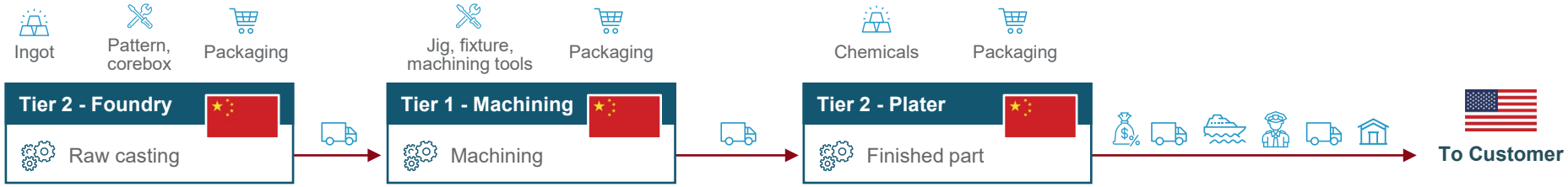
Understanding Total Cost of Acquisition (TCA)

1

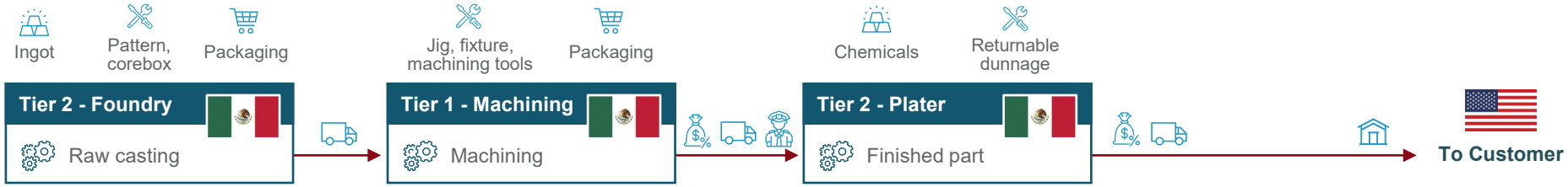
To understand TCA, make a supply chain diagram for each option

- Country of supplier
- Separate supplier / tier
- 1 Process flow marker
- 2 Part identifier
- Long cycle process
- Standard batch process
- Continuous flow line
- Optional process
- Primary raw material
- Scrap
- Purchased part
- Capital expendable tooling
- Visual inspection
- Batch inspection
- Crane transport
- Conveyor transport
- Equipment transport
- Inventory / warehouse
- Land shipping
- Ocean shipping
- Tax
- Import duty / tariff

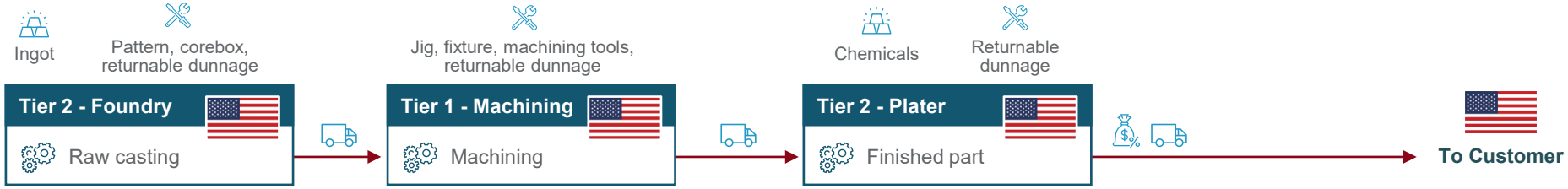
Low Cost Country / Offshore Supply Chain



Low Cost Country / Nearshore Supply Chain



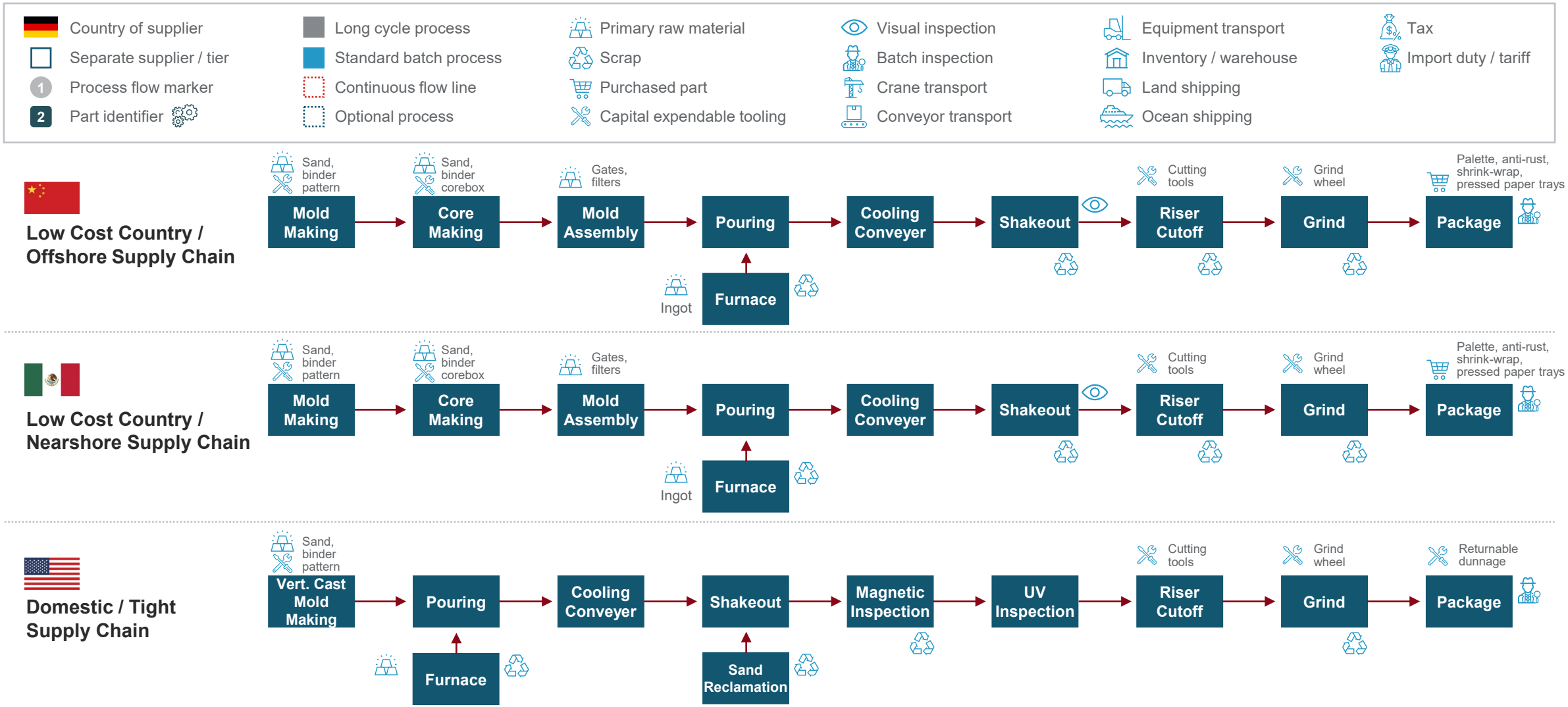
Domestic / Tight Supply Chain



Consider Supplier Differences

e.g., different processes, material, labor rate, overhead

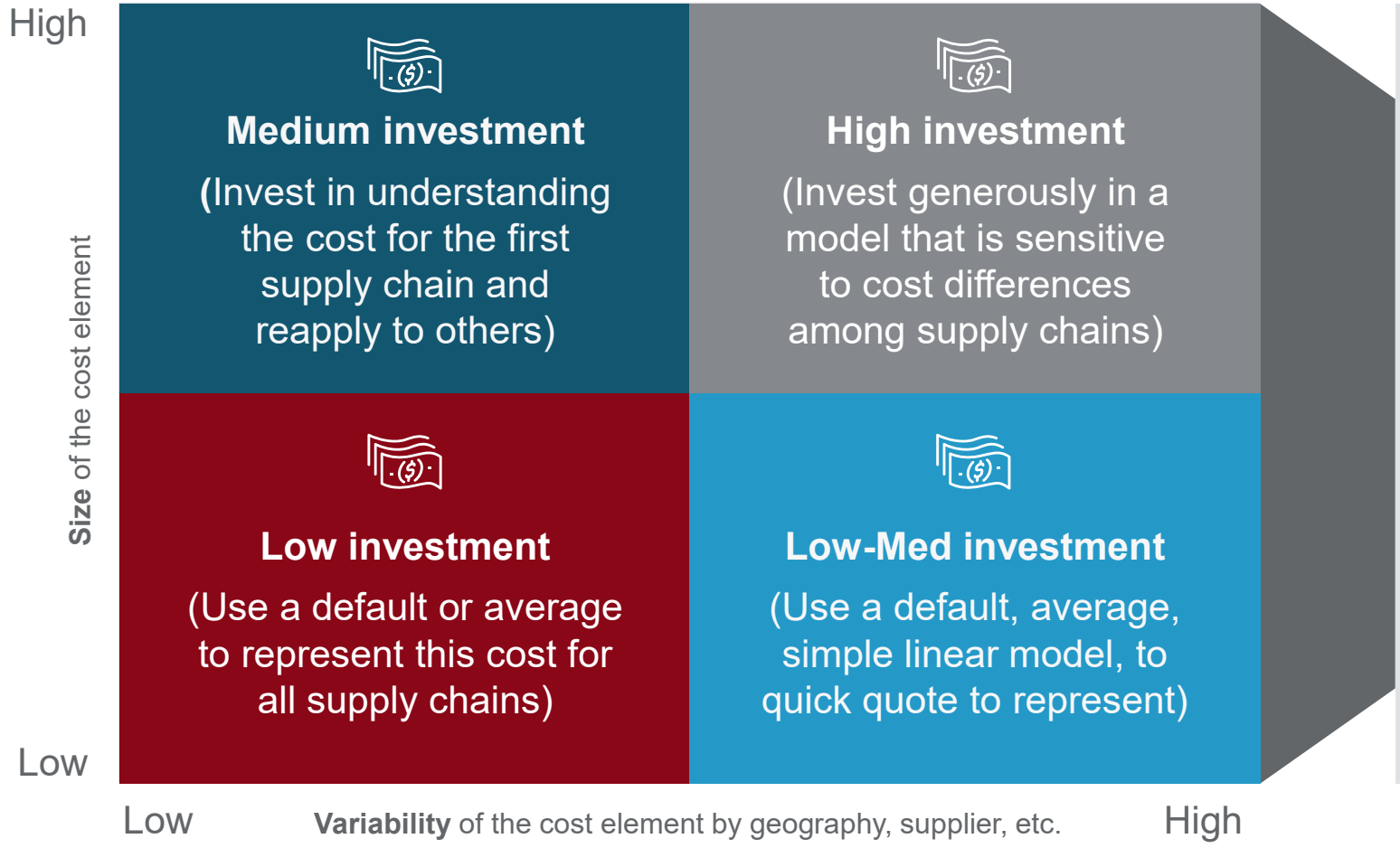
1



Invest Resources Accordingly

2

Not all supply chain resources are created equal



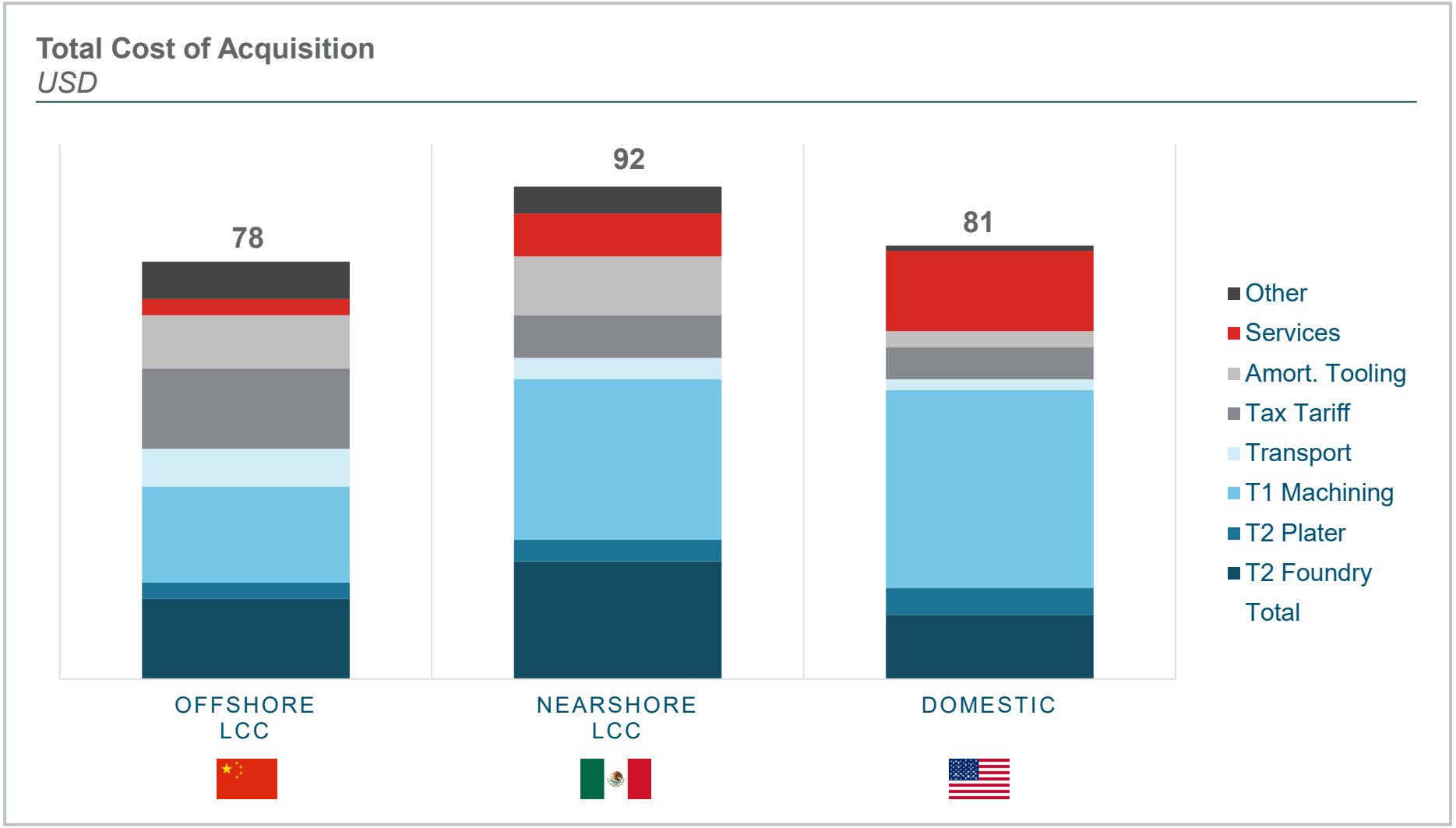
Spend your limited resources/ effort what cost is and where it varies

Pre-estimates the costs before you begin

Costing alternatives include

- Catalogue pricing
- RFQ
- Historical similar to
- Index-based costing
- Parametric costing
- Bottom-up should-cost with process models
- Work breakdown structure
- Custom cost model

Decisions Made Through a TCA Lens



Total cost of acquisition is a full view of what it costs to deliver the part or product to the receiving facility

If it is not quantified, it will not be considered

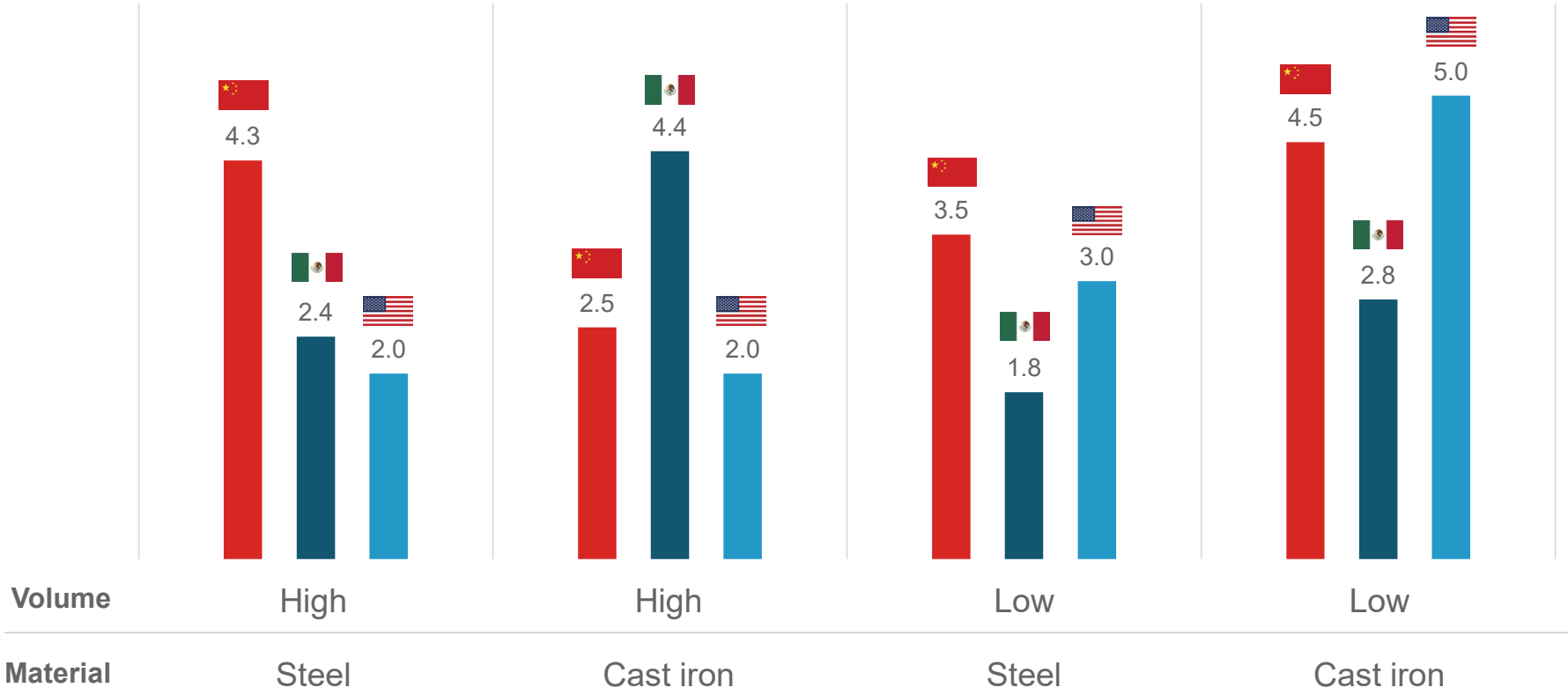
Everything can be quantified

The situation and decisions become much clearer with a TCA lens on the supply chain options

Spend Portfolio Requirements

Different clusters of spend may require different solutions

Total Cost of Acquisition
Millions of USD



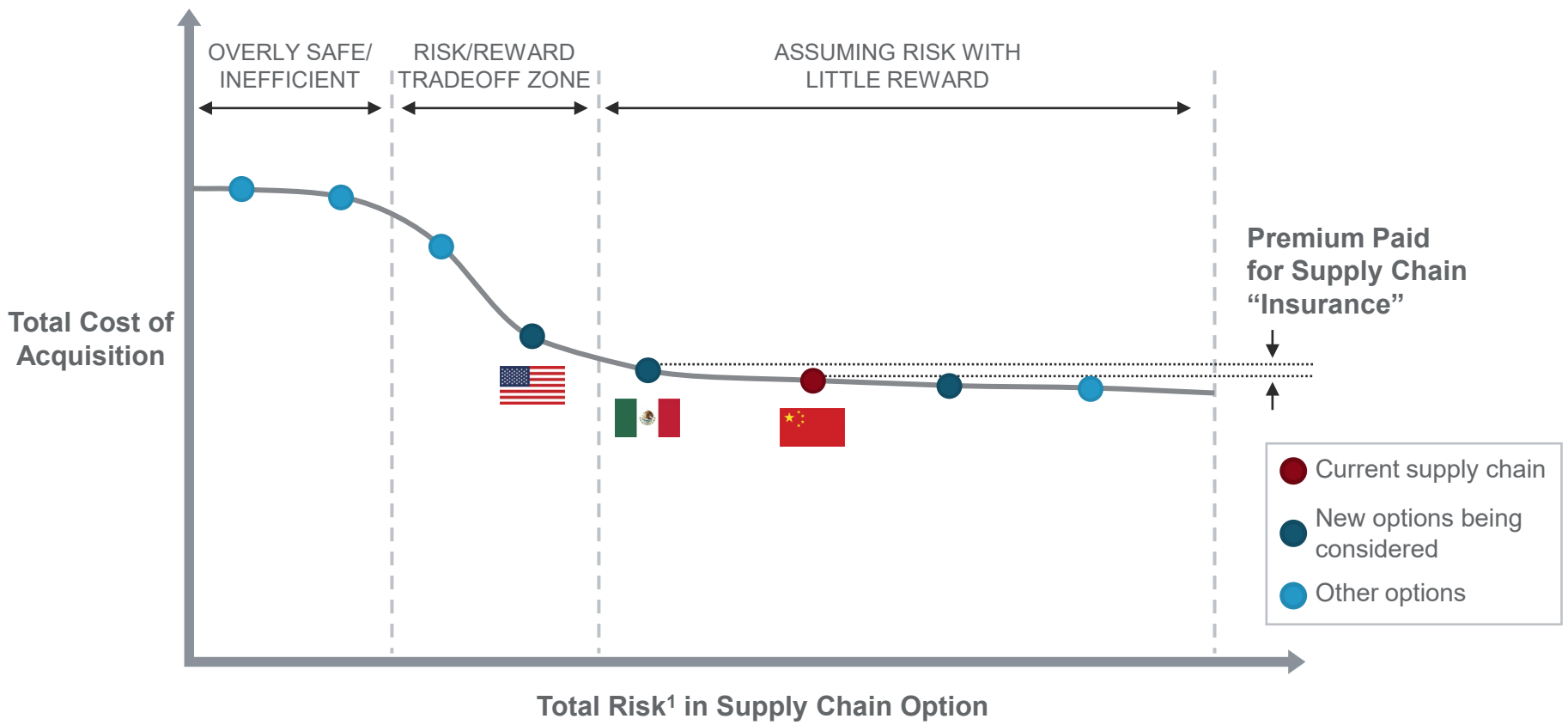
Pick a representative set of parts to evaluate

Does the answer change depending on the spend assumptions?

Consider whether a lane strategy vs. a flexible supplier is the answer

Do you have any clusters where there is no good solution → add supply chain options more appropriate

Match Organizational Goals with the Appropriate Phase of Recovery



Cost is only one aspect (see also delivery, quality, IP security, etc.)

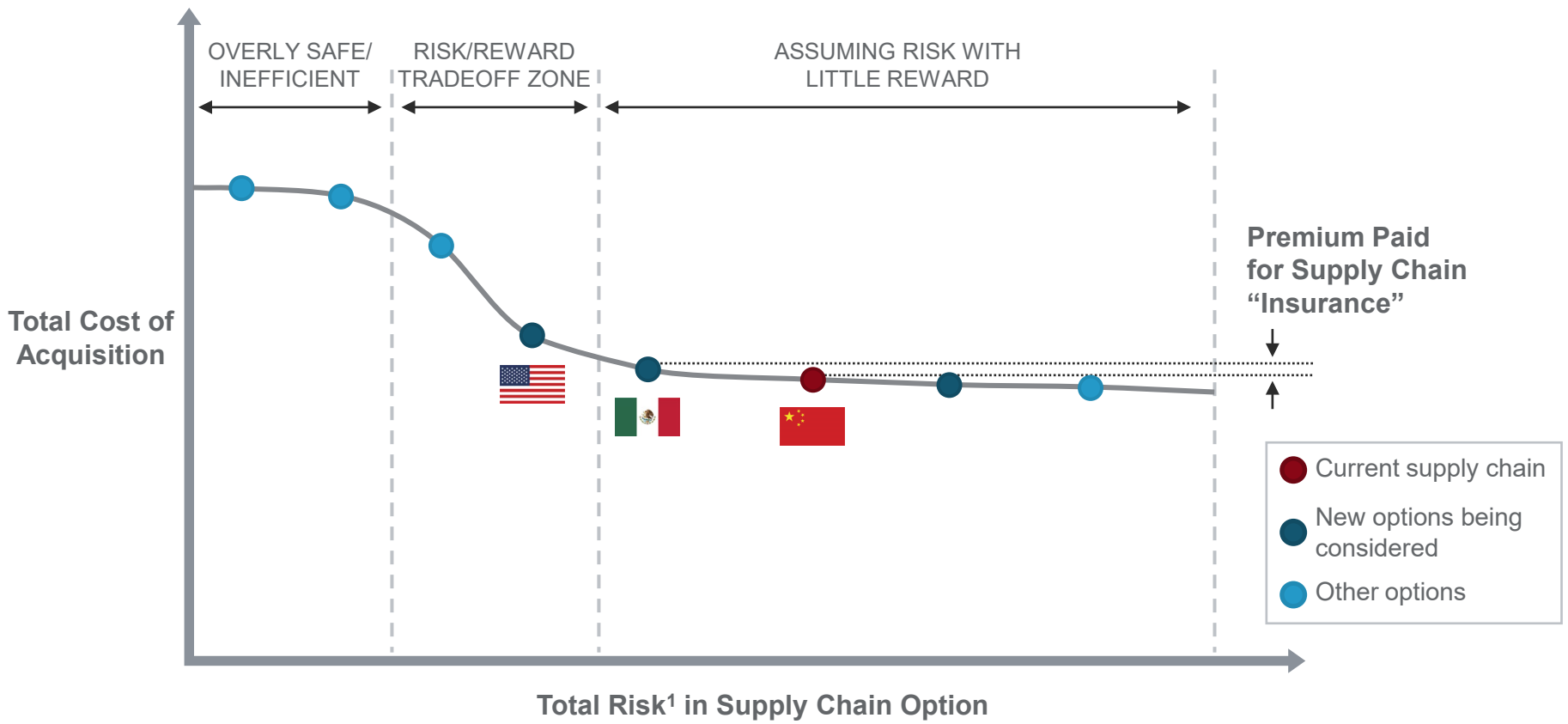
Understand where each supply chain falls on the supply chain curve

Understand your company's and industry's unique culture and needs and select option(s) accordingly

Look for the arbitrage options that give you a lot more flexibility and risk reduction for a tiny "insurance premium"

Understand the portfolio (today and anticipated, not just a small amount of spend)

Evaluating Risk vs Reward



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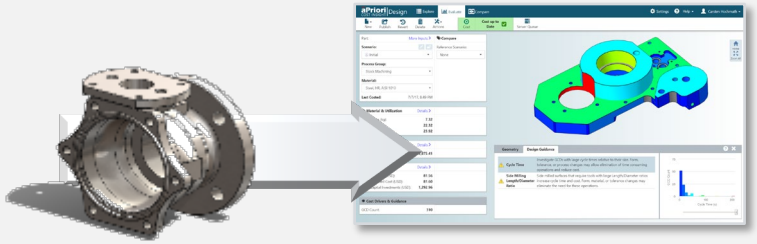
Polling Question #2

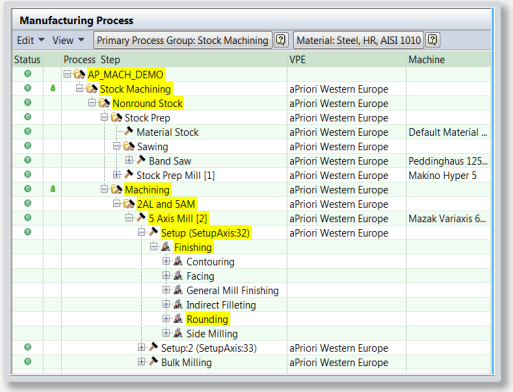
How aPriori Digital Factories Help

What Makes aPriori Different?

Integrated with the Digital Thread



Uses a product's Digital Thread to read geometry and automatically generate a cost & manufacturing analysis based on product designs

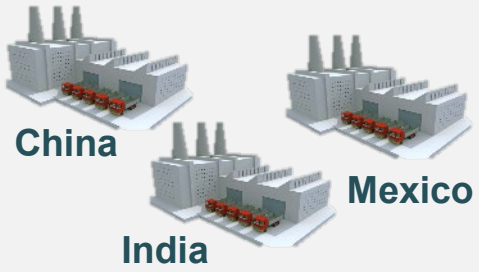


Manufacturing Simulations

Provides accurate analysis of real-world manufacturing conditions; not comparisons to outdated supplier quotes

Enables quick evaluation of manufacturing options at in-house or supplier facilities using region specific Digital Factories

Regional Supplier Data



Single database architecture allows Cost Engineers, Designers, & Buyers to collaborate and evolve estimates as a design takes form

Cost & Mfg. Collaboration

Q&A

Want to see the power of a digital factory on *your* part or assembly?

Contact our Business Development Representative, Daniel Nugent, to set up a free assessment on *your* part with an aPriori Applications Engineer.

dnugent@apriori.com

603-261-0969

Thank you for attending

Stephanie Feraday, President & CEO, aPriori

Eric Hiller, Managing Partner, Hiller Associates

Dave McDermaid, Business Consulting Director, aPriori