STABILITY & BUFFERS

Dynamic Planning Parameters: The Future of Adaptive Supply Chains

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Static planning is holding supply chains back.

Many organizations still rely on fixed parameters such as lead times, safety stocks, lot sizes and capacities. These parameters are expected to represent operational reality, but they are often maintained as permanent values in a world where demand, supplier performance, production capacity and lead times continuously change.

A supplier may become less reliable. Forecast accuracy may deteriorate. Production lead times may increase because of capacity constraints, campaign structures or quality release processes. A CMO may provide less flexibility than originally assumed.

The planning parameters often remain unchanged.

This creates a growing disconnect between the planning model and execution reality. The result is familiar: excess inventory, stockouts, infeasible plans, manual intervention and constant firefighting.

Dynamic planning parameters are intended to address this disconnect.

They are planning assumptions that are systematically reviewed and adjusted when actual performance, variability or the level of operational control changes.

This does not mean that every parameter should change automatically or continuously. It means that parameters must no longer be treated as permanent truths. They need defined ranges, clear adjustment rules, reliable execution data and explicit ownership.

Why Static Parameters Fall Short

Static planning assumptions are poorly suited to volatile supply chains. Fixed lead times, static safety stocks and inflexible capacity assumptions fail to represent real operational variability.

In MRP-driven systems, parameters regulate supply chain flow. MRP does not question whether the parameters are realistic. It calculates requirements based on the values it receives.

Parameters such as safety stocks, order modifiers, lot sizes and lead times must therefore act as stabilizers. In many organizations, however, these values are either never reviewed or maintained as exact point estimates when the underlying reality is variable.

A supplier's lead time may range between 10 and 15 days, while the planning system continues to use a fixed assumption of 12 days.

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This creates overstocking when variability is underestimated and stockouts when it is ignored. The same problem exists on the demand side.

> *When forecast accuracy deteriorates, the typical response is to challenge Commercial or Demand Planning. The forecast KPI remains red, planners compensate manually and the remaining planning assumptions stay unchanged.*

But poor forecast accuracy should also trigger a review of: · Forecast bias · Demand variability · Product segmentation

· Forecasting methods · Safety stocks · Replenishment rules · Inventory buffers

The issue is not limited to demand. **Many companies face a dual-sided problem. Demand is unreliable, while supply is inflexible.**

Supply Chain may be accountable for the plan without having meaningful influence over the production network. Capacity decisions may sit within Operations or individual manufacturing sites. RCCP may not exist, or it may identify capacity overloads without leading to any decision.

Supply lead times are still treated as fixed values even when actual production and replenishment times are long and variable.

The situation becomes more difficult when CMOs are involved. Long lead times, fixed campaign structures, minimum batch quantities, limited access to capacity and contractual constraints reduce the ability to react.

The forecast may be poor, but the supply response may not be controllable either.

Static parameters hide this reality. They create the appearance of precision in a planning model that no longer represents how the supply chain behaves.

> *Instead of absorbing variability, deterministic planning systems often amplify it. An error in demand, lead times, safety stocks or capacity assumptions propagates through the entire supply chain.*

See Figure 2 · page 8

Don't take my word for it. Move the faders yourself: see live which side of your buffer is demand, and which side is supply that days-of-supply logic can't even see.

The Safety Stock Synthesizer — Open the original article for this interactive content

The Role of Dynamic Planning Parameters

Dynamic parameters introduce controlled adaptability into supply chain planning. Instead of relying on fixed assumptions, they connect the planning model to actual execution performance. The purpose is not constant parameter movement. The purpose is to ensure that planning assumptions remain realistic. Dynamic parameters can include:

· Supplier and production lead times · Safety stocks and inventory buffers · Capacity assumptions · Lot sizes and campaign quantities

· Minimum order quantities · Reorder points · Replenishment frequencies · Planning time fences

· Product segmentation A supplier lead time should reflect actual delivery performance. A production lead time should include the reality of queues, campaign cycles, capacity constraints and quality release. A capacity assumption should represent what can realistically be produced, not theoretical nameplate capacity.

A safety stock should reflect the variability it is intended to absorb. A planning segment should be reviewed when the demand or supply characteristics of the product change.

Why Range-Based Parameters Are Essential

Inventory buffers should operate within ranges

Static safety stocks create excess inventory when they are too high and service risk when they are too low. Inventory buffers should be linked to the variability they are designed to absorb and managed within defined thresholds. This also requires a clear view of decoupling points. Supply Chain should be able to explain:

· Where inventory is positioned · Which variability it protects against · Why the investment is required · Which service or flow objective it supports

· Which drivers can be influenced · Who owns the underlying assumptions Too often, inventory is discussed only as a financial outcome.

Finance sees working capital. Commercial sees availability. Operations sees protection. Supply Chain is expected to explain the number, but frequently cannot show the planning logic behind it.

> *Inventory should not simply compensate for poor forecasts, unstable production or unreliable lead times. It should be positioned deliberately as part of the supply chain control model.*

Lead times should reflect actual performance

A single fixed lead time rarely represents reality.

Supplier, production and transportation lead times should be reviewed against actual performance and, where appropriate, managed as ranges.

This is particularly important when lead times are influenced by CMOs, campaign structures, material availability, queue times or quality release processes.

If the system assumes a production lead time of six weeks while actual performance regularly reaches ten weeks, the plan may be technically consistent but operationally irrelevant.

Capacity assumptions must be linked to decisions

Capacity is not dynamic simply because an RCCP chart is updated. RCCP only creates value when it influences priorities, capacity actions, inventory decisions or customer commitments. An effective RCCP process should show: · Where demand exceeds available capacity

· When the constraint will occur · Which products and customers are affected · Which inventory can absorb the gap · Which alternatives exist

· Which management decision is required If the process only reports an overload and nobody has the authority to act, it is reporting, not control. Dynamic capacity parameters therefore require both realistic execution data and clear decision rights.

These adjustments should be triggered when defined thresholds are exceeded. Some can be automated. Others require human review because they involve business trade-offs, customer priorities or structural capacity decisions.

Why Linear Optimization Models Aren't Enough

Many organizations have pursued global supply chain optimization in the belief that linear programming models can deliver perfect efficiency.

These systems promise a one-button solution that aligns supply, demand and capacity. The problem is not optimization itself. The problem is the assumptions on which the optimization is based. Optimization models can only produce useful results when the underlying parameters reflect reality. They fail when they:

· Assume fixed lead times despite high variability · Use capacity values that do not represent operational availability · Ignore campaign structures and minimum batch quantities · Treat weak forecasts as reliable demand signals

· Optimize inventory without understanding decoupling and buffer logic · Identify constraints without linking them to decision rights A mathematically optimal plan based on incorrect assumptions is still the wrong plan.

Optimization can also create instability when global efficiency is prioritized without sufficient local protection. A plan may minimize cost across the network while leaving individual plants, suppliers or distribution points unable to absorb variability.

Optimization models provide valuable strategic and tactical insights. But they need to be combined with stabilization mechanisms, realistic parameters, buffers, decoupling points and execution feedback.

The objective is not to replace optimization. The objective is to prevent optimization from scaling incorrect assumptions across the network.

The Benefits of Dynamic Parameters

Dynamic parameters help supply chains move from reactive planning toward controlled adaptation.

Adaptability

Planning assumptions are reviewed when demand behaviour, supplier performance, capacity or lead times change.

More realistic plans

Plans reflect actual operating conditions rather than inherited master data values.

Better inventory decisions

Inventory buffers can be linked to specific sources of variability and deliberately positioned at relevant decoupling points.

Reduced firefighting

Earlier recognition of parameter drift reduces the need for planners and execution teams to compensate manually.

Clearer management decisions

Deviations can be translated into specific questions about ownership, mitigation and planning logic.

Greater resilience

Buffers, realistic lead times and controlled recalibration help prevent local disruptions from propagating through the entire network.

Dynamic parameters do not eliminate variability. They help the organization understand, absorb and control it.

How to Get Started with Dynamic Parameters

Implementing dynamic parameters requires changes to processes, systems and ownership.

1. Identify the parameters that materially influence performance

Start with parameters that directly affect service, inventory, capacity and schedule stability. These typically include: · Lead times · Safety stocks

· Lot sizes · Campaign quantities · Reorder points · Capacity assumptions

· Replenishment frequencies · Planning segments

Not every parameter needs to become dynamic. Focus first on the values where the difference between the planning assumption and actual performance creates material consequences.

2. Compare planning assumptions with execution reality

Use historical performance and current execution data to determine whether the values in the planning system remain valid. Examples include: · Planned versus actual supplier lead times · Planned versus actual production lead times

· Forecast bias and forecast accuracy · Planned versus available capacity · Planned versus actual campaign duration · Target versus actual inventory ranges

· Planned versus actual replenishment frequency The objective is to identify parameter drift before it becomes a service or inventory problem.

3. Replace point assumptions with ranges where appropriate

A single-value lead time or capacity assumption often creates false precision. Historical performance can be used to define realistic ranges and thresholds.

This does not mean that MRP or APS systems must plan with uncontrolled uncertainty. It means that the planning process should recognize when actual performance moves outside the expected range and requires intervention.

4. Define adjustment rules and ownership

Every dynamic parameter needs a clear owner. Demand Planning may own forecast models, bias analysis and demand segmentation. Procurement may own supplier performance and purchasing lead times. Manufacturing may own production lead times and capacity assumptions.

Supply Chain may own inventory buffers, replenishment rules and end-to-end parameter governance.

> *Management must own structural trade-offs when constraints cannot be resolved within the planning process.*

The organization should define: · Which deviation triggers a review · Who investigates the cause · Who can approve a change

· Which systems must be updated · How the impact is measured · When the parameter is reviewed again Without this ownership, dynamic parameters become another dashboard topic without operational consequence.

5. Use analytics and AI where they add value

Statistical models can identify changes in variability, lead-time performance, forecast bias and supplier reliability.

AI can support the analysis by detecting patterns, highlighting parameter drift and connecting information across planning and execution data.

An LLM can explain why a KPI is deteriorating or structure the management questions that need to be answered. But AI does not replace the planning logic. It does not create capacity. It does not renegotiate a CMO agreement.

It does not determine the right decoupling point. It does not decide which customer receives constrained supply. It does not own the inventory investment or the mitigation. Without the basics, AI only provides a better explanation of why the supply chain is not under control.

The value lies in combining analytical support with supply chain fundamentals, decision rights and accountable owners.

6. Embed parameter management into the planning process

Parameter review should not be a one-time data-cleansing activity during an APS or ERP implementation. It should become part of the operating model.

> *S&OP, S&OE, RCCP and performance reviews should identify when assumptions no longer reflect reality.*

A practical cycle is straightforward: 1. Detect the deviation. 2. Understand the cause. 3. Assess the operational and financial impact.

4. Define the mitigation. 5. Assign ownership. 6. Update the planning logic. 7. Measure whether the intervention worked.

This is how execution feedback becomes part of planning control.

From Stabilization to Adaptation

Stabilization creates the foundation for resilience. Dynamic parameters add the ability to adjust planning assumptions when reality changes.

Together, buffers, decoupling points, synchronization, realistic parameters and execution feedback help supply chains control variability and maintain flow.

The target is not permanent recalculation or uncontrolled automation.

The target is a planning system that remains credible because its assumptions are understood, governed and connected to operational reality.

This is also the foundation required for any serious discussion about AI in supply chain planning.

AI can support detection, analysis and explanation. But it cannot replace supply chain logic, ownership or management decisions.

Before discussing autonomous planning, companies should be able to answer more basic questions: · Do our lead times reflect actual performance? · Is our capacity plan credible? · Does RCCP lead to decisions?

· Can we explain our inventory investment? · Have we defined the right decoupling points? · Do we know which variability our buffers are designed to absorb? · Who owns each planning parameter?

· Do we change the planning model when reality changes? If the answer is no, the supply chain is not adaptive. It is continuing to calculate with outdated assumptions.

See Figure 3 · page 9

What's Next in the Series?

Article 3: **Decision Support in Execution** – Bridging planning and execution to empower teams with faster, data-driven decisions. Article 4: **Decoupling and Synchronization** – How synchronized schedules and decoupling points stabilize supply chains. Article 5: **The Future of Resilient Supply Chains** – Synthesizing these ideas into a framework for adaptability and resilience.

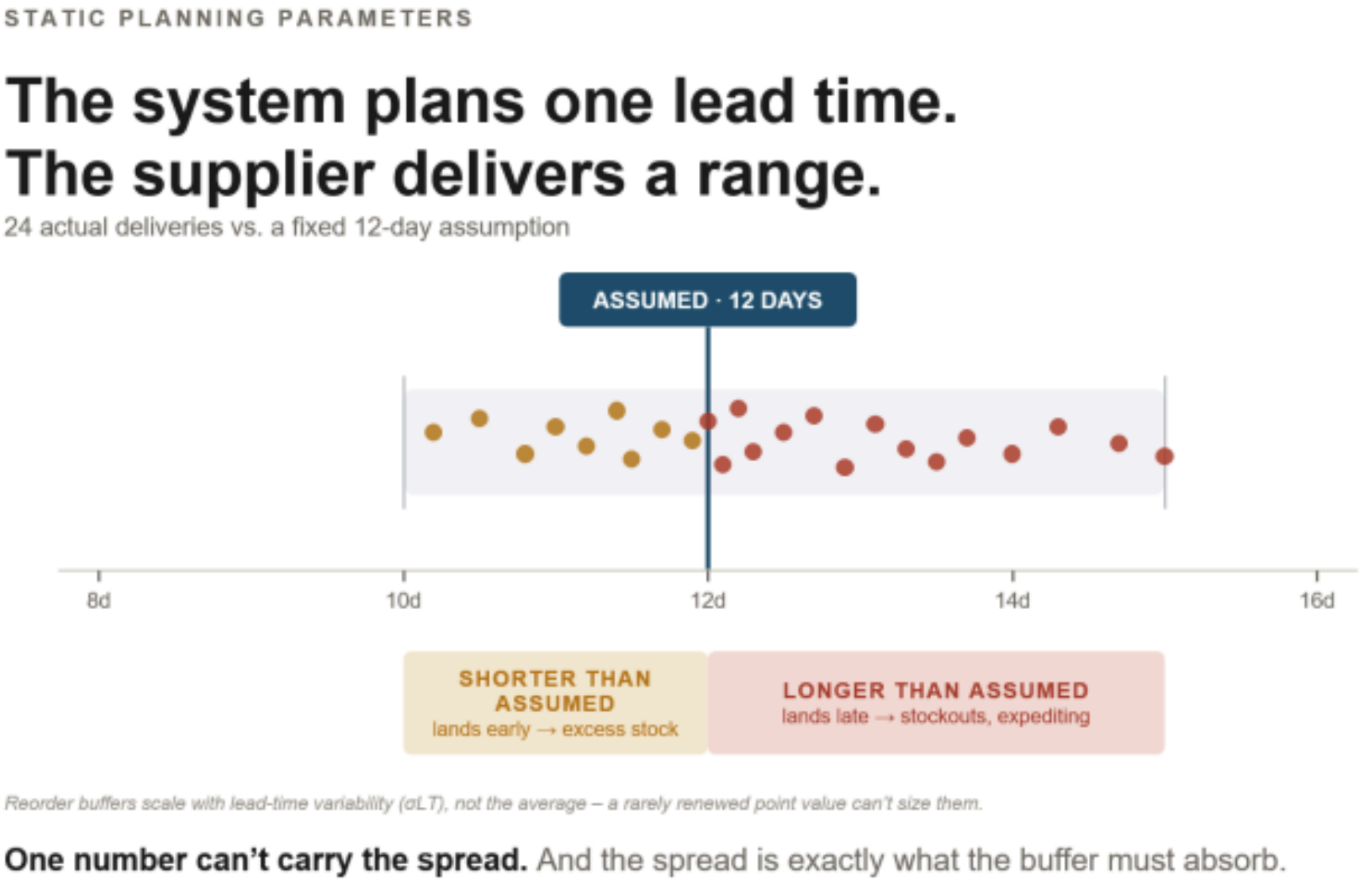
Acknowledgment and Dedication *These ideas are deeply rooted in the lessons I learned during my time at Camelot Management Consultants, where I had the privilege of working with* **Dr. Josef Packowski** *for over 20 years. Our countless discussions on supply chain vulnerabilities and resilience mechanisms shaped much of my understanding of the field. Although he is no longer with us, having passed away in 2023, his wisdom and vision remain a guiding light in my work. This article is written in his honor and memory.*

Acknowledging Foundational Principles The principles of the Demand Driven Institute (DDI), such as decoupling, buffers, and flow-based decision-making, serve as critical foundational elements for stabilizing supply chains. These concepts have significantly advanced supply chain thinking by shifting the focus from traditional MRP-driven approaches to more responsive, flow-driven models.

This article builds upon these foundations, offering additional layers of adaptability, execution feedback, and real-time synchronization. Rather than replacing demand-driven concepts, these additional steps enhance and extend them, ensuring that supply chains are not only stable but also dynamically responsive to change.

In today's volatile world, stabilization alone is not enough. By combining demand-driven principles with real-time adaptability and execution synchronization, organizations can create a resilient, self-learning supply chain that continuously evolves to meet uncertainty head-on.

Figure 1



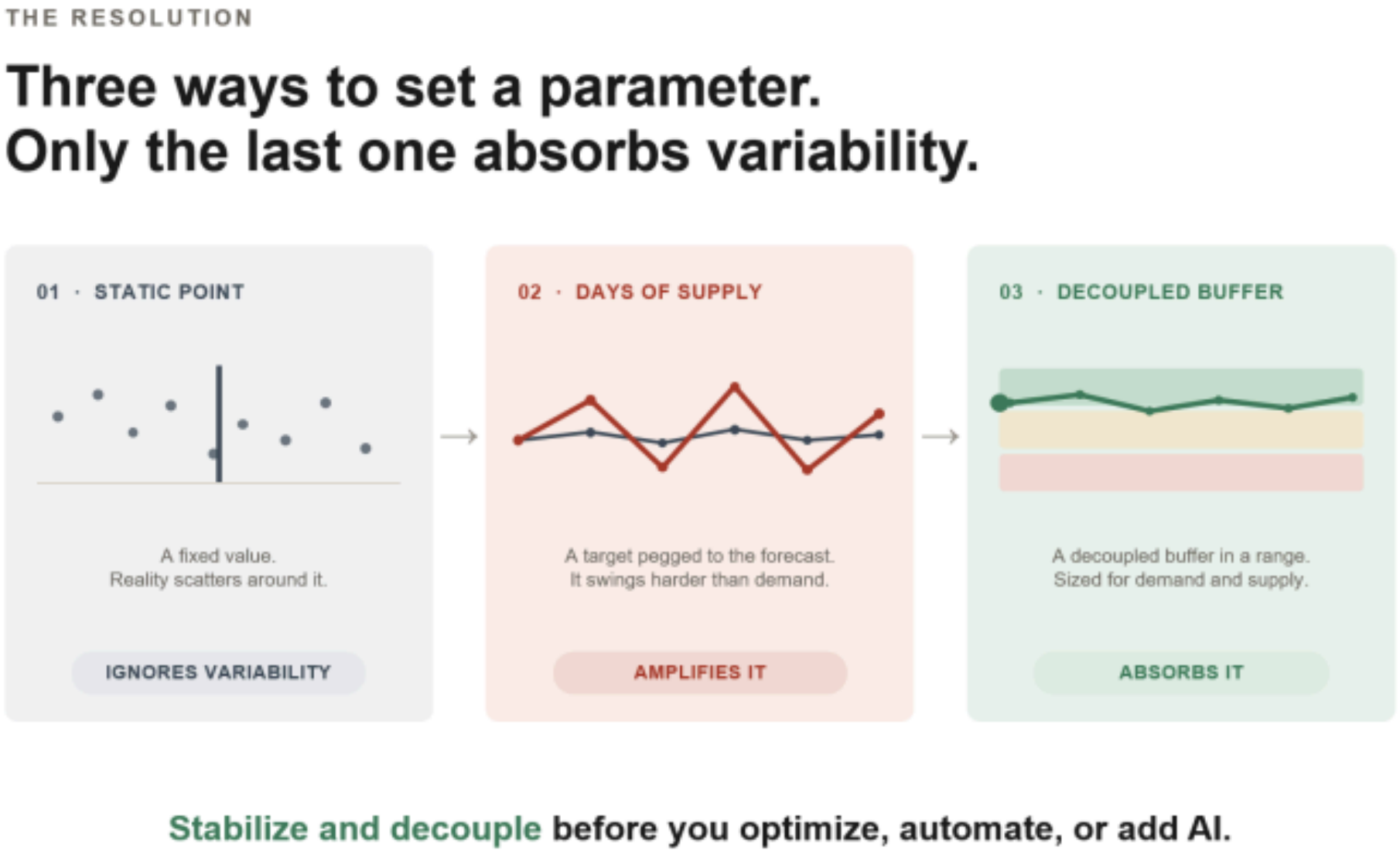
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Figure 2



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Figure 3



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