

# Project Zebra / III

## GLOSSARY v 0.1

One of the critical elements of project success is team alignment on terms and outcomes. We designed this glossary to help the team members of Project Zebra better collaborate.

This document intends to define key terms used in process mapping. Here we start with initial definitions – as imperfect as they are-- and invite team members to work together to drive a shared meaning as we develop and test solutions. Our goal is to define outside-in processes that can sense and translate market signals to improve outcomes.

### **Market Potential**

Market Potential is at the core of a market-driven process. Market potential represents the potential unconstrained demand in the marketplace for the defined segment of the business that is being managed. Market definitions are an important step in the process. For example, if a company currently manufacturers frozen pizza, is their defined segment all pizza consumption or frozen pizza sold in the retail channel. The translation of market potential on unconstrained market views versus calculating potential exclusively on history streams is fundamental to market-driven approaches.

A baseline forecast is the translation of market potential into an accurate representation of market demand with minimal distortion. In the supply chain, demand is shifted and shaped. Demand shaping occurs when the baseline lift (or consumer interest) increases. This happens through marketing, advertising, positioning, and trade programs. The question answers the difference between shaping and shifting, "*Was there an increase in consumption?*" If yes, the program shaped demand. If no, the program shifted demand.

Market Potential incorporates, but is not limited to understanding:

- Implications of pantry loading
- Consideration of channel inventories
- Shifts in competitive activity
- Translation of ongoing shifts in consumption activity with minimal latency
- Sensing market shifts based on multiple factors with continual sensing and listening to understand true market potential.

In a market-driven process, baseline, or market potential, is the core of all demand management applications, including trade promotion, price management, sales forecasting, financial forecasting, and

supply chain requirements. In a market-driven process, baseline demand translation occurs across roles based on role-based definitions.

**What is different?** Organizations are not clear on market potential demand, and multiple demand applications lack market potential alignment. Also, conventional processes, which are order and shipment-based, increase the bullwhip effect introducing demand latency into process-based decisions.

### **Bullwhip.**

The Bullwhip effect is the amplification and distortion of market consumption in organizational silos. Project Zebra's opportunities are to sense the bullwhip swings and reduce the impact of issues with demand translation.

**What is different?** Continual monitoring of market potential and reducing translation variance across roles and functions.

### **Bullwhip monitor**

Increased demand variability in supply chains (the bullwhip effect), discussed for decades, is omnipresent in today's supply chain. However, the practical measurement and counteracting of this effect entails some problems to the companies. Bullwhip monitor answers the following questions:

- *What is the bullwhip in each echelon of the supply chain?*
- *What is the bullwhip amplification factor?*
- *And what is the leading cause of the bullwhip?*

With the right targeted information, we can apply the known and emerging countermeasures:

- (Demand Signaling): Shift to sell thru and POS data, single control of replenishment, lead-time reduction.
- (Order Batching): Discount assorted TL, 3PL Order Consolidation, Regular delivery appointment
- (Fluctuating Pricing): EDLP, Special purchase contracting
- (Shortage Game): Allocation based on past sales, shared capacity & supply information, flexibility limited over time, capacity reservation
- Market knowledge graphs that ingest real-time information from social, news, event, weather, and sensor sources.
- Machine learning algorithms that incorporate forward looking drivers of demand and are less reliant on historical data streams to create more accurate forecasts. This is especially important now as wholesale shifts in demand have occurred across channels, brands, and shopping methods.

**What is different?** Continual monitoring of bullwhip with prescriptive analytics on bullwhip correction factors.

### **Customer-Centric Supply Chains.**

A customer-centric supply chain translates customer and market strategies into segmentation logic used in manufacturing scheduling, the middle-mile design, and the management of allocation and Available-to-Promise rules.

***What is different?*** *Today's processes define segmentation policies but lack the "stickiness" for use. The gap? A gap is a connection between customer strategies, policies, and rule management.*

## **Demand Latency.**

Demand latency is the time from channel purchase to demand translation of channel replenishment to drive order to an upstream trading partner. While most companies believe that an order is a good predictor of demand, the increase in the supply chain's long-tail increases demand latency elongation. With product proliferation, globalization, and micro-segmentation, demand latency dramatically increased over the past decade. For a turn item at a mass retailer, like Wal-Mart, the demand latency is twenty days, while for a long-tail product, the demand latency can be over one hundred days. As a result, the order is not as good a predictor of demand as ten years ago. As a result, increasingly, the order is out of sync with the market.

***What is different?** Outside-in processes minimize demand latency.*

## **Forecast Value Added.**

Over ninety percent of companies forecast, but many organizations struggle to know if the demand planning process is driving an improvement in the process. Forecast Value Added is a measurement of demand planning improvement over the naive forecast (shipments of the prior month).

Demand plans go through multiple steps within an organization, the change in a demand performance can be attributed to a particular action or participant in the forecasting process. FVA determines the effectiveness of any touchpoint in the forecasting process. FVA determines which step adds value and which one does not, to enable the optimization of outcomes.

The FVA analysis is a lean methodology to continually improve demand outcomes while the metric-to-measure performance may be MPE (Mean Percent Error), MAPE (Mean Absolute Percent Error) or bias. The FVA measurement may be positive (the process is improving the accuracy) or negative (the process is decreasing accuracy).

***What is different?** FVA tracking to baseline, not just the naïve forecast.*

## **Market Knowledge Graph.**

Traditional enterprise data is structured and archived in relational databases. Ironically to its name, a relational database does not help to manage relations between stored data. The use of the data in a relational database requires multiple "join" transactions at the lowest granularity to derive two entities' match. Problems arise continually. For example, what if the entities do not have standard granularity levels? What if important, market-defining information is not structured? These are barriers for traditional applications based on relational data models in planning.

In contrast, the data in a graph database is labeled, directed, and assigned properties. The relation between two nodes is as important as what data it connects.

A Market-Driven Knowledge Graph starts with the market or channel and establishes bi-directional relationships market-to-market. Sales and Operations Planning (S&OP) plan effectiveness is continually evaluated with organizational recommendations to improve the plan. A market knowledge graph

translates the plan in each organizational stakeholders language without the requirement to plan at the lowest level of granularity across time horizons.

As a starting point for our work, we are assuming that a Market Knowledge Graph aligns the organizations with answering the questions in Table 1 quickly, across time horizons, and at the speed of business:

*Table 1. The Focus of a Market-Driven Knowledge Graph*

Channel	Enterprise	Suppliers
<p>What is the market potential?</p> <p>How do I shape demand? How effectively am I shaping direction? What is the impact of order shifting on cost and inventory?</p> <p>How do assortment changes affect growth targets?</p> <p>What are the market drivers?</p> <p>How do I test and learn cross-channel?</p> <p>What is margin potential?</p>	<p>How do I tie business strategy to operational processes?</p> <p>-margin</p> <p>-customer priorities</p> <p>-inventory targets?</p> <p>-customer service?</p> <p>-functional targets</p> <p>Why am I shorting orders?</p> <p>What is the right inventory buffer strategy based on COV?</p> <p>What are the proper design of the inventory's form and function based on market shifts and demand and supply variability?</p> <p>How are we managing buffer versus waste in inventory management?</p> <p>What are the issues in supply reliability?</p> <p>How good was the S&amp;OP plan? How do we tie S&amp;OP playbooks to operational effectiveness?</p> <p>How effective are my planning processes?</p>	<p>How do we get the best signals to suppliers?</p> <p>Where are we on driving reliability with suppliers? Quality?</p> <p>What is the impact on corporate sustainability?</p> <p>What is the bullwhip effect of each stage of the supply chain?</p>

**What is different?** Traditional processes lack alignment. Without visibility of margin impacts across functions at the business's speed, functions shift, not shape demand. (Shaping demand increases market potential, where shifting demand increases growth for a period but does not increase baseline demand and often increases costs with a penalty to margin.

**Outside in Process.**

The start of an outside-in process is market data. Market data surrounds the supply chain. Examples include, but are not limited to, weather patterns, geolocation data, rating and review feedback, consumption analysis, pallet and truck sensors, and intelligent devices. The importance varies by industry.

An outside-in process definition does not assume that any of the signals are perfect. Nor does it depend on single signals. Instead, the process definition leverages multiple signals and advanced analytics to reduce noise and improve signal reliability to drive a moment of truth.

An outside-in process has the following characteristics:

Outcome focused. The outcome focuses on winning at a moment of truth. Results are visible to employees with ongoing alignment. Examples include:

- Ship on time in full

- First pass yield schedule adherence

- In-stock %

- Forecast value-added improvement

- Margin

- Inventory effectiveness, or reduction of the bullwhip impact.

The outcome is shaped by multiple data sources in a closed loop to improve the decision support signal. The importance—and interaction of the data—of signals changes with the market.

The goal is alignment: to drive insights and align/synchronize make, source, and deliver from the market (buyer) to market (supplier) bidirectionally.

Orchestration: The fluid movement of decision-making across functions can drive bi-directional orchestration of margin, mix, and volume to maximize strategic objectives. Clarity of local and global performance recognition that different geographies and divisions have different potentials.

Cross-functional. Ensuring coordinated response of the enterprise to customers and suppliers based on the Market Driven Knowledge graph insights.

An outside-in process is different than customer-centricity – although both are basic definitions for our work.

Potential process definitions utilize baseline forecast alignment, continual Coefficient of Variation (COV) analysis/ inventory analysis, unstructured text mining through listening posts, middle-mile orchestration in distribution, continuous test and learn loops, adaptive scheduling, and predictive ETA, and demand orchestration. Each of these examples requires definition and testing.

Descriptor	Definition of Capabilities
Market-Knowledge Graph	A continual governor across sell, deliver, make and source to gauge the success of the plan against actuals and align functions to a balanced scorecard
Market-Driven Demand Management	Use of market signals to assess baseline or market potential and evaluate the "forecastability" of the signal (COV). Ties to sensing and listening capabilities. Baseline runs through demand shaping, price and supply chain planning applications.
Demand Visibility	Translation of baseline demand by role with configurability to understand the impact of mix, price, volume and margin.
Digital Twin	A parallel model to enable what-if scenarios by planners/role in a sandbox environment.
Bullwhip Eliminator	Translation of baseline market requirements by role with minimal latency
Rules Automation	The tie of segmentation logic to ATP and allocation through a rules-based ontology to automate fulfillment
Listening Post	Translation of unstructured text into a demand or supply signal
Sensing	Translation of streaming data into operational and executional planning
Collaboration	Sharing of customer or supplier data in a meaningful way by role.
Synchronization and Time Horizon Consumption	Bottoms up and tops down planning across applications with market-driven consumption logic
Planning Effectiveness Dashboard	Monitoring of planning effectiveness by role
Autonomous Planning	Continual learning based on planning effectiveness and market shifts.

Current examples of outside-in processes are Vendor Managed Inventory (VMI) and Just in Time (JIT). However, these processes do not connect to supply chain planning as a market signal. Instead, they operate in isolation translating demand requirements into order signals.

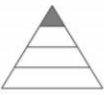



***What is different?*** In most organizations, visibility against the moments-of-truth by region, division and geography is not possible. Nor is it role-based and grounded in market potential.

### **Process Modeling:**

In Project Zebra, the group will focus on defining process definitions of outside-in processes. To facilitate the discussion, the team will use the process modeling framework used in SCOR. (While the group uses the process modeling techniques of SCOR, the group is not limited to the SCOR model's current thinking.)

Using a process model provides a working definition for technologists to build software and for business leaders to design process flows.

### **Level 1,2,3 process (follow SCOR definition)**

		Level		Examples	Comments
		#	Description		
Within scope of SCOR	↑	1	 Process Types (Scope)	Plan, Source, Make, Deliver, Return and Enable	Level-1 defines scope and content of a supply chain. At level-1 the basis-of-competition performance targets for a supply chain are set.
		2	 Process Categories (Configuration)	Make-to-Stock, Make-to-Order, Engineer-to-Order Defective Products, MRO Products, Excess Products	Level-2 defines the operations strategy. At level-2 the process capabilities for a supply chain are set. (Make-to-Stock, Make-to-Order)
		3	 Process Elements (Steps)	<ul style="list-style-type: none"> <li>Schedule Deliveries</li> <li>Receive Product</li> <li>Verify Product</li> <li>Transfer Product</li> <li>Authorize Payment</li> </ul>	Level-3 defines the configuration of individual processes. At level-3 the ability to execute is set. At level-3 the focus is on the right: <ul style="list-style-type: none"> <li>Processes</li> <li>Inputs and Outputs</li> <li>Process performance</li> <li>Practices</li> <li>Technology capabilities</li> <li>Skills of staff</li> </ul>
Not in scope	↓	4	 Activities (Implementation)	Industry-, company-, location- and/or technology specific steps	Level-4 describes the activities performed within the supply chain. Companies implement industry-, company-, and/or location-specific processes and practices to achieve required performance

**What is different?** The current SCOR model is "supply-centric" and inside-out. The opportunity is to use new forms of analytics to drive a step-change in process thinking.

### Moment of Truth

The Moment of Truth (MOT) in the supply chain is a measure of supply chain performance. In simple terms, it is a point when supply chain performance is clearly defined, and the supply chain either met or did not meet the requirement. A simple example in your personal life is a bounced check. When a check was presented, was there money in the account? If not, the check bounces. If yes, the check is funded.

In our case, this represents a performance metric that prioritizes cross-functional enterprise response to customer needs:

- Ship on time in full
- In-stock%
- First pass yield
- Effective ETA

**What is different?** In today's processes, there is a lack of visibility and alignment on the moments of truth.



## **Orchestration**

Bi-directional trade-offs of functional alternatives to develop the best plan. Examples include, but not limited to:

- Increases in raw material pricing orchestrated into an alternate bill of material and potential alternate supplier discussions and revenue management decisions to determine final market pricing.
- Capacity shifts are orchestrated seamlessly between contract manufacturers and internal sources.
- Shifts in price and market potential drive shifts in product portfolios.
- Insights from contactless shopping translated into demand-shaping programs for traditional channels.

***What is different?** Today's processes are linear focused on functional efficiency. There is no bi-directional orchestration.*

## **Market Drivers**

External factors (that can be modeled) affecting market potential. Examples include, but are not limited to, weather, events, illness, GDP, fashion trends, and competitive activity.

### **Demand Levers-**

Demand shaping programs to improve market potential. The list includes trade promotion, price changes, portfolio changes, new product launches, marketing programs, and trade incentives. Most demand shaping activities are combinatorial where multiple levers are used at the same time to increase market potential.

### **Demand Shaping**

Internal activities to try to stimulate market potential. When successful, demand shaping increases baseline lift. Some products have an elastic baseline.

### **Demand Shifting**

When companies attempt to use demand levers but fail to improve baseline lift, demand is shifted from period to period. This increases costs without improving the market potential.

### **Attribute Planning**

A focus on product attributes to understand how portfolio shifts affect market potential. Product Portfolio Analysis-A what-if analysis/evaluation of mix and product assortment.