

Smart Data Fabrics for Decision Intelligence in Supply Chain

A Data-Driven Approach to Demand Sensing and Forecasting



Table of Contents

| | |
|-----------------------------------------------------------------------------------------|---|
| <u>Executive Summary</u> | 1 |
| <u>Introduction</u> | 2 |
| <u>What Is Decision Intelligence—and Why Does It Matter?</u> | 2 |
| <u>The Rise of the AI-Enabled Smart Data Fabric</u> | 3 |
| <u>An Introduction to Demand Sensing and Forecasting</u> | 3 |
| <u>Decision Intelligence for Demand Sensing and Forecasting</u> | 3 |
| <u>Current State of Demand Sensing and Forecasting</u> | 4 |
| <u>Demand Sensing and Forecasting Challenges with External Demand Signals</u> | 4 |
| <u>What are Your Three Biggest Challenges in Demand Sensing and Forecasting?</u> | 5 |
| <u>Demand Sensing and Forecasting Capabilities to Improve Forecast Accuracy</u> | 6 |
| <u>From Data to Actionable Insights</u> | 6 |
| <u>Complementary, Not Replacing</u> | 7 |
| <u>Final Thoughts: Intelligent Demand Sensing and Forecasting</u> | 7 |

Executive Summary

Decision intelligence has emerged as a strategic priority, enabling organizations to make faster, more accurate decisions across demand sensing and forecasting, supply chain orchestration, fulfillment, production planning, and sustainability. However, despite significant investments in analytics and AI, many organizations struggle to realize the full potential of decision intelligence due to limitations in their data architecture.

Effective demand sensing and forecasting are critical for optimizing supply chain performance, particularly in volatile markets. Traditional methods relying on historical data and internal systems often fail to respond quickly to sudden shifts in consumer behavior, supplier capacity, or global disruptions. Key challenges include limited end-to-end visibility, reliance on manual processes, inaccurate data, and fragmented systems, all of which hinder accurate forecasting and timely decision-making.

Demand sensing leverages real-time data to detect immediate demand fluctuations, while demand forecasting uses historical data to predict long-term demand trends. Both approaches benefit from advanced analytics, AI, and machine learning, which provide more precise insights into inventory, sales, and supply chain operations. However, human intervention is still commonly required to interpret complex demand patterns, making processes time-consuming and error-prone.

An InterSystems survey of 450 supply chain professionals highlights persistent challenges in demand sensing and forecasting: 41% cited lack of real-time supply chain visibility, 39% relied on manual processes, 37% experienced inaccurate data, and 34% lacked real-time sensing of demand and supply changes.¹ Addressing these challenges requires unified, harmonized, and validated data across internal systems, partners, and external sources. Organizations that adopt intelligent demand sensing and forecasting platforms can more accurately anticipate shifts, optimize inventory, reduce costs, and respond rapidly to market changes.

¹ <https://www.intersystems.com/resources/optimizing-supply-chain-performance-unified-data-ebook/>

Introduction

Modern supply chains are under unprecedented pressure. From volatile demand patterns and geopolitical disruptions to sustainability imperatives and AI-driven transformation, leaders are navigating an increasingly complex landscape. Yet despite advances in data collection and analytics, many organizations still struggle to make timely, confident, and coordinated decisions.

As organizations continue their shift toward data-driven operations, one capability is at the top of strategic agendas: decision intelligence. The ability to make accurate and timely decisions across a wide range of functions—from demand sensing and forecasting to inventory optimization—has become foundational to modern supply chains.

But even as supply chain organizations turn to more sophisticated models and analytics platforms, many are still lacking the fundamental tools to enable intelligent decision-making. This is due to a lack of consistent, unified, and real-time data. In an InterSystems survey of 450 senior supply chain decision makers spanning various industries including fast-moving consumer goods (FMCG), logistics and transport, manufacturing/consumer packaged goods (CPG), pharmaceuticals, and retail, 42% of respondents reported they were still using manual processes including spreadsheets to integrate and prepare disparate information for decision-making. While spreadsheets can be incredibly useful for planning purposes, they also have limitations.

Spreadsheets are not a useful tool when it comes to decision intelligence. Decision intelligence is focused on improving decision-making by understanding how decisions are made and using AI and machine learning to optimize outcomes. In supply chain, an AI-enabled decision intelligence platform can optimally manage disruptions when and before they occur so companies can react faster and ensure that products are available when companies need them, while also monitoring engagement to improve sales outcomes.

A [report based on the survey findings](#) dives into key supply chain technology challenges, trends, and decision-making strategies across five key use cases: fulfillment optimization; demand sensing and forecasting; supply chain orchestration; production planning optimization; and environmental, social, and governance (ESG). Below, we explore the core findings and what they mean for demand sensing and forecasting.

What Is Decision Intelligence—and Why Does It Matter?

Decision intelligence combines data science, artificial intelligence (AI), behavioral science, and decision theory to improve how organizations make decisions. At its core, decision intelligence bridges the gap between data insights and real-world actions, turning analytics into better choices and measurable outcomes.

Decision intelligence represents the next evolution of data-driven management, integrating data science, artificial intelligence, and human expertise to optimize decision-making at scale. By embedding intelligence into every operational layer, from sourcing and production to distribution and customer fulfillment, decision intelligence transforms fragmented data into strategic foresight and resilient execution. Rather than replacing human decision-makers, decision intelligence augments them. This provides contextual recommendations, risk evaluations, and scenario analyses that lead to better, faster, and more consistent outcomes.

The Rise of the AI-Enabled Smart Data Fabric

A smart data fabric is a next generation approach that seamlessly bridges data and application silos, delivering real-time visibility with embedded analytics across internal and external systems and partners. A decision intelligence platform built on a smart data fabric can integrate, automate, and optimize decision-making processes across the organization, supporting data-driven strategies and improved operational efficiency.

Unlike traditional data lakes or warehouses, which require data to be moved and stored before it can be used, a smart data fabric accesses and processes data in motion, reducing duplication and latency. Key features of a smart data fabric include:

Real-time data access: Connects directly to source systems, eliminating the need for batch processing.

AI and ML integration: Embeds analytics and machine learning capabilities within the fabric itself.

Non-disruptive deployment: Works alongside existing data infrastructure without requiring a complete overhaul.

Dynamic scalability: Supports both operational and analytical workloads across diverse environments.

An Introduction to Demand Sensing and Forecasting

Demand sensing and demand forecasting are both crucial aspects of optimizing supply chains, but they have slightly different functions in their approach and focus. Demand sensing uses real-time data and analytics to identify and respond to immediate demand fluctuations. On the other hand, demand forecasting uses historical data to predict future demand over a longer period (months or years). Different methods, such as statistical modeling and machine learning, are used to enhance the accuracy and adaptability of these processes. Both areas are crucial for companies when it comes to projecting sales, managing inventory, and coordinating replenishment. The end goal is to accurately predict customer demand by using predictive models to forecast future demand.

From a metrics standpoint, companies need to accurately measure forecast versus actual sales, inventory turnover, stockout rates, inventory obsolescence, order fill rates, and on-time in-full percentage. When forecasting, it is important to predict demand for a particular product to avoid excess inventory and stockouts. Advanced analytics and AI tools provide granular insights into sales activities, inventory levels, and financial metrics, supporting more precise decision-making.

Decision Intelligence for Demand Sensing and Forecasting

For demand sensing and forecasting in supply chain, the ability to quickly ingest and analyze data, and subsequently make strong business decisions is crucial. While this is true across all aspects of supply chain management, it is especially important when tracking actual demand versus projected demand. This crucial need can be slowed down or impeded by issues such as a lack of end-to-end supply chain visibility, antiquated data management processes, or even inaccurate data.

Significant disruptions along the supply chain from external factors such as geopolitical events, supplier capacity issues, poor network inventory visibility, and constant changes in buyer behavior make synchronizing demand and supply very difficult. This is further complicated by inaccurate data from dozens of disparate applications and enterprise systems within the organization, its partners, and its suppliers. Traditional forecasting methods struggle to keep up with rapid changes in global supply chains, often failing to predict demand accurately during volatile periods.

Companies have traditionally relied on historical data and internal systems for demand forecasting, but this approach is limited in its ability to respond to sudden market shifts. The ability to sense demand disruptions in real-time and improve forecasting in this environment is difficult to achieve, especially if you want a high degree of customer satisfaction and the responsiveness needed to adapt quickly to unexpected changes. Companies that leverage demand sensing can emerge stronger and better positioned after disruptions.

Current State of Demand Sensing and Forecasting

One of the biggest issues with demand sensing and forecasting is that human intervention is often required. AI often lacks the nuances to fully understand the complexity of demand patterns. So, while human intervention is required to bridge that gap, it can be both time-consuming and error-prone, especially if a company is relying on data that is of poor quality. According to the survey results, when asked how they currently forecast demand, 36% of respondents indicated that they have several solutions that require staff input. Aside from the aforementioned issues with human input, the use of multiple systems often leads to disjointed, disparate data silos. When different systems are unable to communicate, decisions take longer to make and are usually not as accurate, leading to errors in demand sensing and forecasting. To maintain data accuracy and relevance, it is crucial that data is updated and transferred regularly.

Organizations are now beginning to implement intelligent data platforms to address these issues. The survey revealed that 27% of respondents currently use an intelligent data platform. In addition to providing real-time insights and guidance into demand fluctuations, they also ensure that all data is validated and accurate before being used in forecasting models to provide the highest level of accuracy.

Demand Sensing and Forecasting Challenges with External Demand Signals

According to the survey, the top demand sensing and forecasting challenges are related to issues with data: its collection, visibility, and analysis. It's no surprise that all of these issues are directly tied to data inconsistencies. Clean data is essential to ensure accuracy and consistency, especially when integrating external datasets.

When asked to identify their top challenges in demand sensing and forecasting, respondents cited the following: no real-time visibility along the supply chain (41%), current processes are too manual (39%), inaccuracies in data within the organization, partners, and suppliers (37%), and no real-time sensing of demand and supply changes (34%). Understanding demand and supply shifts, and reacting accordingly, is at the heart of demand sensing and forecasting. From the demand side, shifts are the result of changing consumer preferences, brand loyalty, or economic factors. From the supply side, these market shifts are tied to raw material pricing or availability, labor shortages, or new entrants to the market. For those companies that cannot sense shifts in real-time, their forecasting accuracy suffers, thus leading to lost sales and higher cost of goods sold.

What are Your Three Biggest Challenges in Demand Sensing and Forecasting?

No real-time visibility along the supply chain

41%

Current processes are too manual

39%

Inaccuracies in data within the organization, partners, and suppliers

37%

Difficulty working out interplay of macro-economic factors with demand

34%

No real-time sensing of demand and supply changes

33%

Figure 1: Top Challenges in Demand Sensing and Forecasting

Source: Optimizing Supply Chain Performance with Unified Data, 2024.

Supply chain visibility has been a hot topic over the last few years, but most people think of it only from a shipment standpoint. Point-to-point tracking solutions have seen billions of dollars in venture capital investments, but supply chain visibility goes well beyond these solutions. Supply chain visibility enables companies to track the location and status of products, components, and materials as they move through the supply chain. However, it also encompasses the entire end-to-end supply chain, from the sourcing of raw materials to the final delivery to the end consumer. At the core of supply chain visibility is access to real-time data for inventory optimization, tracking, and potential disruptions. To respond effectively to demand changes, companies must be able to adjust inventory levels quickly in response to market volatility and shifting consumer demand.

The second challenge identified by respondents is reliance on manual processes. More and more often, we hear about the autonomous supply chain. Automated demand sensing processes leverage real-time data and advanced analytics to predict short-term demand fluctuations, while manual methods rely on human interpretation of data, which can be time-consuming and prone to errors.

A third challenge highlighted by respondents is inaccuracies in data from within the organization, partners, and suppliers. As far back as 1957, computer scientists have referred to this as “garbage in, garbage out.” In a syndicated newspaper article about US Army mathematicians and their work with early computers, Army Specialist, William D. Mellin explained that computers cannot think for themselves, and that “sloppily programmed” inputs inevitably lead to incorrect outputs. A lot has changed since then, but the underlying principle is the same. Inaccurate data will lead to errors in demand sensing and forecasting, which will impact inventory management, supply chain operations, and profitability.

Demand Sensing and Forecasting Capabilities to Improve Forecast Accuracy

According to the survey, the capabilities respondents believe would most improve their ability to accurately forecast demand correlate with their biggest challenges. The top capability survey respondents said would improve their ability to forecast demand is the ability to ingest and analyze real-time data from many sources in disparate formats (27%). Organizations need a data platform that ingests all relevant data from the sources that matter, both internally and externally, including geopolitical events, information on supply chain product integrity issues, supplier fulfillment discrepancies, and much more. Harmonizing and normalizing all this information to provide accurate data in real time, a decision intelligence platform simulates your business processes and then applies embedded AI and ML capabilities.

The second capability identified by respondents is integrated inventory management with enterprise resource planning (ERP) and electronic point of sale (EPOS) to automate demand-sensing and forecasting (24%). By leveraging demand sensing, organizations can increase output by adjusting production schedules in response to predicted demand, ensuring they meet customer needs effectively. Organizations can integrate more advanced sensing and forecasting capabilities with their point-of-sale, ERP systems or applications, achieving faster time-to-value.

From Data to Actionable Insights

Turning raw data into actionable insights is the cornerstone of effective decision intelligence. **Smart data fabrics** facilitate this process with **robust data management practices, including seamless data ingestion from multiple systems and automated data processing to ensure accuracy and relevance.**

By adopting a smart data fabric approach, supply chain organizations can extract relevant insights from both historical and real-time data, enabling them to identify emerging trends, predict outcomes, and create solutions that address specific business challenges. This ability to transform data into actionable intelligence is what sets leading organizations apart in today’s data driven landscape.

Complementary, Not Replacing

A key benefit of the **smart data fabric** approach is that it **doesn't require organizations to replace their existing systems**. Instead, it overlays the existing architecture, enabling real-time connectivity, transformation, and delivery of data from multiple environments.

Solutions like those offered by InterSystems® also embed AI and machine learning capabilities into the data fabric itself, allowing organizations to streamline operations and accelerate time-to-insight without constantly moving data across environments.

Final Thoughts: Intelligent Demand Sensing and Forecasting

To be agile and competitive, organizations must be capable of extracting critical insights in near real-time. This remains a significant challenge when so many businesses lack end-to-end visibility or rely on manual data analysis and ad hoc provisioning and integration of different solutions. For demand sensing and forecasting, a reliance on manual data analysis, especially given the current state of disparate data streams, can be catastrophic. If companies are unable to understand the reasons behind supply shifts, they will be unable to adjust their demand forecasting accurately, which will lead to improper inventory availability, lost sales, and higher cost of goods sold.

Demand sensing and forecasting efficiency requires unified, trusted, and harmonized data. As an intelligent supply chain decision intelligence platform, InterSystems Supply Chain Orchestrator™ provides a complete view of an organization's supply chain, harmonizing and normalizing disparate data from applications, suppliers, manufacturers, distributors, retailers, and consumers. It uses AI and ML to uncover what is currently happening, predicts what is likely to happen next, and uses prescriptive insights to outline the best options, ensuring maximum effectiveness and minimum delay.

Learn more: Visit InterSystems.com/SupplyChain to explore how unified, real-time supply chain data and AI-driven insights help organizations sense disruptions, optimize inventory, and improve demand sensing and forecasting accuracy.

Disclaimer: InterSystems® software, associated services, materials and expertise may utilize artificial intelligence capability and functionality. Please refer to the [InterSystems Transparency Notice](#), [AI Guidelines](#), Product-specific Documentation and the applicable Statement of Intended Use for more information.

InterSystems Corporation: One Congress Street, Boston, MA 02114-2010, USA.

