Adapting and Thriving in a VUCA World

Conclusions for Post COVID-19 Supply Chains

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1

The Rise of the VUCA World

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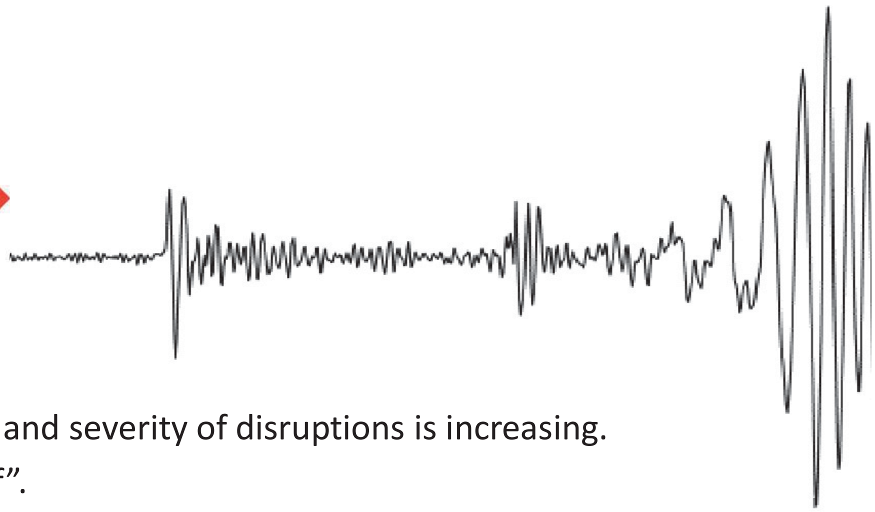
Volatile



The frequency and severity of disruptions is increasing.

"When" not "if".

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Uncertain

It has become increasingly difficult to predict what will happen.

The three truths about forecasting:

1. Forecasts start out wrong
2. The longer the forecasted time range the higher the error rate
3. The more detailed the forecast the higher the error rate

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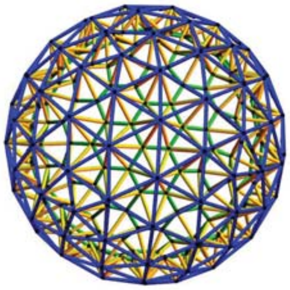
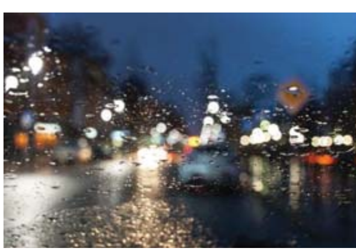
Complex



Today our supply chains have more connections and interdependencies leading to:

1. Elongation – cumulative lead times have extended as we source and sell globally
2. Fragmentation – many more nodes and inputs makes effectively managing integration much more difficult
3. Fragility – even small initiating events can have devastating effects

Ambiguous



It is becoming more and more difficult to tell what is happening.

Supply chains are drowning in data but starved for relevant information.

VUCA is the "New Normal" for Supply Chain

Supply Chain Characteristics	1965	Today
Supply Chain Complexity	Low	High
Product Life Cycles	Long	Short
Customer Tolerance Times	Long	Short
Product Complexity	Low	High
Product Customization	Low	High
Product Variety	Low	High
Long Lead Time Parts	Few	Many
Forecast Accuracy	High	Low
Pressure for Leaner Inventories	Low	High
Transactional Friction/Customer Tolerance	High	Low

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Operating Profit and Inventory 2010 to 2019

Results for 2010 Compared to 2019 by Sector	Operating Margin	Inventory Turns
Retail		
Broadline Retail	-16%	Flat
Drug Retail	-18%	+2%
Grocery Retail	-25%	-7%
Process Manufacturers		
Chemical	-20%	-20%
Consumer Nondurables	-10%	Flat
Containers and Packaging	+30%	Flat
Personal Products	-9%	-2%
Pharmaceuticals	+15%	Flat

Results for 2010 Compared to 2019 by Sector	Operating Margin	Inventory Turns
Discrete Manufacturers		
A&D	-1%	Flat
Automotive	-4%	-1%
Automotive Parts	-35%	+8%
B2B Technology	-12%	-13%
Furniture	-10%	-20%
Medical Device	+6%	-4%
Consumer Durables	+25%	-18%
Diversified Industries	Flat	-11%
Semiconductors	-12%	-19%

LORA CECERE, "SUPPLY CHAIN LEADERS REARRANGING DECK CHAIRS? YES, I THINK SO." JULY 19, 2020, HTTPS://WWW.SUPPLYCHAINSHAMAN.COM/MARKET-DRIVEN/SUPPLY-CHAIN-LEADERS-REARRANGING-DECK-CHAIRS-YES-I-THINK-SO/ (USED WITH PERMISSION)

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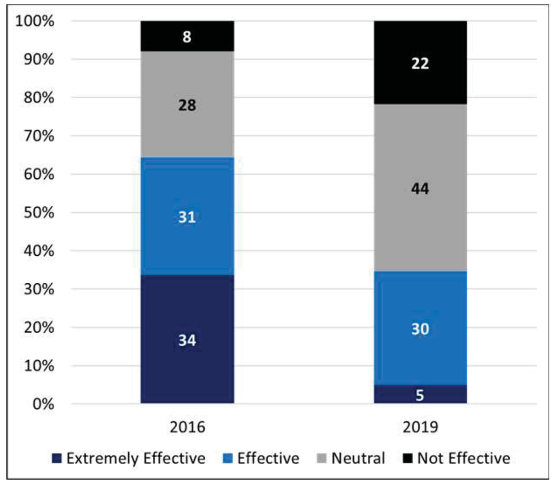
Falling Confidence in S&OP in the VUCA World

Comparison of perceived S&OP effectiveness 2016 versus 2019

"Supply Chain Leaders Rearranging Deck Chairs? Yes, I Think So." JULY 19, 2020, https://www.supplychainshaman.com/market-driven/supply-chain-leaders-rearranging-deck-chairs-yes-i-think-so/



…and this was BEFORE COVID-19!

Harvard Business Review

Topple Rates Increased 6X

"We investigated the longevity of more than 30,000 public firms in the United States over a 50-year span. The results are stark: Businesses are disappearing faster than ever before. Public companies have a one in three chance of being delisted in the next five years, whether because of bankruptcy, liquidation, M&A, or other causes. That's six times the delisting rate of companies 40 years ago. And the rise in mortality applies regardless of size, age, or sector. Neither scale nor experience guards against an early demise.

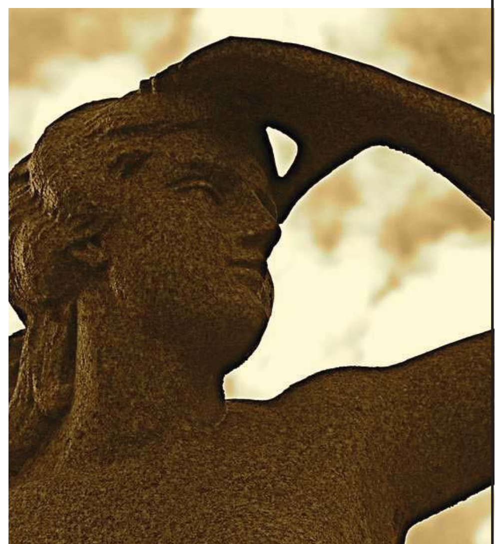
We believe that companies are dying younger because they are failing to adapt to the growing complexity of their environment. Many misread the environment, select the wrong approach to strategy, or fail to support a viable approach with the right behaviors and capabilities."

(Martin Reeves, Simon Levin, and Daichi Ueda, Harvard Business Review, January-February 2016)

"We believe that companies are dying younger because they are failing to adapt to the growing complexity of their environment."

Looking Ahead and Moving Forward

1. Leadership must start with the assumption that big disruptions ARE going to happen.
2. Leadership cannot build business and supply chain models based on profit maximization strategies that ignore the above conclusion.



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Resilience – the Survival Factor

Resilience is the ability of a system to return to equilibrium after a large disturbance (either imposed or self-imposed). If a system is too rigid, the disturbance will push it into chaos.

The Economist

1. Companies should seek to build supply chain resilience and the ability to adapt to the VUCA world.
2. Investors are beginning to closely watch how companies foster resilience.

"Supply Chain Resilience for an Era of Turbulence," Economist Intelligence Unit, March 2021, pp. 2–3 [report commissioned by the Association for Supply Chain Management (ASCM)].

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Resilience Requires Coherence

The ability to align subsystem purpose and actions with that of the system. Subsystems that are not in alignment can cause coherence to break down and push the system into collapse.

The alignment of local actions with the global objective is a key component for prevailing improvement disciplines.

LEAN

Ohno

TOC

Goldratt

6 Sigma

Deming

13

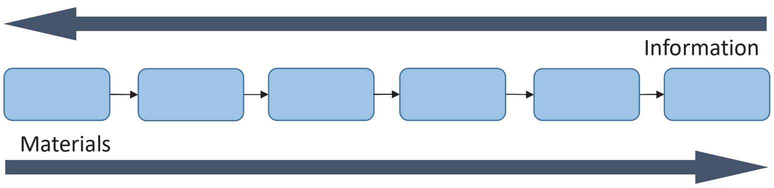
But Coherence to What?

- What is the true objective of a supply chain, and how can the subsystems' purposes be best aligned to that objective?
- Is there a fundamental principle that can focus every business and its subsystems?

14

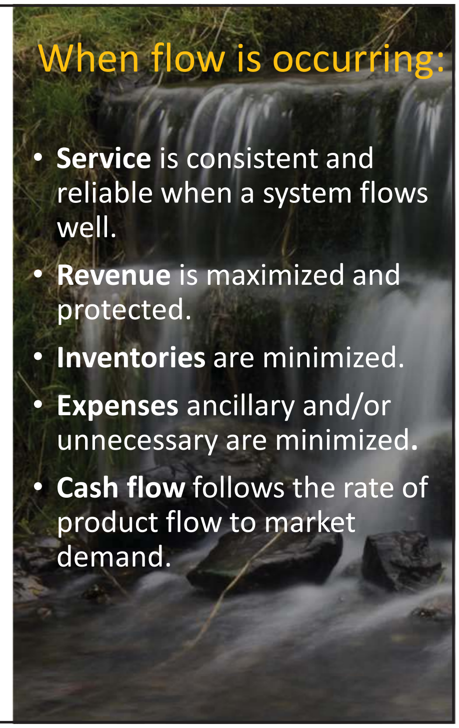
Coherence to Flow is the Key

All benefits will be directly related to the speed of FLOW of materials and information. George W. Plossl



Protection and Promotion Flow =

ROI Maximization



When flow is occurring:

- **Service** is consistent and reliable when a system flows well.
- **Revenue** is maximized and protected.
- **Inventories** are minimized.
- **Expenses** ancillary and/or unnecessary are minimized.
- **Cash flow** follows the rate of product flow to market demand.

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Flow is THE Lever for ROI

$$\boxed{\Delta \text{Flow}} \rightarrow \boxed{\Delta \text{Cash Velocity}} \rightarrow \boxed{\Delta\left(\frac{\text{Net Profit}}{\text{Investment}}\right) \rightarrow \Delta \text{ROI}}$$

Flow is the rate at which a system converts material to product required by a customer.

Cash velocity is the rate of net cash generation; sales dollars minus truly variable costs minus period operating expense (aka contribution margin).

Net profit/investment the equation for ROI

This equation first appeared in *Demand Driven Performance: Using Smart Metrics* (Smith and Smith, McGraw-Hill, 2014)

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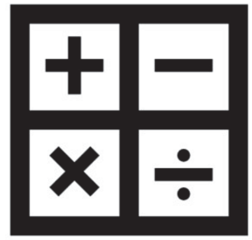
What About Cost?

- Companies throughout the world obsess over cost performance at the strategic, tactical and operational level
- Cost strategies rely on predictable and consistent volume to attempt to maximize profit and ROI
- Many companies attempt to force coherence to cost by assuming this equation is valid:



$$\Delta\text{Cost} \rightarrow \Delta\text{Cash Velocity} \rightarrow \Delta \left(\frac{\text{Net Profit}}{\text{Investment}}\right) \rightarrow \Delta\text{ROI}$$

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Coherence to Cost is Trouble in the VUCA World

- When the volume is not realized in the predicted way there are three bottom line effects:
    1. Too much of the wrong
    2. Too little of the right
    3. Additional expenses to attempt corrections
- Assets are fundamentally misaligned to the market
- The larger the disruption, the worse the misalignment
- The bigger the misalignment the lower the chance of survival

The Economist

"A focus on maximum efficiency harms resilience."

"Supply Chain Resilience for an Era of Turbulence," Economist Intelligence Unit, March 2021, pp. 2–3 [report commissioned by the Association for Supply Chain Management (ASCM)].

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The Flow Based Reality

This is not even cost accounting!

$$\Delta\text{Cost} \rightarrow \Delta\text{Cash Velocity} \rightarrow \Delta\left(\frac{\text{Net Profit}}{\text{Investment}}\right) \rightarrow \Delta\text{ROI}$$

- Cost is a consequence of flow within a defined period.
- The better flow through to the market in a period the better the calculated cost (units sold/variable and fixed costs).

This is cost accounting!

$$\boxed{\nearrow \Delta\text{Cost}}$$

$$\Delta\text{Flow} \rightarrow \Delta\text{Cash Velocity} \rightarrow \Delta\left(\frac{\text{Net Profit}}{\text{Investment}}\right) \rightarrow \Delta\text{ROI}$$

This is management accounting!

Cost was NEVER intended to be a decision driver; its creation was to ensure transparent and consistent reporting to shareholders and tax authorities!

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The Missing Links to Flow

$$\Delta\text{Visibility} \rightarrow \Delta\text{Variability} \rightarrow \Delta\text{Flow} \rightarrow \Delta\text{Cash Velocity} \rightarrow \Delta\left(\frac{\text{Net Profit}}{\text{Investment}}\right) \rightarrow \Delta\text{ROI}$$

Variability is defined as the summation of the differences between our plan and what happens.

Variability ↓ = Flow ↑

Variability ↑ = Flow ↓

Visibility is defined as **relevant information** for decision making.

Visibility ↑ = Variability ↓

Visibility ↓ = Variability ↑

Debra Smith and Chad Smith, "*Demand Driven Performance – Using Smart Metrics,*" McGraw-Hill, 2014

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The Biggest Question Becomes…

How do we gain visibility to relevant information in the VUCA environment in order to best manage to flow?

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Four Essentials for Distilling Relevant Information

1. Relevant Ranges Defined
2. Flow-Based Operating Model Defined
3. Reconciliation (bi-directional) between Relevant Ranges
4. Organizational Flow-Based Metrics

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1. Relevant Ranges

- From economics and management accounting
- The relevant range is the time frame in which specific assumptions and the derivative metrics and behaviors are valid
- What is relevant at any one time will differ between ranges.
- Force fitting irrelevant assumptions into the wrong range will directly lead to distortive "information" and behaviors
- Different relevant ranges will be managed by different personnel

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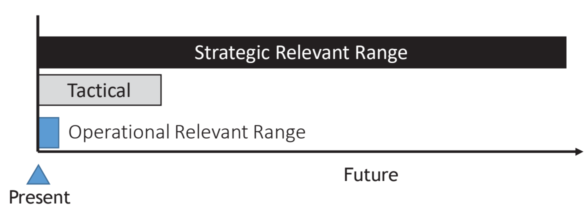
Each Range has a Version of the Flow Equation

Δ Strategic Visibility $\rightarrow \Delta$ Strategic Variability $\rightarrow \Delta$ Strategic Flow $\rightarrow \Delta$ Strategic Cash Velocity $\rightarrow \Delta\left(\frac{\text{Net Profit}}{\text{Investment}}\right) \rightarrow \Delta$ROI

Δ Tactical Visibility $\rightarrow \Delta$ Tactical Variability $\rightarrow \Delta$Tactical Flow $\rightarrow \Delta$ Tactical Cash Velocity $\rightarrow \Delta\left(\frac{\text{Net Profit}}{\text{Investment}}\right) \rightarrow \Delta$ROI

Δ Operational Visibility $\rightarrow \Delta$ Operational Variability $\rightarrow \Delta$ Operational Flow $\rightarrow \Delta$ Operational Cash Velocity $\rightarrow \Delta\left(\frac{\text{Net Profit}}{\text{Investment}}\right) \rightarrow \Delta$ROI



The relevant range is at the visibility stage of the equation

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2. A Flow Based Operating Model

1. Promoting and protecting flow is the key to driving return on investment now and in the future.
2. Flow can be a unifying factor, not just in operations but also between functions and across the supply chain, to advance and align their individual primary objectives.
3. Cost is a consequence of flow management over a defined period.

A flow-based operating model is the defined operational capability specifically designed on and for the fundamental principle of the promotion and protection of flow.

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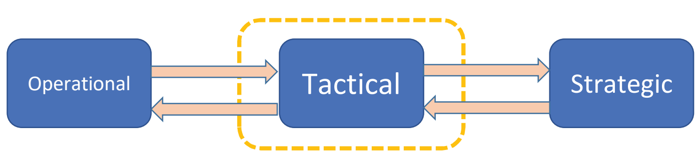
3. Tactical Reconciliation

- The assumptions and information between relevant ranges differ
- There is a need to reconcile the differences in a constant bi-directional and iterative fashion in order to drive adaptation
- Strategy must be influenced by operational capability and performance as well as how the model might perform under predicted conditions.
- Operational capability must be influenced by predicted conditions and/or strategic expectations in future time periods.



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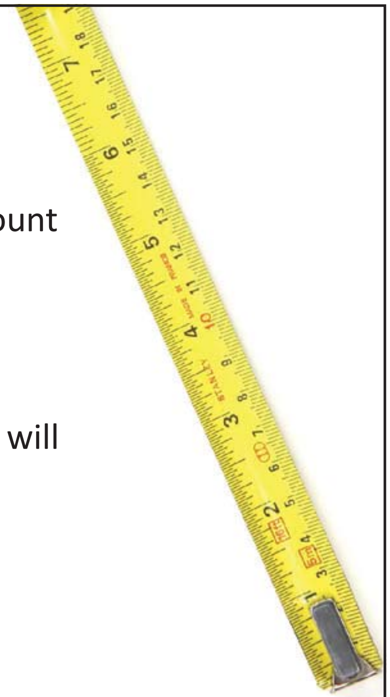
26

4. Flow-Based Metrics



- Any suite of flow-based metrics must take into account the other three prerequisites:
  - ✓The metrics must fit the range
  - ✓The metrics must fit the flow-based operating model
  - ✓The metrics must be reconcilable between ranges.
- Force fitting non flow-based metrics into any range will lead to conflicts and distortions throughout the organization – it will obscure what is relevant!

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The Characteristics of an Effective Metrics Suite

Performance Objectives ▶ **Signals** ▶ **Intended Behavior** ▶ **Measured Result**

Performance Objectives

What is the flow-based objectives of the range?

Signals

What signals are used to convey relevant information about the objective?

What are the ranges of priority in the signal set?

Who sees the signals in each range?

Intended Behavior

What are expected behaviors in response to signals and their relative strength?

Who is intended to act?

Measured Result

What specific outcome is measured for each range?

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28

Demand Driven Adaptive Enterprise™

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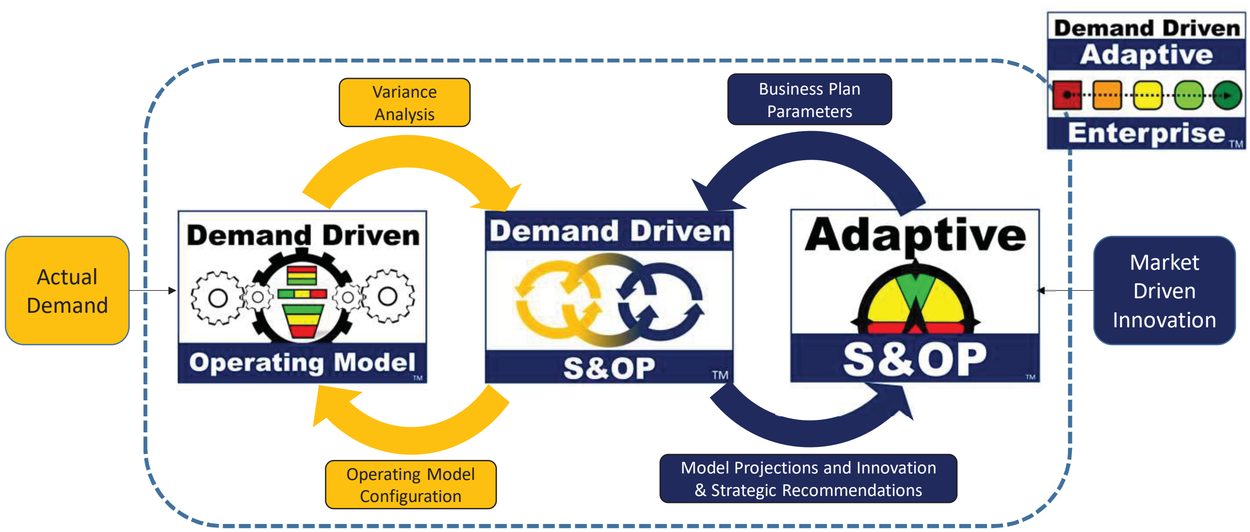
Demand Driven Adaptive Enterprise Model



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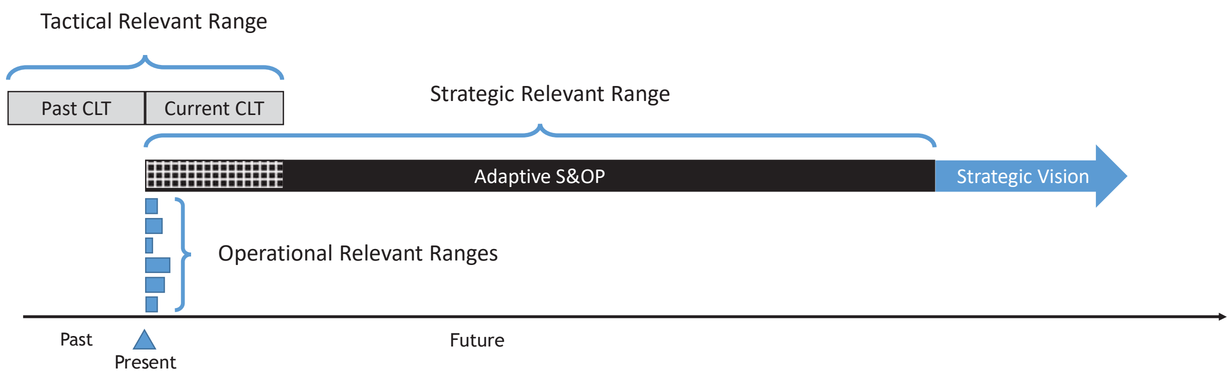
Relevant Ranges in the DDAE Model



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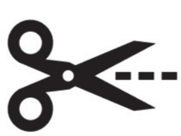
The Flow Based Operation Model

Combines elements of MRP, DRP, Lean, Theory of Constraints, Factory Physics and Six-Sigma.

Strategically places **decoupling points** for lead time compression and variability (bullwhip) mitigation



Strategically places **control points** for schedule synchronization

Protects decoupling and control points through stock, time and capacity buffers

Paces operations to **actual demand**

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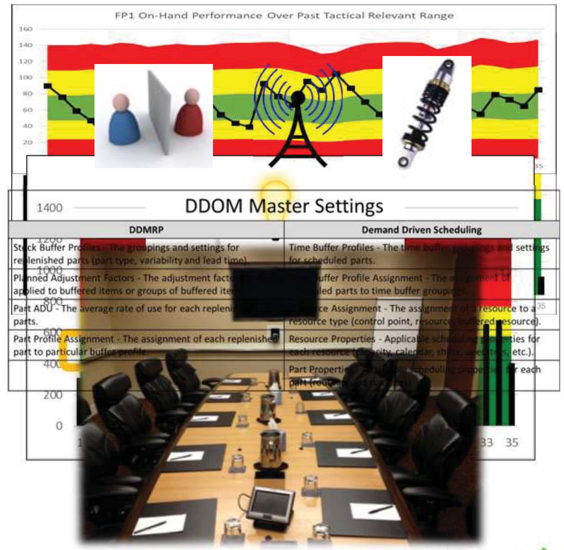
Tactical Reconciliation

1. Tactical Review (Demand Driven Variance Analysis)
2. Tactical Projection (Projecting model performance within the tactical range)
3. Tactical Configuration/Reconciliation (shaping the model to the evolving environment and strategy)
4. Tactical Exploitation (short range supplements to flow when necessary)
5. Strategic Recommendation (ideas for better model performance needing senior–level approval)
6. Adaptive S&OP Participation (bring operational reality to the strategic side of the model)



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The DDAE Metric Suite

Performance Objectives	Signals	Behavior	Measured Result
Operational Reliability	DDMRP supply order recommendations, resource dispatch lists	Execute to the model, plan, schedule, and market expectation	Net flow status, order acceptance and order release timeliness, on-time to ship, schedule sequence adherence
Operational Stability	On-hand and synchronization alerts, time buffer penetrations, resource load graphs	Pass on as little variation as possible	On-hand status, time and capacity buffer status, control point schedule stability
Operational Velocity	Work-order progression/flow exception reports	Pass the right work on as fast as possible	On-time to buffer, request to promise gap, scrap, expedite fees, safety
Tactical Waste Reduction	Pareto, buffer run, and control charts Buffer entry reports Reason code assignments	Strive to improve the output potential/capability of the model configuration within the tactical period.	Inventory, lead time, fill rate, on-time delivery, yield/scrap
Tactical Contribution Margin	Buffer projection reports Resource loading Product contribution margin reports	Maximize cash generation given the model configuration potential and tactical opportunities (volume and rate) within the tactical period.	Period contribution
Tactical Expense Control	Expedite expenses, OT in past period	Spend minimization to meet the requirements of the market and the DDOM design within the tactical period.	Tactical expense buffer utilization
Strategic Contribution Margin	Period revenue, period variable costs, period expenses, period contribution and rate	Drive innovation (internal and external) and growth to increase cash generation capability (rate)	ROI
Working Capital	ITR, Taguchi Capability Index (Cpm), acid-test ratio, inventory liquidity potential	Ensure proper levels of working capital to protect and promote flow in the short and long term	
Market Volume	Market share, sales volume, quality (service levels, warranty claims and reliability, market perception)	Ensure and grow a solid base of business for the enterprise (volume)	

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34

More Detail Available

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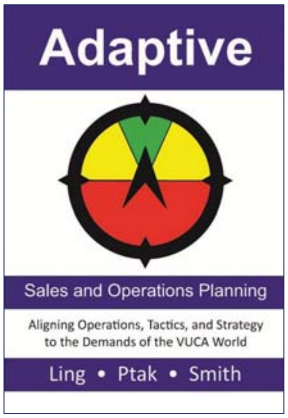

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35