



An Introduction to the Demand Driven Adaptive Enterprise Model

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Professional Development Reminder

1	CEU per webinar	Demand Driven	CEU	Demand Driven	CEU	Adaptive Enterprise	CEU
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More Detail Available

“It is not too long, or too deep, but explains to Management and the Executive of any company working in the supply chain, why they are battling to succeed with current planning and control systems that were developed 50 years ago, and why they need to change and what they need to change to.”

Ken Titmuss
CFPIM, CSCP, SCOR-P, CPF, PLS, CS&OP, CSCA, CLTD,
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The Demand Driven Adaptive Enterprise



Surviving, Adapting, and Thriving
in a VUCA World

Carol Ptak • Chad Smith



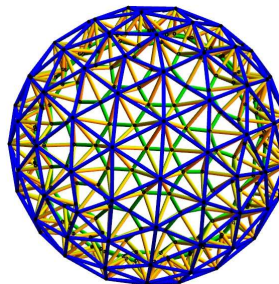
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What is VUCA

- Volatile
- Uncertain
- Complex
- Ambiguous



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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	High	Low



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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.”



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Risks in the VUCA World

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

COLLAPSE: Change from within or outside the industry renders the firm's business model obsolete

CONTAGION: Shocks in one part of the business spread rapidly to other parts of the business

FAT-TAIL: Rare but large shocks, such as natural disasters, terrorism, and political turmoil

DISCONTINUITY RISK: The business environment evolves abruptly in ways that are difficult to predict

OBSOLESCENCE RISK: The enterprise fails to adapt to changing consumer needs, competitive innovations, or altered circumstances

REJECTION RISK: Participants in the business's ecosystem reject the business as a partner

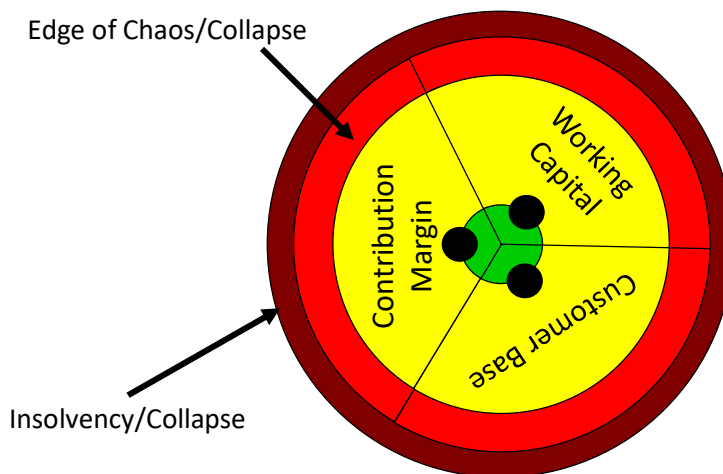


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The Organizational “Vital Signs”



- Working Capital = inventory & cash & credit
- Contribution Margin = cash generation rate
- Customer Base = market share, sales, service & quality

Organizational signals/alarms intensify as any or all of these vitals move toward the outer ring!



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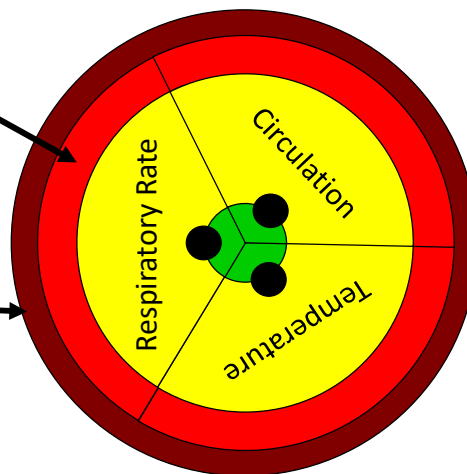
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An Analogy – The Human Vital Signs

Critical Condition

Death



- Circulation = pulse and blood pressure
- Respiratory Rate = the number of breaths per minute
- Temperature = a small zone must be maintained or it will result in fever or hypothermia

Medical attention intensifies as any or all of these vitals move toward the outer ring!



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Complex Adaptive Systems

Why Complex?

- 1. Nonlinearity.** Dynamic interactions and high degrees of inter-dependencies across a throughout a multi-dimensional structure. Which means...
- 2. Extreme sensitivity.** Lots of small initiating events occurring in a short time frame can produce significant nonlinear outcomes that may become extreme events. Which means...
- 3. Disproportionate cause and effect.**
A part that costs ten cents can halt the assembly of multimillion dollar end items as quickly as a \$10,000 part.

Debra Smith and Chad Smith, "Demand Driven Performance – Using Smart Metrics," McGraw-Hill, 2014, p. 189



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Why Adaptive?

Refers to the way a system changes or evolves through a process:

- 1. Emergence** is a reconfiguration of the system triggered externally or internally.
- 2. Feedback** is a set of signals and triggers monitored by adaptive agents.
- 3. Selection** is decisions, actions and learning in response to signals and triggers.

Complex Adaptive Systems Key Attribute, Characteristics and Success Factor

Key Attribute

Coherence

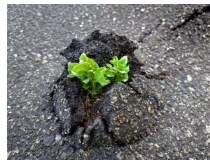
Subsystem behavior is in alignment with the overall system objective



Success Factor

Resilience

The ability to maintain or restore system equilibrium through large shocks.



Characteristics

1. **Boundaries** – the practical limits of the subsystems and overall system.
2. **Edge of Chaos** – the zone between equilibrium and chaos (collapse).
3. **Signals** – the communication protocol within the system.
4. **Signal Strength** – part of the communication protocol conveying priority.
5. **Feedback Loops** – mechanisms to judge system and subsystem performance
6. **Adaptive Agents** – those who receive, interpret, learn and react to signals.

Debra Smith and Chad Smith, "Demand Driven Performance – Using Smart Metrics," McGraw-Hill, 2014, p. 189



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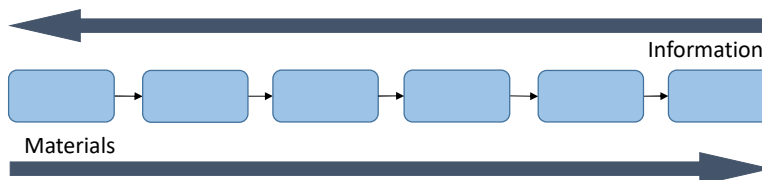
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Coherence to Flow

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

George W. Plossl



**Protection and Promotion Flow =
ROI Maximization**



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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.

Explaining Flow

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

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

Quantifying Flow

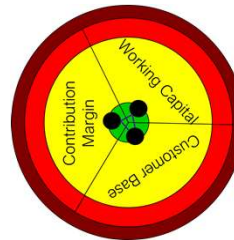
- Throughput * Lead Time = WIP or...
- WIP/Lead Time = Throughput or...
- WIP/Throughput = Lead Time

Flow and the Company Vitals

Flow is a direct contributor to all three vitals.

Flow and Cost

The better things flow, the better controlled costs will be in any particular period.



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 (aka contribution margin) minus period operating expense.

Net profit/investment the equation for ROI



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The Missing Elements for 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 Prerequisites for Relevant Information



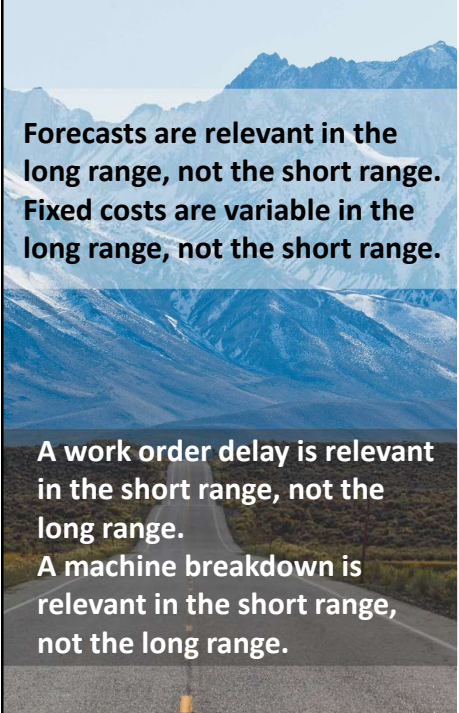
1. Understanding Relevant Ranges
2. Implement a Flow-Based Operating Model
3. Tactical Reconciliation (bi-directional) between Relevant Ranges
4. Implement Flow-Based Metrics



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1. Relevant Ranges

Forecasts are relevant in the long range, not the short range.
Fixed costs are variable in the long range, not the short range.

A work order delay is relevant in the short range, not the long range.
A machine breakdown is relevant in the short range, not the long range.

- Relevant Range = The time frame in which assumptions are valid
- The assumptions and information that are valid and relevant will differ between these ranges.
- Force fitting irrelevant assumptions into the wrong range will lead directly to distortive information.
- Different relevant ranges are typically utilized by different personnel

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2. Flow-Based Operating Model

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

There are VERY specific ways to design a flow-based operating model.

A Flow-Based Model is Supported by:

Economics
 Mathematics
 Physics
 Management Accounting
 George Plossl (MRP)
 Eli Goldratt (TOC)
 Taiichi Ohno (LEAN)
 Dr. Deming (Six-Sigma)

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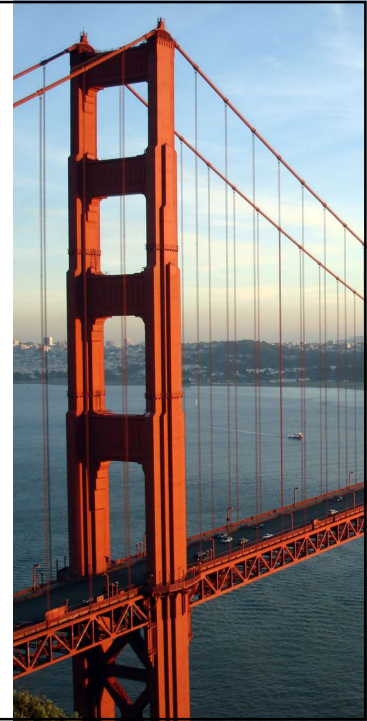
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3. Tactical Reconciliation

- The assumptions and information between relevant ranges differ
- There is a need to reconcile these assumptions 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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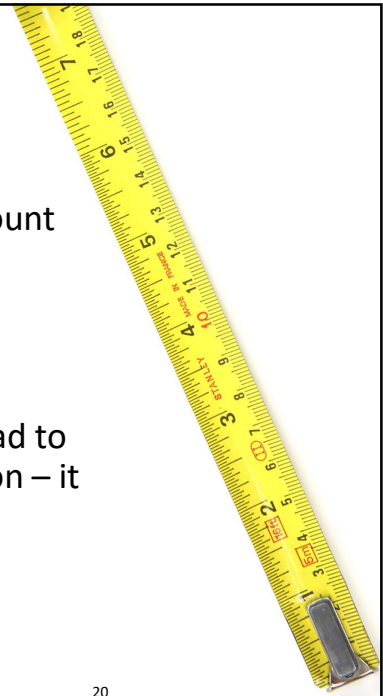
4. Flow-Based Metrics

- 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 will directly lead to conflicts and distortions throughout the organization – it will obscure what is relevant!



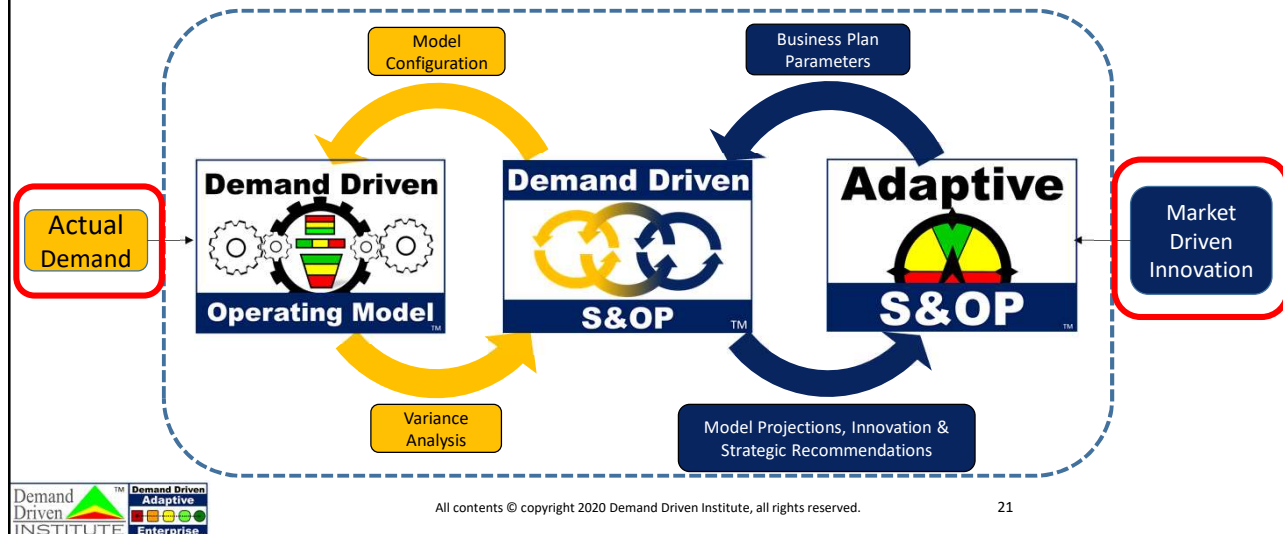
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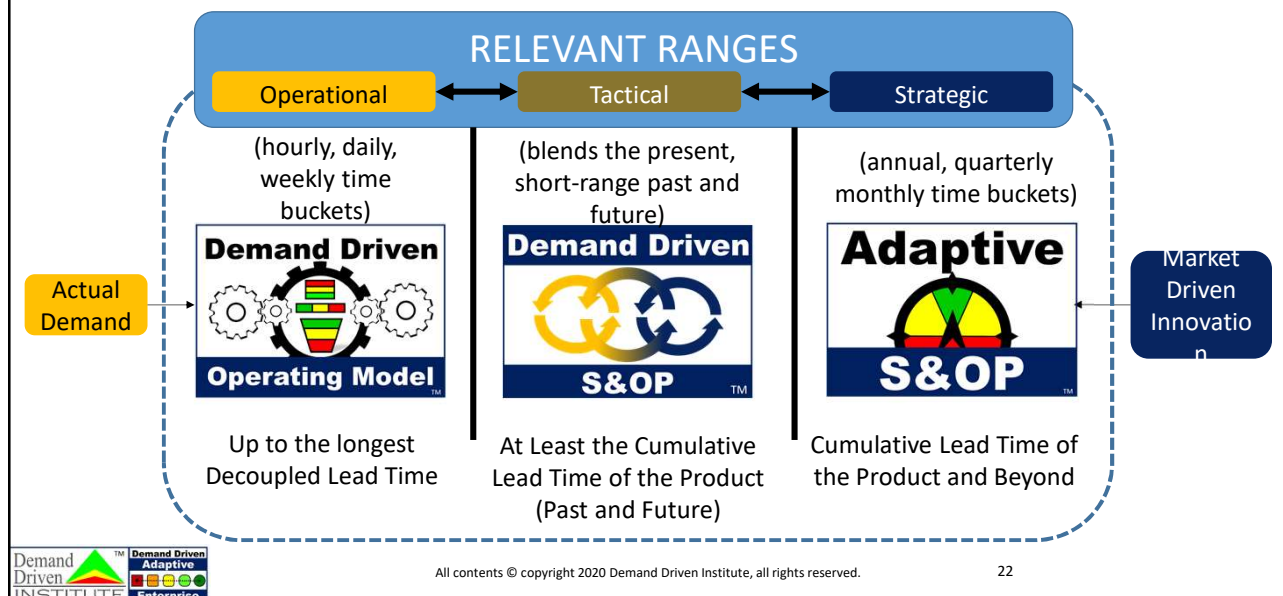
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Demand Driven Adaptive Enterprise Model



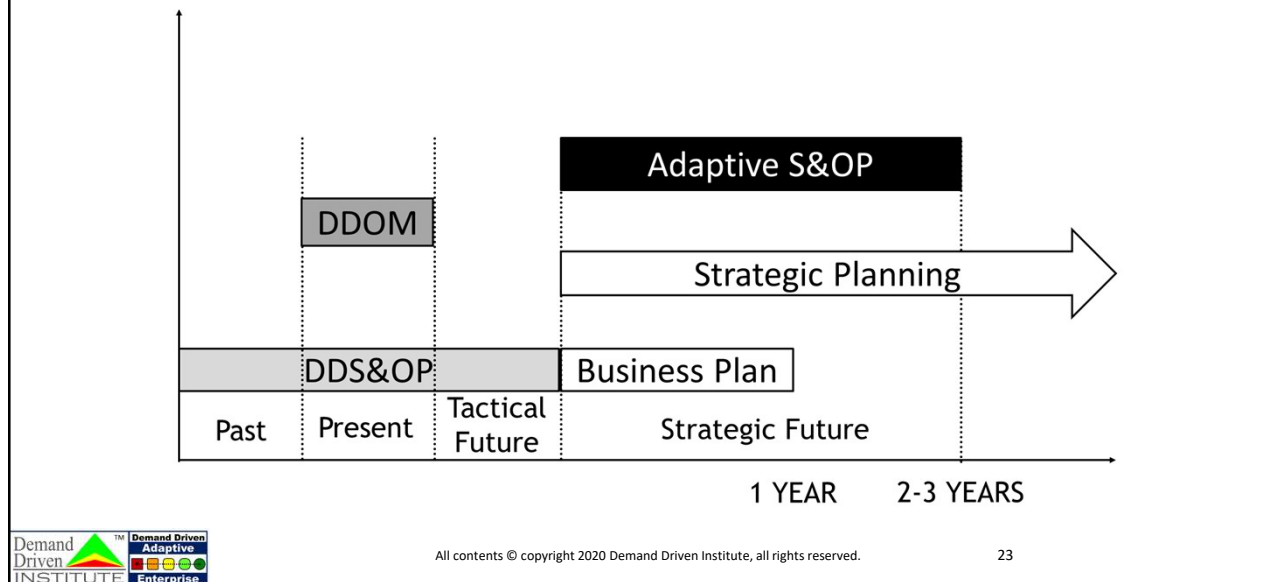
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1. Relevant Ranges in the DDAE Model

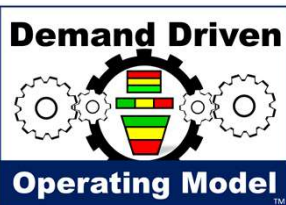


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1. Relevant Ranges in the DDAE Model



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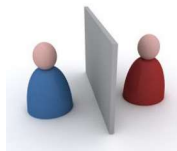
2. The Flow Based Operation Model

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

Paces operations to **actual demand**



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



Strategically places **control points** for schedule synchronization



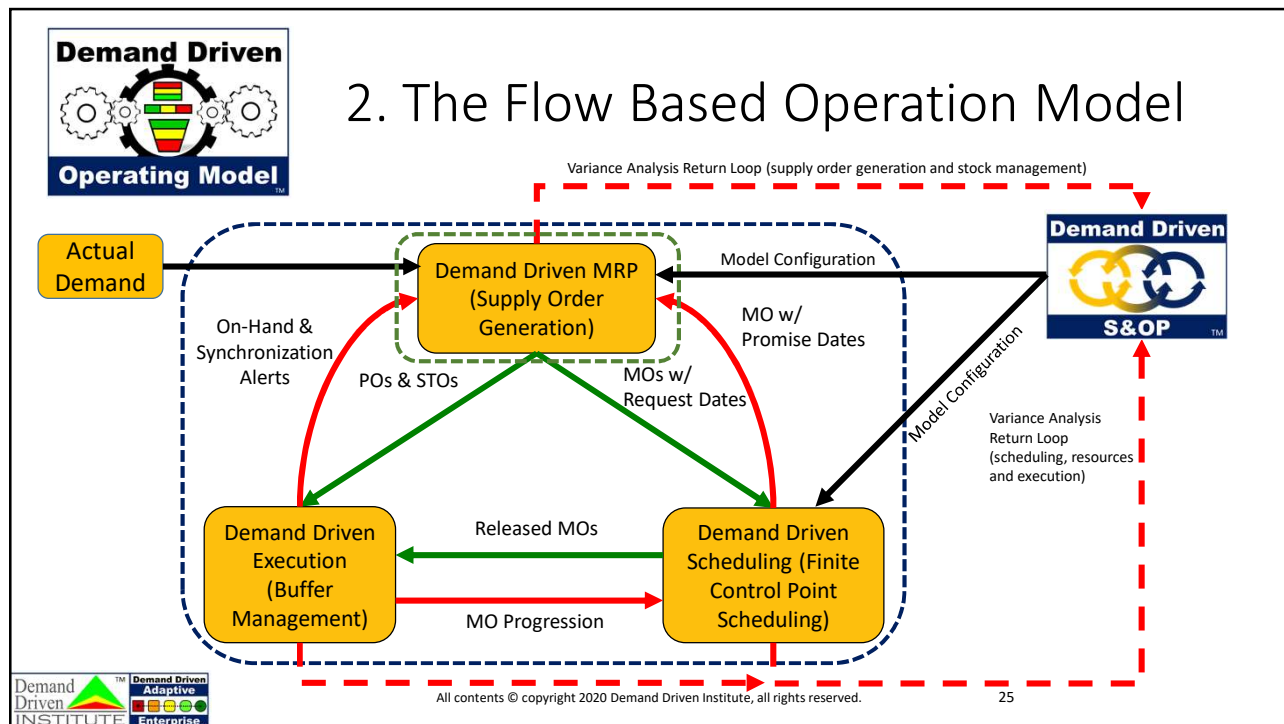
Protects decoupling and control points through stock, time and capacity buffers



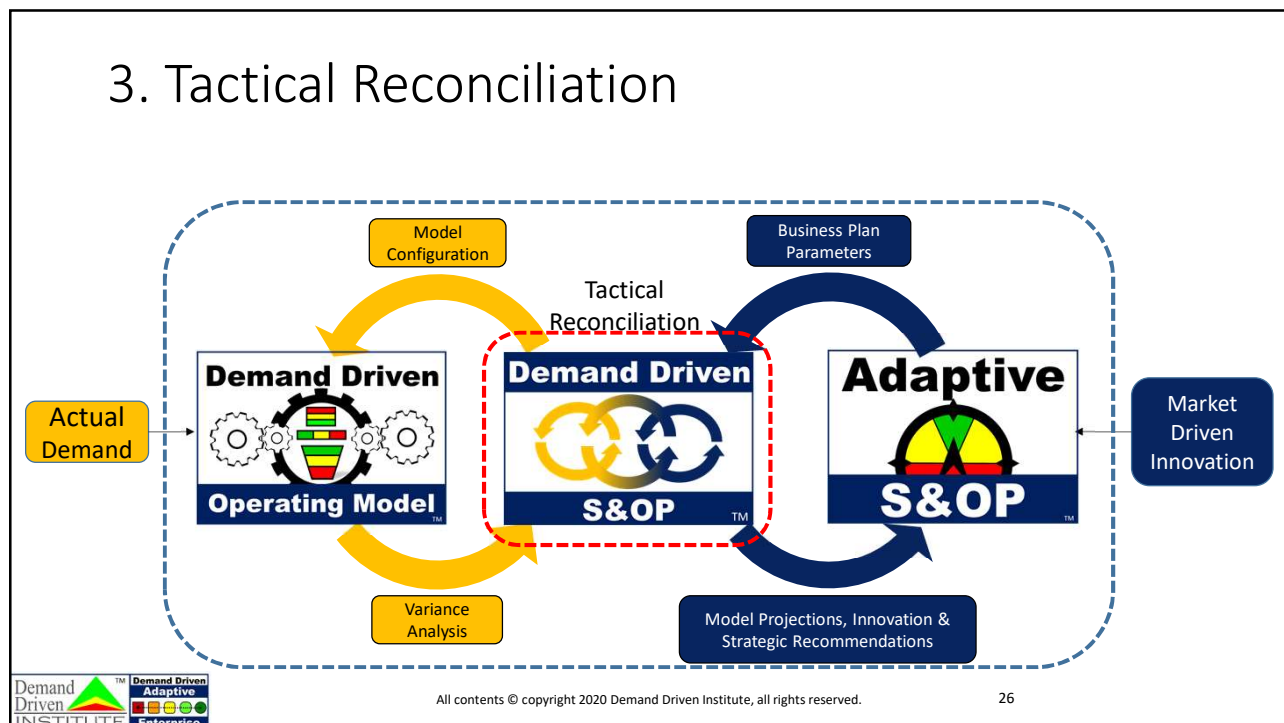
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Tactical Reconciliation

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. Strategic Projection (projecting model performance in the strategic relevant range)



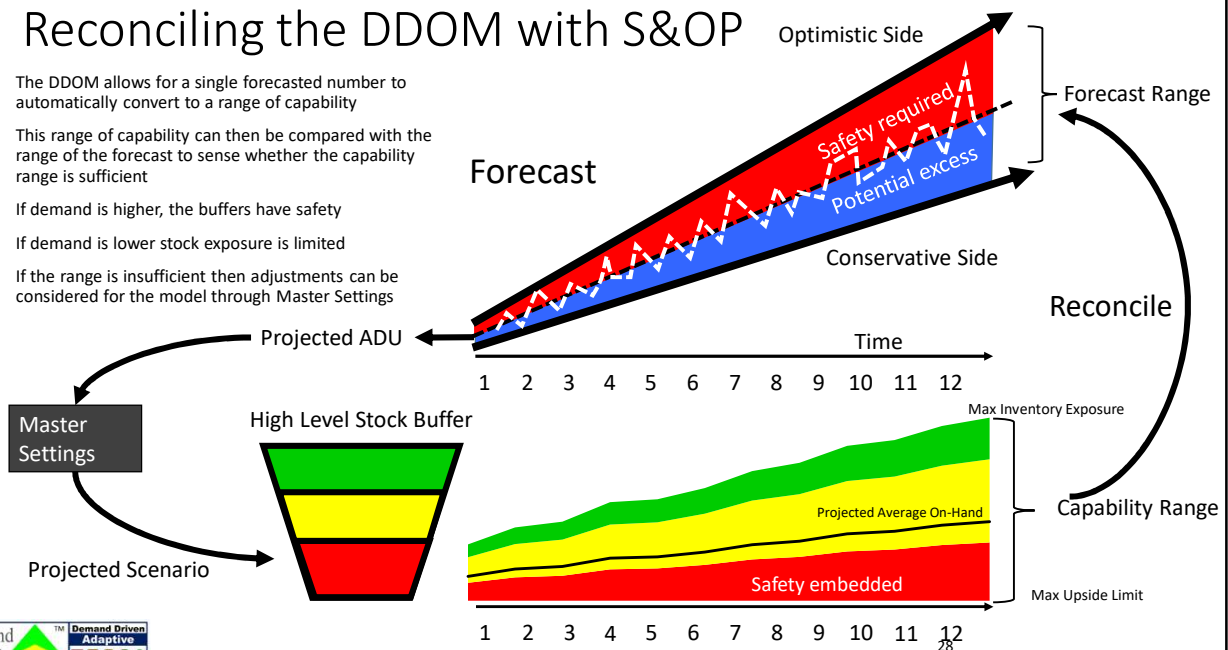
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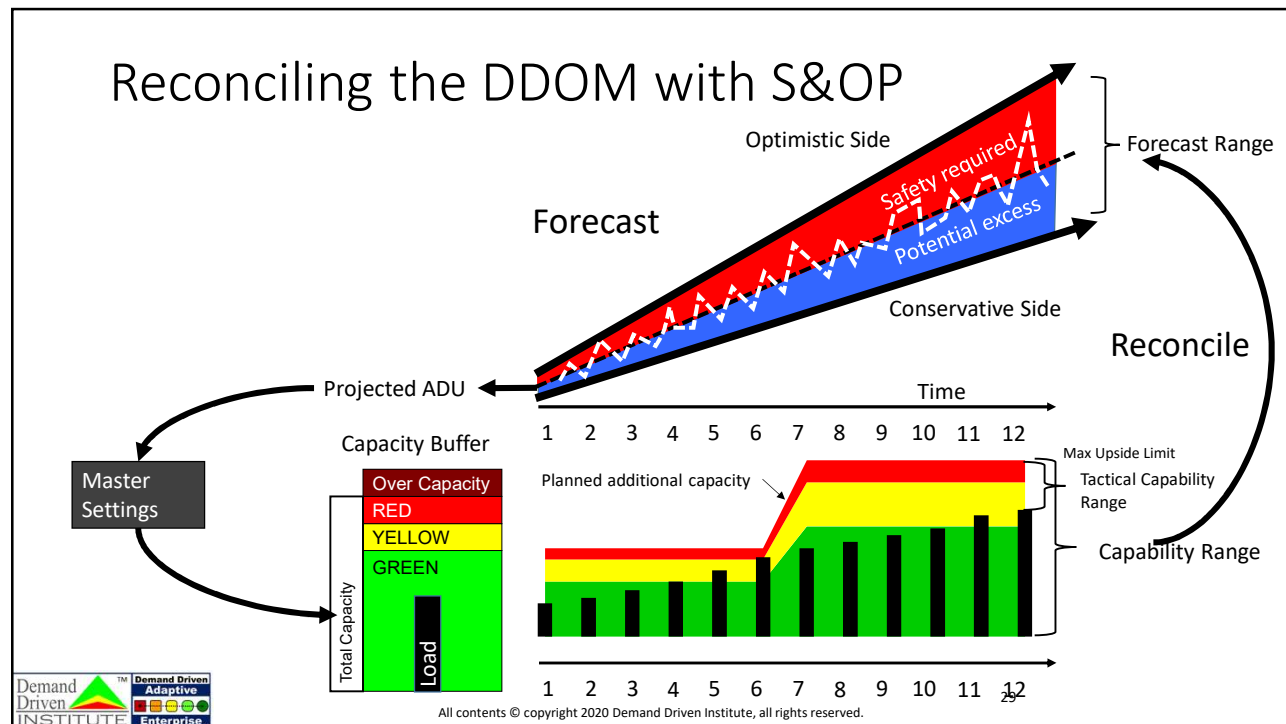
Reconciling the DDOM with S&OP

- The DDOM allows for a single forecasted number to automatically convert to a range of capability
- This range of capability can then be compared with the range of the forecast to sense whether the capability range is sufficient
- If demand is higher, the buffers have safety
- If demand is lower stock exposure is limited
- If the range is insufficient then adjustments can be considered for the model through Master Settings

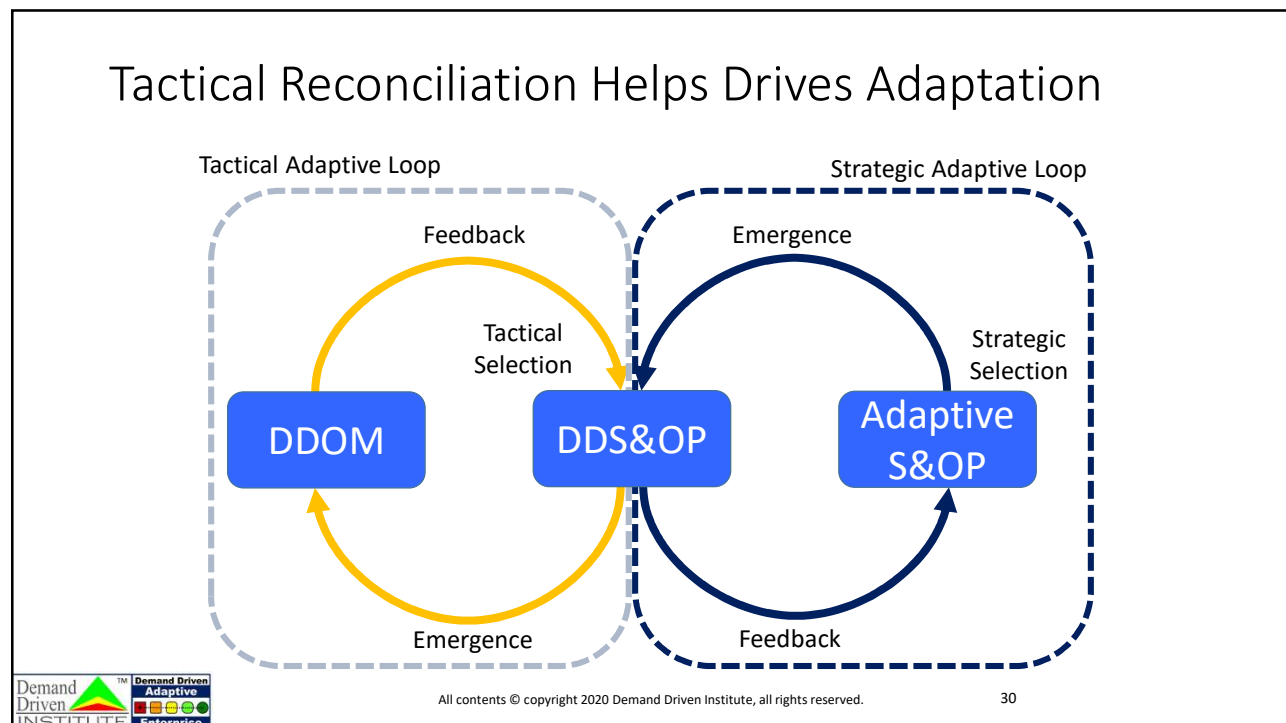


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4. Flow-Based Metrics Keeps Coherence

	Metric Objectives	The Message Behind the Objective
Operational	Operational Reliability	Execute to the model, plan, schedule and market expectation;
	Operational Stability	Pass on as little variation as possible;
	Operational Speed/Velocity	Pass the right work on as fast as possible;
Tactical	Tactical Improvement & Waste Reduction (Opportunity \$)	Identify and prioritize obstacles and/or conflicts to flow
	Tactical Expense Control	Spend minimization to meet the requirements of the market and the DDOM design.
	Tactical Contribution	Maximize system return according to relevant model factors and tactical opportunities (volume and rate)
Strategic	Contribution Margin (cash generation rate)	Drive innovation (internal and external) and growth to increase cash generation capability (RATE)
	Working Capital (inventory & cash & credit)	Ensure proper levels of working capital to protect and promote flow in the short and long term
	Customer Base (market share, sales & service & quality)	Ensure and grow a solid base of business for the enterprise (VOLUME)



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

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The DDAE Model is Built for Complex Adaptive Systems

Key Attribute

Coherence

Subsystem behavior is in alignment with the overall system **FLOW** objective

Success Factor

Resilience

Strategic buffering combined with well defined CAS characteristics create a resilient enterprise.

Characteristics

1. **Boundaries** – Primarily defined by defined relevant ranges.
2. **Edge of Chaos** – Specific zones and metrics that are carefully monitored.
3. **Signals** – Highly intuitive and visual signals.
4. **Signal Strength** – Highly intuitive and visual signals that give an immediate sense of relative priority.
5. **Feedback Loops** – Defined tactical and strategic feedback processes and mechanisms.
6. **Adaptive Agents** – Defined adaptive agents are present in all relevant ranges.



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How to Get Started?



DDAE III	Sensing, Adapting and Innovating across the supply chain (customers and suppliers) for continual ROI improvement. Mature DDAE Model.
DDAE II	Leverage the Demand Driven Operating Model capability across the enterprise and into the market. DDS&OP and Adaptive S&OP in place.
DDAE I	Synchronizing and leveraging operational capability for better flow performance. Expand the implementation of a Demand Driven Operating Model.
Stage 2	Begin to emphasize flow-based operational efficiency with the preliminary implementation of DDMRP.
Stage 1	Focused on cost-based operational efficiency (Cost reduction AND Responsiveness in conflict).



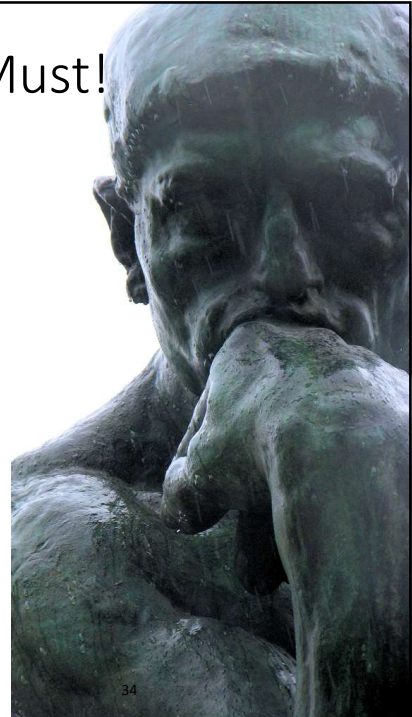
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A Final Element - Thoughtware is a Must!

- Thoughtware BEFORE hardware and software!
Invest in people's ability to think and problem solve systemically.
- If you can't think systemically then you can't observe, identify and resolve distortions to relevant information and materials at the systemic level.
- That means your organization is INCAPABLE of thinking and adapting for FLOW at all levels.
- Ensuring and maintaining a framework for the four pre-requisites for relevant information should be the primary job of senior management



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