THE **SPARK** INITIATIVE

Building outside-in processes for better supply chain planning

FINAL REPORT

OMP

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1 Executive summary

This report summarizes the outcomes of the Spark Initiative, a think tank of supply chain experts and industry leaders who are exploring a revolutionary outside-in approach to supply chain planning. With the Spark Initiative, OMP wanted to help members of the OMP Community to share, learn, and test outside-in capabilities using state-of-the-art technology. By joining forces, participants in the Spark Initiative could accelerate their understanding of how outside-in planning can be applied to real-world cases.

Launch and objectives

The Spark Initiative was launched in November 2022, with active support by key OMP customers such as Dow, General Mills, Land O'Lakes, and Nestlé. An **advisory board** was created to help select real-life cases that would help validate key concepts of outside-in planning. After an initial joint training round, **two test cases** were identified and tested. The results of these tests and the learnings from the entire initiative are summarized in this report.

Test cases and results

Nestlé's test case revolves around the challenges of forecast accuracy for new product introductions. The test showed it was possible to leverage POS data to dramatically reduce demand latency and improve forecast accuracy, and highlighted the potential of increased visibility and cross-departmental collaboration.

General Mills' test case aimed to decrease raw material volatility by reducing latency in the supplier forecasts. While a direct translation of finished goods demand into raw material demand offered a reduced latency and supports the value of latency reduction, supplier data quality shared across ecosystems was discovered to be a main contributor to material volatility due to its impact on raw material forecasts.

Insights and collaboration

In both cases, the discussion of outside-in concepts and the collaboration with other departmental roles led to **new insights** and opened up **opportunities** for further improvements in collaboration, with a unified visibility of the river of demand as an ideal to-be state. The work included the prototyping of cross-functional dashboards supporting realistic collaboration scenarios, examples of which are included in this report.

Conclusion and future directions

The Spark Initiative participants concluded there is **clear value** in applying outside-in planning principles to transform the way we plan supply chains. While data quality remains a challenge for most companies, an innovation mindset, the willingness to iterate often and think outside the traditional planning paradigms are key success factors.

Available technology will support further experimentation, but OMP is **committed** to continue working on co-innovation in this area to design and include outside-in functionality in its Unison Planning™ offering.

2 Why outside-in planning?

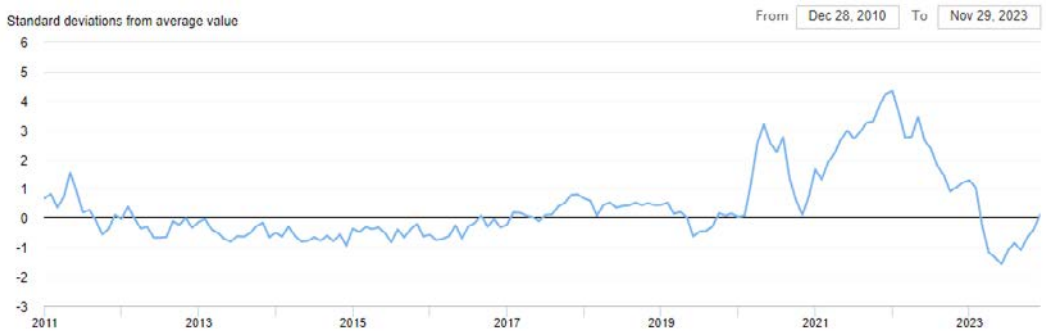
Across the globe, supply chains are under pressure. More disruptions, more uncertainty, and increasing market pressure drive the search for planning processes that help companies become more agile and resilient.

How can outside-in planning help in situations where the current planning approach seems to fall short?

2.1 Dealing with disruptive changes

Over the last few years, global events and market dynamics have sent a shockwave through the supply chain planning landscape. Changes in market dynamics have transitioned beyond the sudden unavailability of a critical material or an unexpected peak in demand for a finished product. The Covid-19 crisis transformed how people buy, forcing us to rethink our approach to distribution and forecasting. Logistics challenges and geopolitical events have forced us to consider local sourcing from multiple suppliers to reduce risk.

To define an objective metric of these challenges, the Federal Reserve Bank of New York defined its **Global Supply Chain Pressure Index** (GSCPI [1]), which clearly shows the increased intensity of disruptions since early 2020, which continues to this day:



As disruptions became more frequent and impactful and the pressure on our supply chains increased, a number of **limitations of current planning processes** became evident. Planners discovered that current planning practices were designed to perform well within a certain rate of change in material availability and market demand. As the river of demand evolved from a slow-moving stream to a maelstrom of confusing information, and previously exceptional situations became the norm, planning processes were stretched beyond their limits.

1 See **newyorkfed.org/research/policy/gscpi#/overview** for more information.

Example scenarios

Example 1: Demand latency and the bullwhip effect

Every supply chain relies on a **demand forecast** to decide what to produce. If we are good at predicting demand a few weeks or months in the future, we can build and distribute the right volume of product to the right channel, with a minimal amount of excess inventory and little risk of lost sales. In a predictable market, replenishment orders received from our channels are an adequate proxy for the actual demand – except in a disruptive and rapidly changing market. Imagine a sudden peak in consumer demand.

The **latency** between the market signal from the final consumer and the moment it becomes visible for us as an order means we will have produced too little, and our safety stock may be insufficient for keeping up with demand. But as the replenishment orders come in, we may interpret the increased demand as a trend instead of a one-time peak and decide to increase production – building up excess inventory that will never sell. The latency has now created a **bullwhip effect**.

Example 2: Supply volatility and the bullwhip effect

The supply of raw materials uses an **estimated lead time** to translate a planned consumption by our supply chain into a procurement order to one or more suppliers. But what happens if that lead time is not realistic because the supplier is unable to source a critical component, or because the delivery of the material is delayed by port congestion or the absence of containers for transport? If the estimated lead time is no longer a reliable proxy for the actual delivery delay, safety stocks will not be able to buffer the variability and a similar **bullwhip effect** will manifest itself on the supply side.

Adapting our planning processes to the new normal

There are no signs that the increased supply chain pressure is a passing phase. Rapidly changing markets and increasing customer expectations keep up the pressure on the demand side, while the supply side is affected by price volatility and shortages in materials and labor. There are **no simple solutions** like stocking up on raw materials or producing more finished goods inventory. Companies need to keep inventory and cost under control, while maintaining the same service level. In addition, new sustainability regulations are likely to make the challenges for planners even more complicated, introducing additional KPIs to optimize.

For decades, our traditional organizational structures, roles, and processes have been optimized for **efficiency**, but not necessarily for **agility**. We may have ended up designing for a steady state that no longer exists. Outside-in planning advocates for a unified perception of the state of the business, driven by demand, enabling all stakeholders to have a simultaneous view of the supply chain and make balanced decisions.

As disruptions and rapid changes have become the new normal, it is time to adapt our planning processes. They need to be smarter, more capable of "seeing" what is happening outside our enterprise boundaries, so we can substitute actual, near-real-time insights for history-based assumptions.

2.2 Planning at the speed of business

How can we make our planning processes more responsive and capable of dealing with rapid market changes?

Reducing signal latency

First, we will need to **leverage all relevant market data** to reduce signal latency. For instance, we can use actual point-of-sales data instead of historical order data to inform us about market demand, or use other signals such as buyer intent or weather data sources to predict what demand will look like. Similarly, **supply signals** can be used to improve our understanding of the dynamic behavior of the upstream supply chain. Together, they reduce the decision latency that causes our supply chains to deliver the wrong product at the wrong time and spend its resources on a suboptimal result.

> *In the Spark Initiative we're setting up ways to capture and interpret signals from the outside world as early indicators of variability, both on the demand and supply side. For instance, point-of-sales data show a peak in demand much sooner than an inventory replenishment order.*

Jo Vernelen
Senior Product Manager at OMP

But that will not be enough. Latency not only occurs at the edge of our supply chain, but also between the various **functional silos within our enterprises**. Even if a market demand signal is available in real time, it must be translated into actionable information by passing through different departmental processes, to feed the planning cycle, which also adds a certain amount of latency. Ideally, we transform the sequential planning approach into a **cross-functional approach** in which relevant information flows in both directions to influence decision-making.

> *As a planner, you need a much more agile and collaborative environment in which you can quickly run through various scenarios and make ad hoc decisions. You simply don't have the time to wait for the next monthly S&OP meeting a few weeks ahead. These meetings are still important for aligning supply chain operations with company strategy, but when there's disruption all around, they end up lagging behind. We need a planning strategy that goes beyond relying on steady-state insights.*

Lennert Smeets
Senior Product Manager at OMP

These are some of the **key tenets of outside-in planning**. In addition to using both enterprise and market data to make better business decisions more quickly, outside-in planning requires process transformation in areas such as master data management, redefining the form and function of inventory, working towards a deeper understanding of market and demand dynamics, rethinking the collaboration with procurement, and redefining the alignment between the tactical and operational planning horizons.

2.3 Why outside-in planning is difficult

The promise of outside-in planning appeals to many a supply chain leader. So, why don't they **simply embrace this better way of planning**? There are several reasons outside-in planning has not taken the world by storm.

The need for organizational change

While concepts like using point-of-sales data as a demand signal are appealing, they are **difficult to implement at scale**. Although the technology to ingest, transform, and interpret the vast mountains of data is available, IT departments need to be empowered to prioritize such initiatives within their already significant portfolio of projects.

In addition, **getting access to market data** requires a good deal of negotiation – not only with the distribution channels that can deliver that data, but also within an organization, where departments consider themselves the "owner" of this information and are often reluctant to share it. Why? Because their business objectives are not always aligned and transparency puts (departmental) results at risk. Consider, for instance, the interests of a regional distribution center tasked with fulfilling last-minute orders and hesitating to reduce the inventory that enables them to achieve that objective or a procurement department that has been pressuring a supplier into delivering a regular volume of a certain material, but is experiencing a decreasing supply reliability.

As a result, **departmental silos** form as a solution to a real business problem. Teams will work to gain access to data relevant to their purpose, but will often remain blind to the value that very same data may have for other roles within the organization. As a result, one department may discover that its "neighbor" routinely receives (but does not use) data that it lacks, while in another situation, two (or more) teams maintain the same (master) data with slightly different formats, business logic, and validation rules, obstructing clear communication and collaboration.

Breaking down these departmental silos that stand in the way of outside-in planning practices requires a **culture change**. And as these changes need to happen across the entire end-to-end supply chain, a lot of people need to get on board. This kind of large-scale business transformation requires a **solid change management** approach, with clear executive support and a mandate to work differently and support to transform the organization where necessary.

Proof of value is missing

But **executives like proof**. The promise of a better way of planning, leading to superior results and supply chain excellence, does not suffice by itself to embark on a large-scale, fundamental redesign of supply chain practices that have been in use for decades. It is less a sign of conservatism than of good governance to ask for **concrete evidence that outside-in planning can really make a difference. In practice**, this means starting with improvement projects with a limited scope, addressing a key pain point, and attempting to demonstrate the value and wider applicability of these concepts across the supply chain.

Finally, even when companies are willing to embark on a pilot project to prove the value of outside-in planning, there is **no industry standard approach** to defining such outside-in processes. It requires collaboration with people from different teams across the enterprise, all of whom usually have more than a full workload, who are willing to work through the necessary learning curve together. As a team, they would need to identify a concrete business case for their pilot to take on.

The Spark Initiative from OMP aimed to support members of the OMP Community in sharing, learning, and testing outside-in capabilities using state-of-the-art technology. By joining forces, Spark Initiative participants could accelerate their understanding of how outside-in planning can be applied to real-world cases.

3 Spark Initiative

In November 2022, OMP launched the Spark Initiative, a think tank of supply chain experts and industry leaders, to explore the potential value of outside-in planning. With this initiative, OMP aimed to improve decision-making for its customers by introducing a new way of thinking about supply chain planning.

3.1 Defining key objectives

OMP defined the Spark Initiative with three key objectives in mind:

- To learn and iterate quickly
- To share our findings with the industry
- To incorporate value-proven insights into our product and offering

The chosen approach was to work **in close collaboration** with OMP customers to **learn, explore, and share** outside-in capabilities using massive amounts of external data and state-of-the-art technology. OMP invited members of the OMP Community to submit their **real-world business cases** to build and validate the potential of an outside-in planning approach. A handful of companies were selected to participate in the research by providing real-life test cases.

3.2 Getting support from industry leaders

The Spark Initiative think tank is supported by a board of business leaders, industry professionals, academics, and OMP experts. This advisory board drives the agenda, advises on the conceptual framework, and monitors the pilot tests.

Meet the members of the Spark Initiative advisory board here.

I'm excited about participating in the Spark Initiative because it's the next frontier in supply chain planning. How do we harness all these signals out there? How do we identify which ones matter most to our business? What do they mean to us and to our ecosystem partners? In the end, it's not companies that compete, but the ecosystems around us. We have to make these ecosystems more effective in order to stay competitive. And I believe this initiative will bring us one step closer to achieving that goal.

Dave Winstone
Spark board member and Global ISC Director at Dow

In the initial phase, members of the Spark Initiative participated in collaborative **training sessions** on the concept of outside-in planning. Doing this as a team gave them the opportunity to bring their wealth of knowledge and experience to the table, sharing insights in group discussions and sparking fresh ideas about outside-in supply chain planning.

One of the learnings from these training sessions was that the challenges in moving towards outside-in planning are similar across companies and industries. While data and technology are critical success factors, changing processes was the most challenging task. Participants understood that there is as **much to unlearn** as there are new practices to adopt, and that it would be essential to progress step by step, taking the necessary time to thoroughly understand the new concepts and back those insights up with concrete, fact-based proof of value.

Listen to our OMP Talks podcast **"Real-world solutions for age-old supply chain challenges"** in which Bob Herzog, a seasoned supply chain leader with over 25 years of experience in Procter & Gamble's planning department and a key member of the Spark Advisory Board, explains why he supports the initiative.

3.3 Identifying test cases

The Advisory Board then proceeded to select **two test cases** to evaluate. Board members were asked to provide candidate test cases for which they could provide real-life data samples and collaboration with the OMP team performing the implementation of the outside-in planning approach.

Nestlé's test case: demand visibility

Nestlé's test case revolves around **new product introductions**. Since there's no prior sales data, the first production run relies on sales and marketing forecasts. But can we accelerate demand visibility to provide better guidance for future production runs instead of waiting months to discover whether a product is a hit or a dud? In terms of outside-in thinking, this is a situation in which latency has a huge impact and reducing it is highly valuable.

General Mills' test case: supply resilience

General Mills took a different but related approach to latency reduction. The slow transformation of demand signals into supply signals through traditional material requirements planning (MRP) processes leads to providing **raw material suppliers** with inaccurate and volatile forecasts. From an outside-in perspective, this boils down to synchronization – not only across functional silos, but also across the extended enterprise. The ultimate objective is to enable the translation of demand flows and bi-directional orchestration for the procurement plan within the tactical planning horizon.

Joint project teams for practical application

Dedicated project teams consisting of customer and OMP experts then began planning the required testing steps, analyzing the data, and considering how processes might have to change to improve collaboration. Over a period of three to four months, these teams evaluated the practical application of key outside-in planning concepts and prepared their findings. These were presented at the OMP Conference in Barcelona on September 27-28, 2023, where we shared valuable insights and best practices on how to incorporate outside-in planning concepts in supply chains. This report contains further details on the scope of the test cases, the results that were obtained, and the overall insights gained from the Spark Initiative.

> *From my perspective, seeing how board members and customers grew from this experience was amazing. From expressing expectations and undergoing training to testing real-life supply chain scenarios, it was one of the most incredible innovation journeys I've been part of. The commitment and enthusiasm of everyone involved was truly inspiring.*

Paul Delbar
Product Marketing Manager

The initiative aligns with OMP's mission to deliver the best supply chain planning solution in the market. Exploring and understanding the potential benefits of outside-in planning for our customers is an important innovation project that helps us shape our product road-map to better support outside-in planning.

4 Test case #1: Nestlé

Optimizing new product introductions

Nestlé's test case revolves around the challenges of forecast accuracy for new product introductions, where little historical data is available to build a realistic forecast. Latency in getting real consumer demand signals results in a longer period without any realistic guidance for the supply chain.

The test showed it was possible to leverage POS data to dramatically reduce demand latency and improve forecast accuracy, and highlighted the potential of increased visibility and cross-departmental collaboration.

4.1 Context

For most SKUs, companies can rely on historical sales data and forecasting algorithms to predict what they should plan for in the coming period. With **new product introductions** (NPI), this is a lot harder, as there is no historical data other than using comparable proxy SKU as a baseline. When the first production quantities hit the shelves, visibility into the actual consumer signal is key to accurately predicting where the product forecast will go, so the second production run can be planned.

In practice, this signal reaches the planning team **too late**. This significant demand latency often leads to a bullwhip effect and results in either underproducing (and obstructing a successful introduction) or overproducing (and wasting product and trade funds) the new SKU.

With new products, the bullwhip effect is **amplified** by the fact that it is hard to translate a replenishment order signal into a true demand signal, as distribution networks may still be placing orders to fill sales channels. As the product transitions into a "normal" flow through the distribution channel, this effect fades.

Finally, whenever any sales-related data becomes available, different teams may need to **realign** their plans in coordination. Without transparency and collaboration, sales, marketing, procurement, finance, and supply chain risk increasing process latency and further reducing the agility in responding to market events.

4.2 Scope and objectives

This test case focused on testing how the use of customer data could **improve collaborative decision-making for NPI** by reducing demand latency and lessening the bullwhip effect. The test case was developed in collaboration with Nestlé, which provided actual Walmart consumer purchase (point-of-sale) and inventory data. But the test context also applies to most consumer-oriented forecasting situations.

Test case objectives:

Outside-in analysis

Reduce bullwhip effects by improving forecast for NPI by reducing the latency on outside market signals

Does the use of data points "closer" to the market (such as point-of-sale data or channel inventory) improve forecast accuracy? How would this reduce the bullwhip effect?

Planning simulation

Develop the ability to simulate the impact of planning scenarios for different stakeholders

How can we simulate the impact of the reduced latency on KPI improvements for the different supply chain actors?

Stakeholder alignment

Develop the ability to simulate the impact of planning scenarios for different stakeholders

How can we create better visibility for all supply chain actors on how demand changes and how our supply chain responds to it?

4.3 Approach

4.3.1 Leveraging point-of-sale data

The advantages of using (near) real-time POS data over delayed replenishment orders are easily understood. But how can such an approach be implemented at scale? How would this reduce latency? Would forecasts based on such data actually be more accurate?

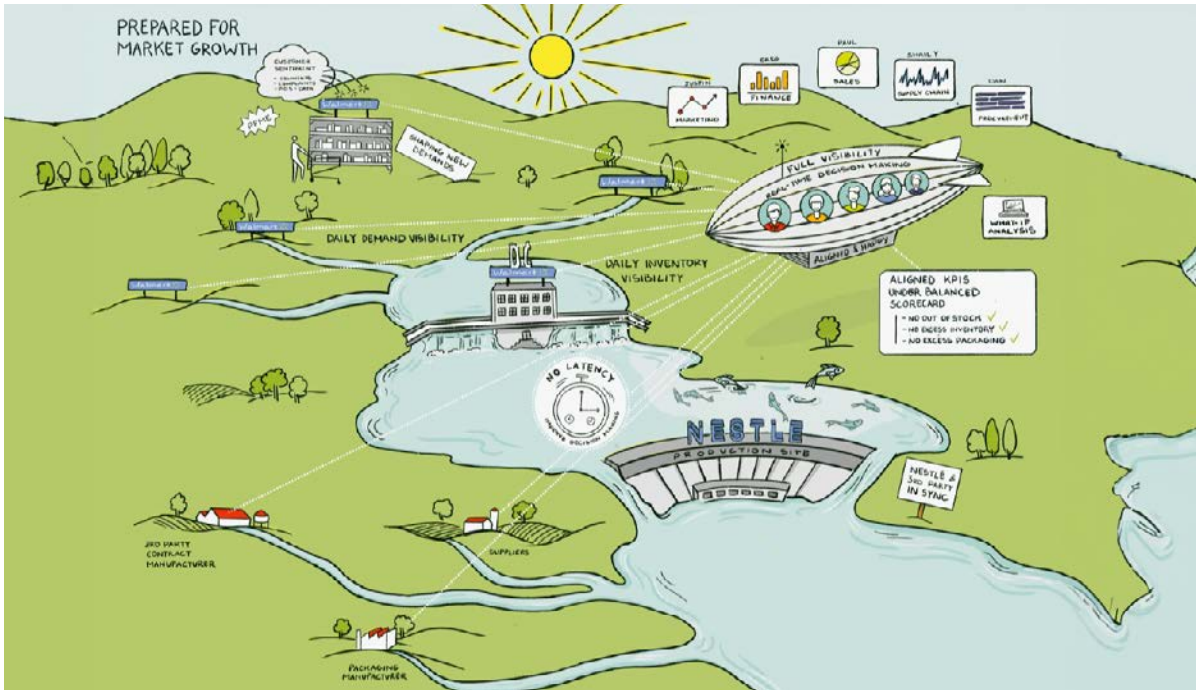
Most reorder processes introduce a latency of two to ten weeks between consumer purchases and replenishment orders from the distribution channel. Internal process latency in transforming these signals to a planning action can be estimated at two to six weeks. Even then, upstream supplier lead times can further increase the delay on an adequate market response. All in all, using a POS signal instead of the replenishment order signal could result in a **potential latency reduction of up to 15 weeks**.

So, the challenge became a quest for a lower-latency signal with sufficient granularity. For POS visibility, Nestlé had access to an IRI data feed with a two-week latency. But this data was at too high a level of aggregation, making practical usage difficult.

Fortunately, following internal discussions, Nestlé discovered the availability of a Walmart data stream representing POS data with a latency of one week. Compared to the (currently used) Walmart order signal, this represents a potential latency reduction of one to **nine weeks** compared to the replenishment order latency. The POS signal also gives a better indication of consumer demand compared to the re-order volumes (re-order volumes may include bullwhip effects through e.g. retailer inventory strategies). A number of different forecasting approaches levering this data were tested. This resulted in the ability to provide a forecast with a **15% higher accuracy**.

4.3.2 Improving collaboration

How do you spark an internal discussion on the advantages of outside-in planning? One framework introduces the concept of the **river of demand**, a vision in which demand signals flow unobstructed up the supply chain, with all stakeholders (general management, finance, sales, procurement, and supply chain itself) gaining a bird's-eye view of the entire end-to-end process. Ideally, they have access to a single unified dashboard where any evolution and decisions are translated into KPIs relevant for each of these roles.



As organizations chart their current (as-is) way of working, they discover how the current state feeds the bullwhip effect. Information is often delayed, aggregated, or even siloed. Instead of clear water, the river of demand turns muddy, is subject to shoals, or gets occluded by dams. In such a landscape, it is hard to maintain a unified view of the supply chain. Instead, supply chain stakeholders develop a local (siloed) understanding of their part of the supply chain, adding further process delay in responding to demand signals that were originally clear and timely...

This discovery process starts by asking stakeholders simple questions: What is your objective for a successful NPI? How do you measure that success? What kind of data do you need to make decisions? What kind of visibility would you like to see in a unified business dashboard to help you respond faster and better?

Far from a simple discussion, this process resulted in a better understanding of the needs of other stakeholders and a definition of a number of dashboards that support a collaborative workflow, such as the example scenario described below.

4.4 Results

The results of the test case can be summarized as follows:

Improved forecast accuracy	Forecast accuracy improved 15%, which helped to reduce latency by three weeks, leading to increased supply chain responsiveness
Inventory reduction	Simulations showed a 10% reduction in inventory and a similar benefit on write-offs and other inventory-related related metrics
Collaborative dashboarding	A better understanding of the needs of each role led to improved insights for all and accelerated collaborative decision-making

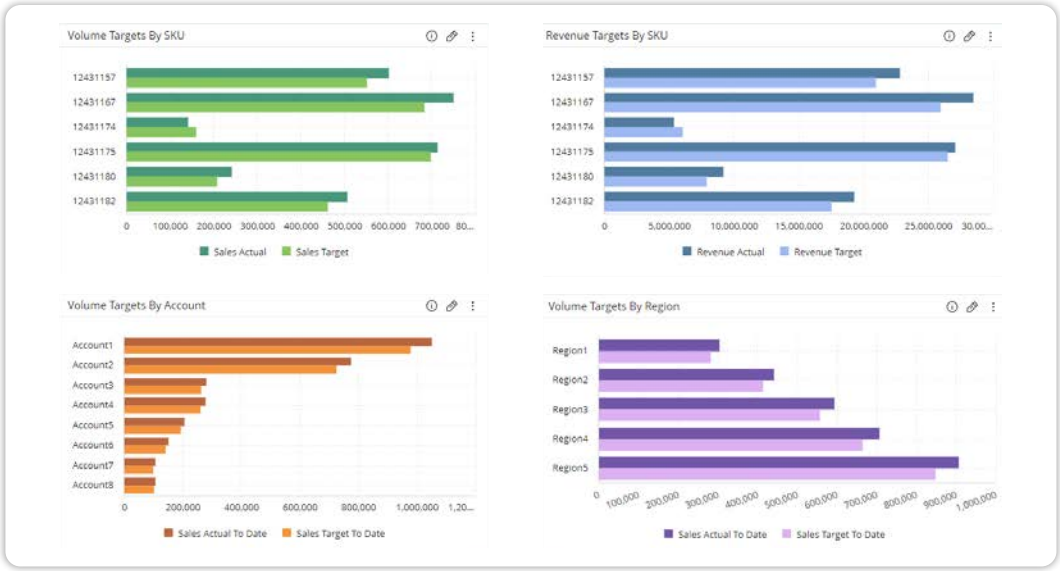
In addition, an extended animation video on the river of demand at Nestlé was created to support internal alignment and change management initiatives.

While the scenario is based on real-life, the data shown in these examples is synthetic.

We are witnessing the launch of a (hypothetical) new Nestlé product called Genesis. The stakeholders have access to a collaborative dashboard that brings all information together in a single coherent view, but allows each actor to develop insights relevant to their role.

Sales targets to date

For instance, the sales manager (Paul) can review his usual targets, focused on volumes and revenue by SKU, account, and region. Everything appears to be on track.



Account penetration

He then looks at the evolution of the number of accounts and stores over time. Slightly behind, but not too bad.

Is merchandising support effective and is there sell through?

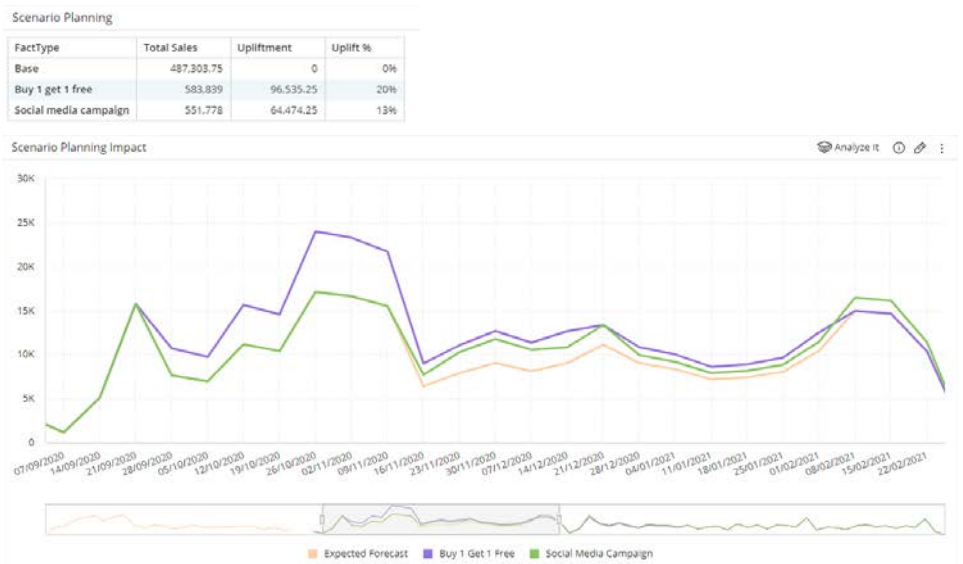
Greg, the general manager, pops in to discuss the new digitally focused merchandising efforts with Paul. Across different accounts, their efforts appear to be paying off, with a positive sales uplift and return on investment.

Is there sell through at customer?

With Nestle's new outside-in visibility, Paul then analyzes how well customer sales are translating into end consumer demand. He notices an alarming drop in POS data. An end-to-end inventory view then shows how customer inventory is building up. A new production run is planned to meet the order driven forecast, but Paul suddenly realizes that he's seeing a classic bullwhip effect playing out in front of him.

Actions to improve sales

Paul quickly takes action. He alerts the team and explores two possible sales strategies for stimulating consumer demand. The first is a buy one, get one free promotion. The second is a social media campaign. Based on price sensitivity and online analytics, Paul analyzes the sales impact of both over time.

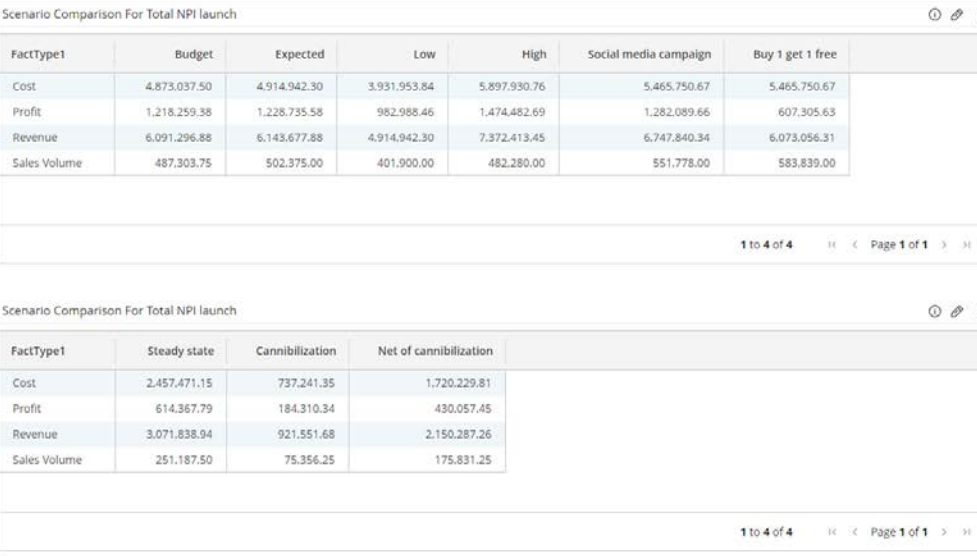


Scenario Planning

FactType	Total Sales	Upliftment	Uplift %
Base	487,303.75	0	0%
Buy 1 get 1 free	583,839	96,535.25	20%
Social media campaign	551,778	64,474.25	13%

Future financial planning

Justin in Finance was initially happy with the launch being ahead of budget to date. He then starts looking at the financial impact for the scenarios Paul has run. The buy one, get one free promotion results in a better sales uplift, but lower margin and net profit. The social media campaign uplifts sales, but with a lower margin impact.



Scenario Comparison For Total NPI launch

FactType1	Budget	Expected	Low	High	Social media campaign	Buy 1 get 1 free
Cost	4,873,037.50	4,914,942.30	3,931,953.84	5,897,930.76	5,465,750.67	5,465,750.67
Profit	1,218,259.38	1,228,735.58	982,988.46	1,474,482.69	1,282,089.66	607,305.63
Revenue	6,091,296.88	6,143,677.88	4,914,942.30	7,372,413.45	6,747,840.34	6,073,056.31
Sales Volume	487,303.75	502,375.00	401,900.00	482,280.00	551,778.00	583,839.00

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Scenario Comparison For Total NPI launch

FactType1	Steady state	Cannibilization	Net of cannibilization
Cost	2,457,471.15	737,241.35	1,720,229.81
Profit	614,367.79	184,310.34	430,057.45
Revenue	3,071,838.94	921,551.68	2,150,287.26
Sales Volume	251,187.50	75,356.25	175,831.25

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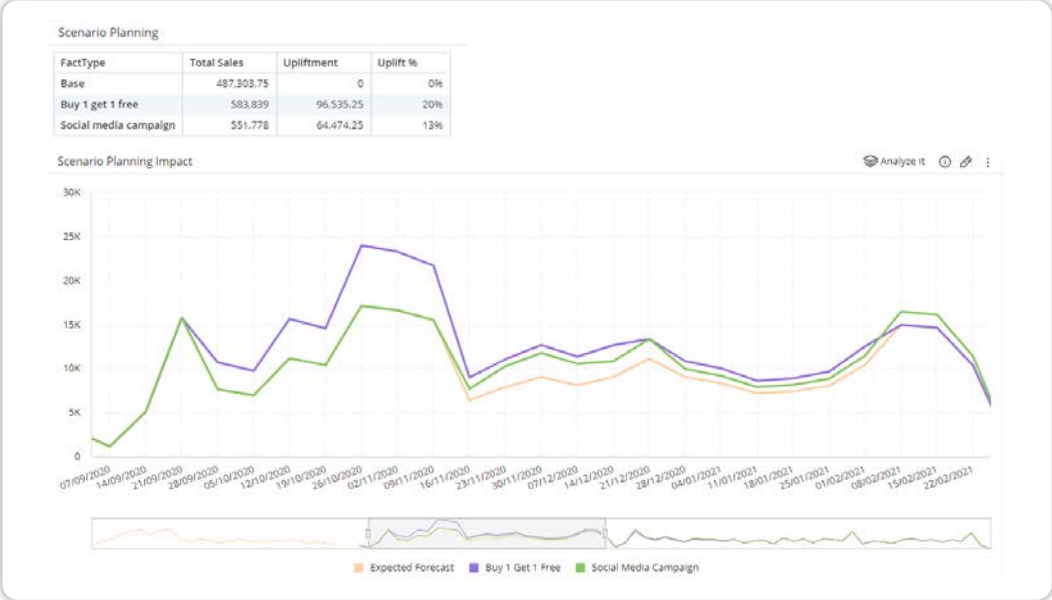
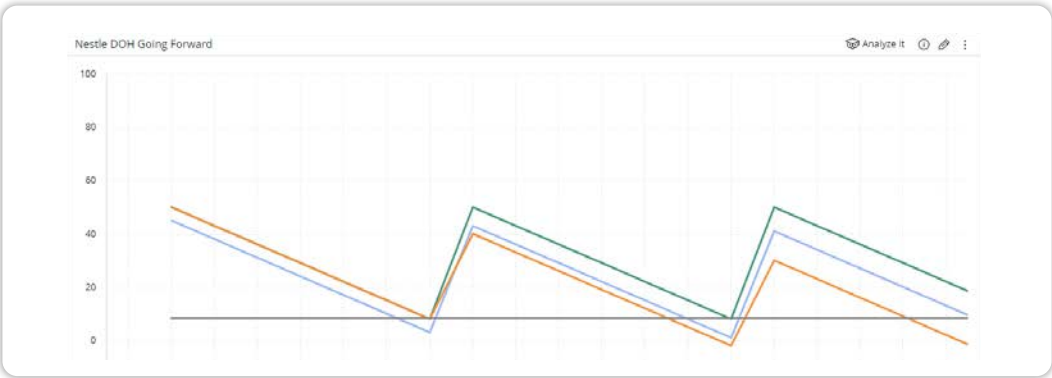
Actions to improve sales

Paul quickly takes action. He alerts the team and explores two possible sales strategies for stimulating consumer demand. The first is a buy one, get one free promotion. The second is a social media campaign. Based on price sensitivity and online analytics, Paul analyzes the sales impact of both over time.



Forecasting

Shaily in supply chain checks whether production and inventory plans can support the sales shift.



Dan in Procurement checks for raw material risks. A few concerns are highlighted with the social media campaign, but Dan is able to quickly resolve these with the supplier.

The team submits the strategy change to Greg, who quickly approves and is happy to further invest in the new digital strategy.

Raw Material Plan And Risks

Raw Material	Next 1 Month Production Run					Next 6 Months Pro
	Max Available	Req: Social Media	Req: Expected	Shortfall: Social Media	Shortfall: Expected	Max Available
67015139	4,710	6,688.2	5,684.97	-1,978.2	-974.97	14,130
60187321	4,295	6,013	5,111.05	-1,718	-816.05	25,770
55992768	2,820	3,919.8	3,331.83	-1,099.8	-511.83	19,740
11355541	1,794	2,332.2	1,982.37	-538.2	-188.37	8,970
73387332	6,576	6,839.04	5,813.18	-263.04	0	32,880
68491798	3,132	3,163.32	2,688.82	-31.32	0	28,188
16285635	892	900.92	765.78	-8.92	0	8,028
13480132	3,576	3,039.6	2,583.66	0	0	14,304
27251745	3,258	3,225.42	2,741.6	0	0	16,290
33490467	1,001	890.89	757.26	0	0	7,007
35812111	5,720	5,262.4	4,473.04	0	0	51,480
45411959	1,737	1,511.19	1,284.51	0	0	5,211
50787531	6,228	6,103.44	5,187.92	0	0	37,368
58213077	417	362.79	308.37	0	0	1,668
59683433	6,888	6,612.48	5,620.6	0	0	61,992
71429890	1,056	855.36	727.06	0	0	5,280
73269768	1,340	1,219.4	1,036.49	0	0	12,060
77263994	6,770	6,566.9	5,581.87	0	0	27,080
83006675	3,016	2,503.28	2,127.79	0	0	21,112
85738551	3,068	3,037.32	2,581.72	0	0	12,272
95580210	0	0	0	0	0	0

5 Test case #2: General Mills

Improving supplier resilience

General Mills' test case aimed to decrease raw material volatility by reducing latency in the supplier forecasts, as fluctuations in material availability are causing many supply chain disruptions.

While a direct translation of finished goods demand into raw material demand offered a reduced latency and supports the value of latency reduction, supplier data quality was discovered to be a main contributor to material volatility due to its impact on raw material forecasts.

5.1 Context

The pandemic resulted in an all-time high rate of disruptions in raw material availability. As a result, the supply chain is not only under pressure on the **demand** side (with increased variability and higher customer expectations), but also on the **supply** side (with decreasing supplier reliability impacting the supply chain's ability to respond in a timely manner).

Suppliers claim that this **supply volatility is** (at least partly) **due to the raw material forecast** they receive. If the forecast accuracy of that signal is low, the bullwhip effect in our supply chain simply ripples up towards our suppliers in the same way as latency in the distribution channel affects our own responsiveness.

5.2 Scope and objectives

This test case focused on discovering the drivers for raw material disruptions and investigating how outside-in planning techniques, such as reducing the latency in translating demand to raw material needs and increasing bidirectional alignment between suppliers and the internal supply chain, could help reduce their impact. The test case was developed in collaboration with General Mills, which provided data related to a raw material forecast and usage data, as well as supplier performance information.

Test case objectives:

Data accuracy

Implement a proactive management of supplier data quality issues

Can outside-in planning techniques help avoid disruptions or at the very least provide additional visibility into key risk areas?

Supplier forecasting

Create a better supply forecast by using a signal with lower latency (replace MRP by a translation of the finished goods forecast)

Is it possible to build a lower-latency raw material supply forecast that provides a more accurate representation of the actual raw material demand?

Stakeholder alignment

Improve supplier risk management by linking finished goods forecast to raw material constraints, leveraging stochastic planning

Can we create dashboards that show the relationship between (finished goods) demand and (raw material) supply to help mitigate risks?

5.3 Approach

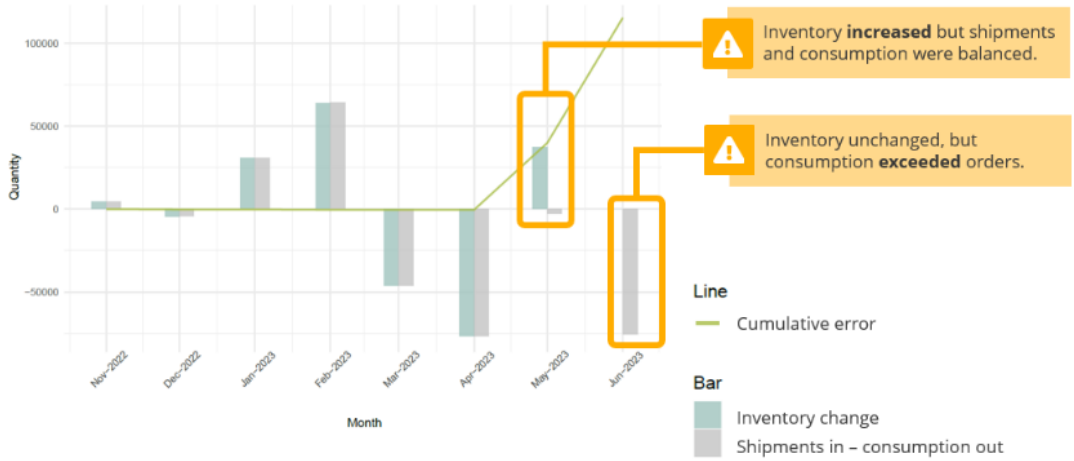
5.3.1 Supplier data quality

Data quality in itself is not an outside-in planning topic. Every digital transformation project has to deal with the complexity of aligning data formats, integrating systems from various data providers (both internal and external), monitoring data quality, and responding to the frequent changes that can bring smart business solutions to a grinding halt.

But as outside-in planning attempts to harmonize all links in the supply chain around a holistic and near-real-time view of the world, it tends to combine **more data faster** – increasing the vulnerability of systems and processes to data quality issues, especially when that data is provided by an external party.

For General Mills, the quality of **raw material inventory data provided by suppliers** was a key contributor to supply disruptions. In this test case, we looked at raw material availability at an external manufacturer. Supplier shipments into the manufacturer adds to inventory, while production consumption (and write-offs) decrease it. The change in inventory should always equal the difference between two streams in the same period.

In practice, General Mills discovered this was not the case. The three signals were often out of sync, as shown in the diagram below.



How does this translate into a disruption? Imagine General Mills is filling 50,000 jars and discovers midway through production that only 45,000 of the 60,000 reported lids are actually physically in stock. This is anything but an ideal situation. But it gets worse. We discovered a 55% correlation between data errors and forecast accuracy as provided to the external manufacturer. The raw material forecast is clearly impacted by data issues in a significant way.

The solution was found in an automated detection of data issues, reported to planners on a daily basis, which allowed them to rectify them before any raw material plans and supplier forecasts were made.

5.3.2 Reducing supplier forecast latency

Armed with more accurate data, the job for planners remains to provide suppliers with a more reliable raw material forecast – but also to do so **faster** than what can be achieved with the current MRP process that informs the procurement department. The process latency in translating finished good forecast data into raw material demand has a significant effect on the bullwhip, which in turn leads to high volatility in raw material availability.

In addition to traditional MRP, two new methods were applied: a simple moving average and a direct translation of the finished goods forecast into raw material demand. These were measured over various forecast horizons.

Overall, the majority of SKUs showed improved performance with the new direct translation method. Further testing beyond the proof-of-concept would be needed to ensure that this approach is sufficiently robust to be applied in a general manner.

5.3.3 Helping planners manage (and avoid) risks

The stress on planners facing raw material disruptions is tremendous. Imagine having to deal with numerous stockouts of raw materials at production sites, monitor thousands of product locations, and deal with an increasingly aggravated set of stakeholders. What if we could build a set of dashboards that show potential risk areas faster (with lower latency) and provide actionable insights?

5.4 Results

The results of the test case can be summarized as follows:

Automated data error handling	Provide planners with alerts based on automated error detection logic
Improved supplier forecasts	Replace MRP supply forecast by new signal with reduced latency and improved accuracy
Increased resilience	Improved supplier resilience through scenario and identifying supply/demand mismatch

While the scenario is based on real-life, the data shown in these examples is synthetic.

A possible scenario would run like this:

Shaily, General Mills' supply planner, starts by scanning all raw materials to quickly identify problem areas. Color coding indicates how soon a stockout may occur, while the numbers indicate the size of shortfall.

Shaily can quickly see the impact across High, Medium, and Low demand scenarios, so that if Paul in Sales decides to run that social media campaign, Shaily is prepared in advance.

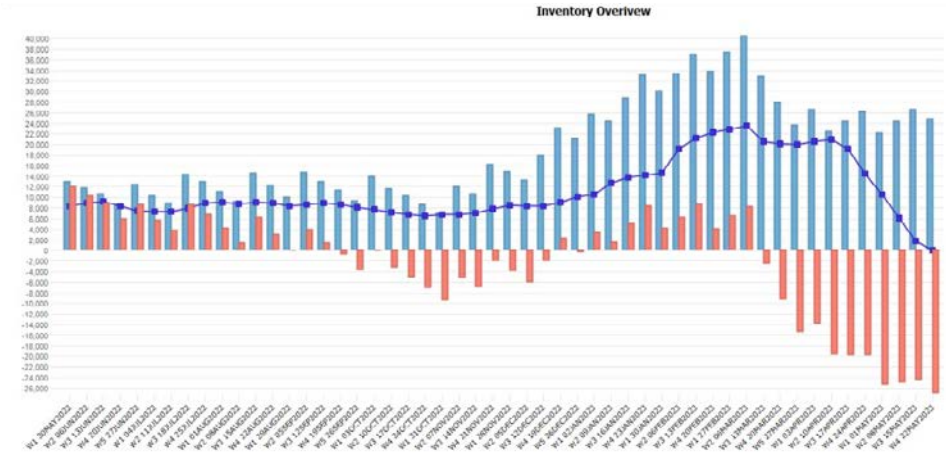
Shaily starts by picking the most problematic raw materials to further evaluate.

SparkReport_BelowZero

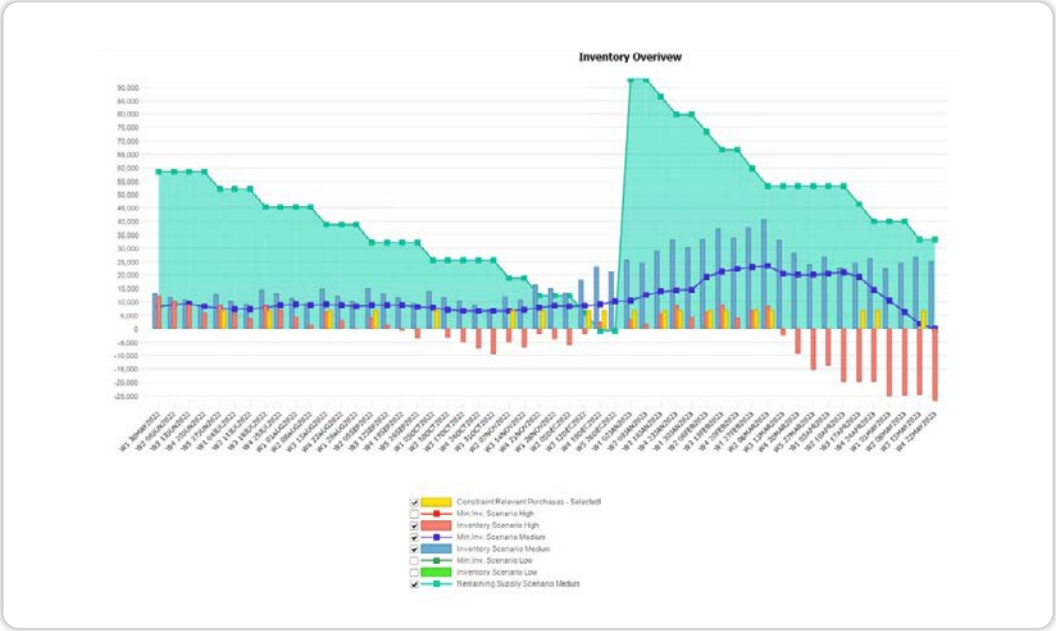
Product Description	Product	High		Medium		Low	
	Demand Scenario	Max Below Zero	Pct of Average Consumption	Max Below Zero	Pct of Average Consumption	Max Below Zero	Pct of Average Consumption
INGR_1825	2693880000	62,832	981%	22,350	409%		
INGR_1309	2366750000	48,287	4,228%	32,510	3,985%	17,631	4,004%
INGR_1828	2694460010	48,140	1,984%	26,622	1,536%	5,105	491%
INGR_1081	2260148000	48,094	5,184%	34,353	5,184%	20,612	5,184%
INGR_361	2041160020	39,786	2,015%	22,264	1,578%	4,742	560%
INGR_508	2083410020	38,299	3,904%	26,023	3,713%	13,747	3,269%
INGR_94	2017530000	34,149	2,785%	15,884	1,813%	7,097	1,350%
INGR_1390	2366750010	31,147	1,640%	6,768	499%		
INGR_1859	2707280000	31,119	3,408%	17,504	2,684%	5,956	1,522%
INGR_506	2083410000	25,856	1,683%	2,934	267%		
INGR_130	2020930000	25,070	3,348%	14,213	2,657%	5,268	1,641%
INGR_2346	2886060010	23,783	1,220%	4,922	353%	2,953	353%
INGR_436	2051240000	23,167	1,017%	12,591	2,387%	7,554	2,387%
INGR_349	2040730050	21,542	2,556%	12,439	2,067%	3,337	924%
INGR_1873	2713380000	20,246	3,324%	11,165	2,566%	3,549	1,360%
INGR_2168	2825430000	17,128	1,339%	4,671	511%		
INGR_1861	2707320000	15,520	3,287%	8,483	2,515%	2,576	1,273%
INGR_1969	2760310000	14,039	3,113%	8,648	2,684%	3,257	1,685%
INGR_1980	2768880000	11,811	3,362%	7,301	2,910%	2,791	1,854%
INGR_2023	2785280000	11,392	3,397%	6,914	2,886%	2,436	1,694%
INGR_261	2036286000	10,913	1,440%				
INGR_2003	2776276000	10,885	1,587%	3,379	690%	269	92%
INGR_95	2017530020	10,187	3,422%	6,659	3,132%	3,131	2,454%
INGR_1874	2713420000	10,050	2,902%	4,979	2,013%	594	400%
INGR_1610	2552341000	9,606	2,553%	4,046	1,506%		
INGR_1456	2394161000	9,182	1,212%				
INGR_2347	2886060020	8,992	1,171%	6,423	1,171%	3,854	1,171%

Shaily then goes into further location granularity to determine the most at-risk locations. She is able to look at the situation in each specific product/ location to see how it evolves over time.

In this example, Shaily can see the current expected demand plan on the blue bars and line. The red bars show the projected raw material inventory in the high demand scenario, alerting Shaily to potential problems in Oct. 2022 and March 2023.



Shailey then overlays a remaining contract balance view in turquoise. She can see that the current contract balance is maxed out before resetting in 2023. Shailey comes up with two mitigating strategies.

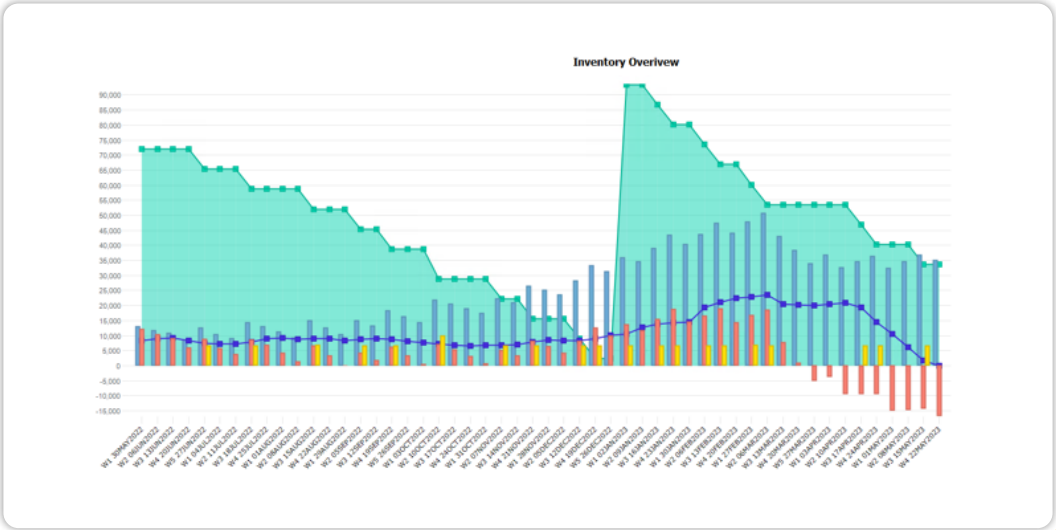


First, she alerts Dan in Procurement about the need to secure additional supply. This is now being planned nine months in advance, unlike the typical last-minute rush.

Second, she gives Paul in Sales a call about the potential downstream impact and to caution against running that extra promotion. Paul is frustrated about having to limit sales again, but appreciates the early warning. He asks for further details on which SKUs may be at risk.

Shaily quickly pivots to a downstream finished goods report, which highlights the main consumers of this raw material. She highlights these to Dan to temporarily avoid for the promo. Dan contacts the supplier and discovers that it is possible to provide an additional quantity for the short raw material.

Shaily quickly adjusts the plan and supplier contract accordingly and is able to see the updated impact on raw material and finished goods inventory. The 2022 shortage is avoided, with sufficient time to still address the 2023 challenge.



6 Insights and recommendations

What did we learn from the Spark Initiative? Has the value of outside-in planning become clearer? We've listed 5 concrete tips on how you can take some of our learnings and apply them to improve your own supply chain.

To evaluate the success of an innovation track such as the Spark Initiative, we need to answer a number of questions:

- Did we arrive at a clear conclusion to our main hypothesis, the value of outside-in planning?
- Did we develop a better understanding of how that value is delivered?
- Do we better understand how to repeat and scale up the experiment?

Below, we examine each of these in turn.

6.1 The value of outside-in planning

How certain can we be of our conclusion given the limited the scope of the Spark Initiative?

First of all, although we focused on two test cases with a limited scope in a short timeframe, both cases were rooted in **business reality** and continuously evaluated by their business owners, who are uniquely positioned to evaluate the relevance of the suggested experiments. Their broad

> Looking back on a year of collaborative exploration, the Spark Initiative confirmed the **potential value of adopting outside-in planning principles**. In both test cases, we identified significant potential business benefits by **improving signal accuracy** and **reducing latency.**

experience allowed them to extrapolate the **potential business benefits** of the chosen approach from the results of the test case.

Second, the results of each test case were regularly **discussed within the Advisory Board**. This allowed them to understand the degree to which the tested concepts could be more **broadly applied** to **different organizations across industries**, a degree of **wider applicability** of the chosen approach.

As with every experiment, some tests did not lead to a positive result, while others did, but each "failed" experiment brought its own learnings and helped the team to fine-tune its approach.

At the conclusion of the test period, the participants agreed that the results show **sufficient potential** to justify taking further steps towards a larger-scale implementation of outside-in planning. In addition, the experience created a desire to explore other **outside-in planning use cases**.

6.2 An innovation mindset stimulates cross-functional collaboration

Test results show objectively measurable improvements in key supply chain performance metrics, as described in the individual test case results. The participants also confirmed that a substantial amount of value comes from the **internal co-envisioning and co-creation process** itself. Simply put, the organization becomes more aware of how demand information flows through the supply chain and how processes and departmental silos stand in the way of achieving greater agility and resilience.

At the root of creating this awareness lies the fact that to take an outside-in perspective **means asking different questions**. With an open and innovation-oriented mindset, supply chain actors that previously considered each other competitors can discover a common view of the planning challenge and learn to collaborate more effectively.

Traditionally, different teams have a different perspective on the same data, as they are trying to answer different questions at different times. Investing in understanding each other's point of view and objectives helps people to **speak a common language** and set objectives that reinforce one another. As a result, participants reported significant progress in **cross-functional alignment and collaboration**.

6.3 Five tips on how to succeed in implementing outside-in planning

What else have we learned on our journey towards outside-in planning? What are the do's and don'ts? What advice can we pass on to other companies wanting to transform their planning practices?

1

Invest in obtaining the right data

Given the importance of outside-in planning on obtaining more accurate (external) signals, **data** was an important theme throughout the testing phase. First of all, **obtaining accurate data** can be challenging, as it requires stronger collaboration with data providers, not only supply chain actors outside of the organization, such as suppliers or distribution and sales channels, but also **within the organization**. There might be valuable data collected by one team that the other team is unaware of. Relevant data may be perceived as "owned" by one team and consequently withheld from others.

Especially at scale, this process of data quality management will require special attention. It is worth underlining that, in some cases, companies already have access to mountains of data that has the potential of being useful. One pitfall is to start processing this available data and see what can be done with it – instead, the learnings suggest it is better to **drive data gathering from an understanding of business needs**.

While data accuracy remains important, even incomplete and somewhat "noisy" data can be useful for driving insights. Also, the arsenal of data quality management tools currently available includes AI models that increase the ability to eliminate data noise. Companies can leverage these technologies when implementing a **continuous data quality governance process**.

2 Technology is not the issue

A second data-related challenge is the effort required to **validate and harmonize** new signals, ranging from raw data ingestion and storage through data quality management and harmonization to augmenting existing digital supply chain twins to incorporate and process these new signals.

The good news here is that **the technology is readily available**. In most cases, the available tools are sufficient, especially if you start with research and experiment on a small scale to learn and understand, and (only) then turn to automation to scale up data volumes. When it comes to modeling and harnessing the new data, your current supply chain planning toolset should be sufficient for getting started, provided it has the flexibility to model new signals and present them in a cross-functional way.

To support outside-in planning techniques at scale, planning solutions may need to incorporate new or redesigned features. The Spark Initiative highlighted several functional areas that are being translated into designs and included in the Unison PlanningTM roadmap in close collaboration with OMP customers.

3 Start small, iterate often

Outside-in planning is a broad field, with opportunities across the entire supply chain, from demand to supply. While the Spark Initiative approach forced companies to seek out relatively small and "doable" experiments with sufficient potential business value to make it worth the effort, corporate programs often shoot for an overly ambitious portfolio of use cases all at once. Introducing outside-in planning requires a **paradigm shift**, with many things to unlearn and processes to re-examine. An iterative approach is the best strategy to ensure your efforts stay focused on delivering actual business value.

Start small and look for quick wins that deliver immediate value if successful. Small and frequent iterations will allow you to learn from failed experiments as much as you would from successful ones. We believe this is an important lesson for companies wanting to develop their own outside-in planning test case(s).

4 Be ready to think differently

During the training sessions, the participants were often **challenged to look at supply chains in a very different way**. This is difficult, not in the least because we are perpetuating principles and processes that seem to have stood the test of time, and outside-in planning seems to question their wisdom. To what extent do we need to unlearn and radically transform the way we work? How do we plot a course from how we work today to an improved approach to supply chain planning? And how can we mobilize entire organizations to make such changes?

There is no simple, painless way to introduce outside-in planning. It is not a matter of applying a different algorithm or using a novel data model. Your planning processes, starting with sales and operations planning (S&OP), need to be reexamined to ensure they promote collaboration rather than siloed thinking. So, you will inevitably need to review the process model and rethink roles and responsibilities.

Techniques such as visualizing the River of Demand or defining a role/question grid can help facilitate these cross-departmental discussions and stimulate different ways of thinking about supply chain challenges.

5 You are not alone

The strength of the Spark Initiative was to bring together industry leaders who understand the need to rethink how we plan our supply chains. It takes courage to share your challenges with your peers, discuss where you are falling short of your objectives, and ask for feedback and insights. But we believe a collaborative approach to innovation allows companies to learn from one another, more rapidly resulting in real benefits.

OMP remains committed to assisting its customers in their innovation journeys towards improving supply chain practices and achieving superior supply chain performance.

7 More resources

Blogs and news:

- **What is wrong with todays supply chain planning strategies (Feb 2023)**
  Lennert Smeets and Jo Vernelen
  omp.com/blog/what-is-wrong-with-todays-supply-chain-planning-strategies

- **Inside the spark initiative: A journey of supply chain innovation (Sep 2023)**
  Paul Delbar
  omp.com/blog/inside-the-spark-initiative-a-journey-of-supply-chain-innovation

- **The Spark Initiative advances to testing phase: pioneering outside-in supply chain planning (Jul 2023)**
  omp.com/news-events/news/2023/the-spark-initiative-advances-to-testing-phase-pioneering-outside-in-supply-chain-planning

Podcasts:

- **How can outside-in planning improve supply chain performance and maximize business value? (May 2023)**
  Jan Snoeckx
  omp.com/resource-center/podcast/2023/outside-in-planning-to-improve-supply-chain-performance-and-maximize-business-value
- **Real-world solutions for age-old supply chain challenges: Bob Herzog on the Spark Initiative (Aug 2023)**
  Bob Herzog
  omp.com/resource-center/podcast/2023/real-world-solutions-for-supply-chain-problems

Web resources:

- omp.com/the-spark-initiative/resources
- The Glossary
- The Spark Initiative Charter

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Questions?
Contact us at **spark@omp.com**