An Introduction to the
Demand Driven Adaptive Enterprise Model

Carol Ptak
Chad Smith

Professional Development Reminder

1 CEU per webinar

1 Professional Development Point!

All contents © copyright 2020 Demand Driven Institute, all rights reserved.
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, CSC, CLTD, DDPP, DDLP, DDFF & APICS Master Instructor

Get your copy at Amazon

What is VUCA

• Volatile
• Uncertain
• Complex
• Ambiguous
VUCA is the “New Normal” for Supply Chain

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

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)
## Risks in the VUCA World

**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

**OBSEOLESCENCE 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

---

## 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!
An Analogy – The Human Vital Signs

- 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!

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.

**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

---


---

Coherence to Flow

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

![Diagram of Flow](image)

- 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.

George W. Plossl

All contents © copyright 2020 Demand Driven Institute, all rights reserved.
Explaining Flow

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


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.

It seem so obvious, but...

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.

\[ \text{Variability} \downarrow = \text{Flow} \uparrow \]
\[ \text{Variability} \uparrow = \text{Flow} \downarrow \]

Visibility is defined as relevant information for decision making.

\[ \text{Visibility} \uparrow = \text{Variability} \downarrow \]
\[ \text{Visibility} \downarrow = \text{Variability} \uparrow \]
The Biggest Question Becomes...

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

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
1. Relevant Ranges

- 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

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.

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)
- Taichi Ohno (LEAN)
- Dr. Deming (Six-Sigma)
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.

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!
1. Relevant Ranges in the DDAE Model

**RELEVANT RANGES**

**Operational** (hourly, daily, weekly time buckets)
- Up to the longest Decoupled Lead Time

**Tactical** (blends the present, short-range past and future)
- At Least the Cumulative Lead Time of the Product (Past and Future)

**Strategic** (annual, quarterly, monthly time buckets)
- Cumulative Lead Time of the Product and Beyond
1. Relevant Ranges in the DDAE 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.

2. The Flow Based Operation Model

- Paces operations to actual demand.
- Combines elements of MRP, DRP, Lean, Theory of Constraints, Factory Physics and Six-Sigma.
2. The Flow Based Operation Model

3. Tactical Reconciliation
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)

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
Reconciling the DDOM with S&OP

Projected ADU
Conservative Side
Optimistic Side
Time
Forecast Range
Buffer Projection
1 2 3 4 5 6 7 8 9
10 11 12
Capacity Buffer
GREEN
YELLOW
RED
Over Capacity
Total Capacity
Planned additional capacity
Max Upside Limit
Tactical Capability Range
Capability Range
1 2 3 4 5 6 7 8 9 10 11 12
1
Reconcile

Tactical Reconciliation Helps Drives Adaptation

Tactical Adaptive Loop
DDOM
Tactical Selection
Feedback
Emergence

Strategic Adaptive Loop
DDS&OP
Adaptive S&OP
Emergence
Feedback
Strategic Selection
Emergence

All contents © copyright 2020 Demand Driven Institute, all rights reserved.

30
4. Flow-Based Metrics Keeps Coherence

<table>
<thead>
<tr>
<th>Metric Objectives</th>
<th>The Message Behind the Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational</strong></td>
<td></td>
</tr>
<tr>
<td>Operational Reliability</td>
<td>Execute to the model, plan, schedule and market expectation;</td>
</tr>
<tr>
<td>Operational Stability</td>
<td>Pass on as little variation as possible;</td>
</tr>
<tr>
<td>Operational Speed/Velocity</td>
<td>Pass the right work on as fast as possible;</td>
</tr>
<tr>
<td><strong>Tactical</strong></td>
<td></td>
</tr>
<tr>
<td>Tactical Improvement &amp; Waste Reduction (Opportunity 5)</td>
<td>Identify and prioritize obstacles and/or conflicts to flow</td>
</tr>
<tr>
<td>Tactical Expense Control</td>
<td>Spend minimization to meet the requirements of the market and the DDOM design;</td>
</tr>
<tr>
<td>Tactical Contribution</td>
<td>Maximize system return according to relevant model factors and tactical opportunities (volume and rate)</td>
</tr>
<tr>
<td><strong>Strategic</strong></td>
<td></td>
</tr>
<tr>
<td>Contribution Margin (cash generation rate)</td>
<td>Drive innovation (internal and external) and growth to increase cash generation capability (RATE);</td>
</tr>
<tr>
<td>Working Capital (inventory &amp; cash &amp; credit)</td>
<td>Ensure proper levels of working capital to protect and promote flow in the short and long term;</td>
</tr>
<tr>
<td>Customer Base (market share, sales &amp; service &amp; quality)</td>
<td>Ensure and grow a solid base of business for the enterprise (VOLUME).</td>
</tr>
</tbody>
</table>


The DDAE Model is Built for Complex Adaptive Systems

**Key Attribute**

**Coherence**

Subsystem behavior is in alignment with the overall system 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.
### How to Get Started?

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1</strong></td>
<td>Focused on cost-based operational efficiency (Cost reduction AND Responsiveness in conflict).</td>
</tr>
<tr>
<td><strong>Stage 2</strong></td>
<td>Begin to emphasize flow-based operational efficiency with the preliminary implementation of DDMRP.</td>
</tr>
<tr>
<td><strong>Stage 3</strong></td>
<td>Sensing, Adapting and Innovating across the supply chain (customers and suppliers) for continual ROI improvement. Mature DDAE Model.</td>
</tr>
<tr>
<td><strong>DDAE I</strong></td>
<td>Synchronizing and leveraging operational capability for better flow performance. Expand the implementation of a Demand Driven Operating Model.</td>
</tr>
<tr>
<td><strong>DDAE II</strong></td>
<td>Leverage the Demand Driven Operating Model capability across the enterprise and into the market. DDS&amp;OP and Adaptive S&amp;OP in place.</td>
</tr>
<tr>
<td><strong>DDAE III</strong></td>
<td>Leverage the Demand Driven Operating Model capability across the enterprise and into the market. DDS&amp;OP and Adaptive S&amp;OP in place.</td>
</tr>
</tbody>
</table>

### 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.
Remote Learning Opportunity

NOW ON SALE
INTRODUCING SELF-STUDY BUNDLES

- Demand Driven Planner (DDP™) self-study access and courseware
- Sample exam and solution key
- Two DDP™ certification exam attempts
- Lifetime access to updated videos and courseware

* Demand Affiliates can provide you discount codes that will provide a further price reduction of $100 – $150 USD (depending on your location)

INDIVIDUAL REMOTE EDUCATION AND TESTING

Thank you!