



Cognitive Demand Sensing

A Step Towards Building
Supply Chain Resiliency

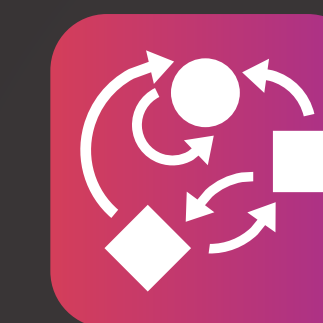
SUPPLY CHAIN



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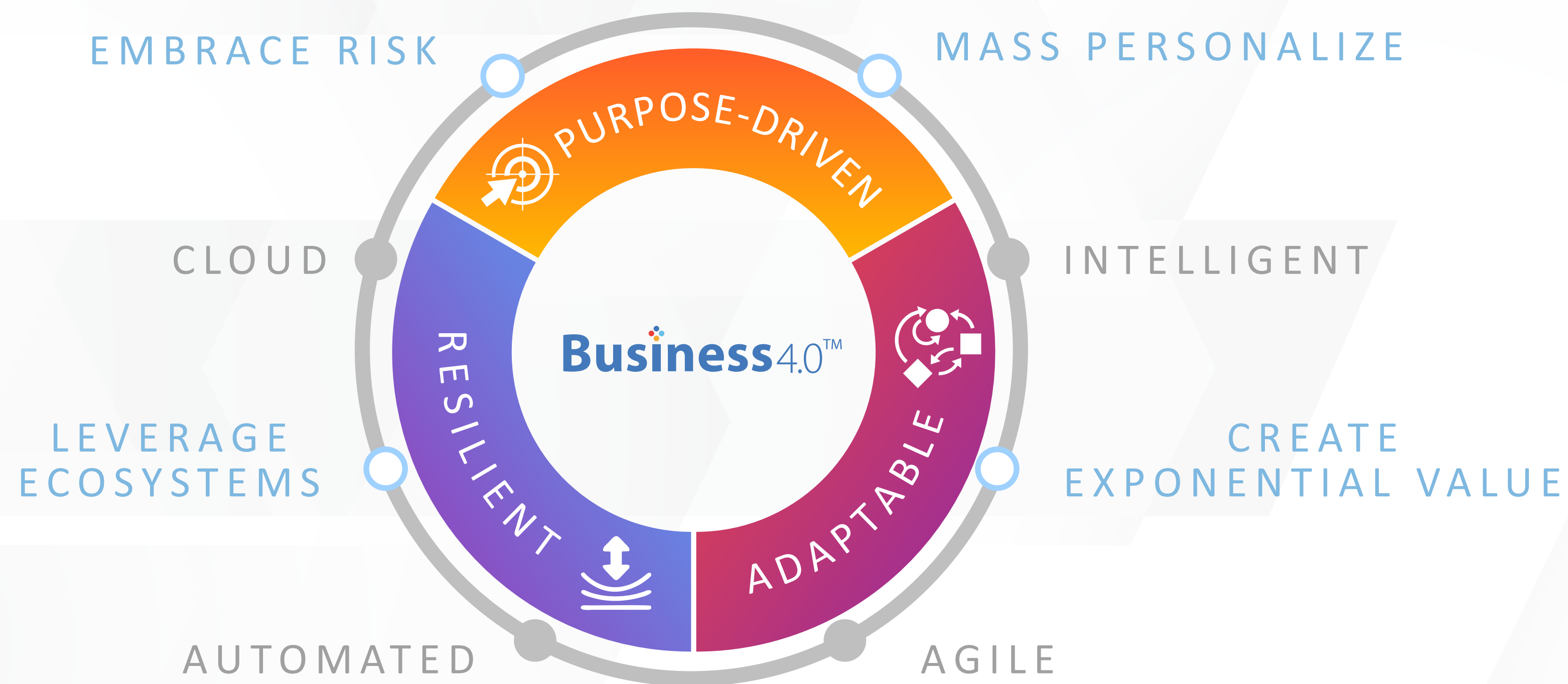
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Executive Summary

Supply chain disruptions have been one of the most difficult COVID-19 impact for businesses to manage. Across industries, closures, movement restrictions and transport logjams have affected supply chains the world over. Another aspect that has upended all business plans is the drastic change in demand of products and services. While the demand for essential goods have spiked, that for non-essential goods have plunged. To ensure smooth operations and deliver customer value, companies along the value chain need accurate forecast of demand and arrange reliable and timely supplies to the end consumer.

At a time, when the pandemic has upset all business plans and calculations, traditional methods of demand forecast have been the weak links in business continuity. Forecasting based on market segmentations, geographic and demographic factors, and consumption patterns use historical data, and could not keep pace with rapid changes in the marketplace and society. In this time of crisis, companies that have put in place processes for AI-driven demand sensing have been able to get more accurate real-time forecast and plan their supplies accordingly.

In other words, cognitive supply chain planning using AI-driven demand sensing have become even more critical in these uncertain times. It can ensure on-time delivery for improved customer satisfaction and revenue realization, improved forecast accuracy at the product-mix level, and improved working capital with reduced inventories.

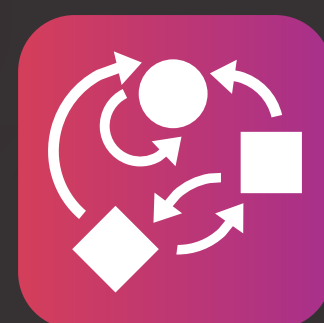
Cognitive demand sensing allows machine-driven processing of large volumes of data both internal and external, followed by algorithmic analysis to give real-time insights to guide informed decision making at every level and at every stage of the supply chain.



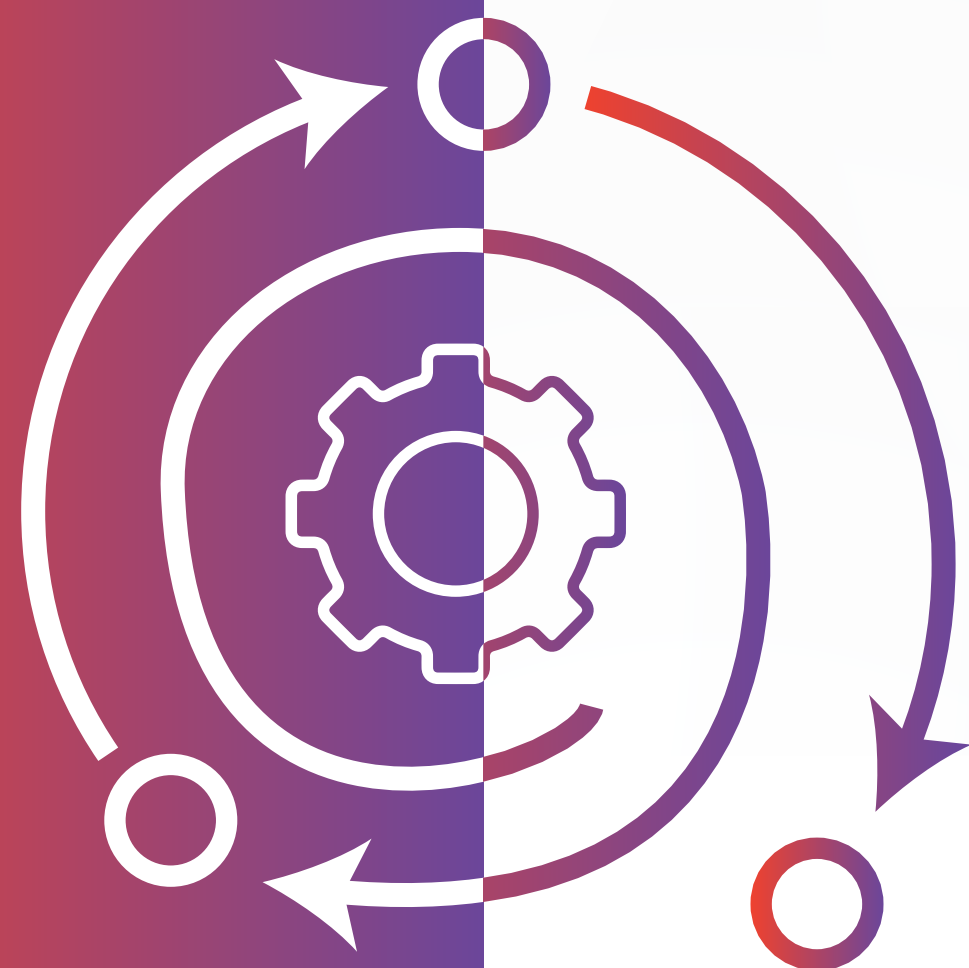
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Impact of COVID-19 on Supply Chain

The post COVID-19 era has seen a dramatic shift in consumer behavior with changing preferences in product, channels, pricing, and promotions. The sales growth for health and safety products such as anti-septic liquid and hand sanitizers has increased by over 200% and 300% respectively whereas products for stay-at-home living such as frozen foods grew by 36%¹. Similarly, ecommerce and supermarket sales grew by 62% and 23% respectively while sales of convenience stores declined by 31%.² These are figures from mid-May, and they

continue to dynamically change every week as the economy re-opens.

For CPG companies, the ask is to be agile and quickly adapt to the fast-changing consumer behaviors, shifting product preferences, spike in ecommerce sales, altered shopping frequency and size of purchases. At the same time, it is crucial to build resilience by preserving cash and mitigating the COVID-19 impact (see Figure 1).

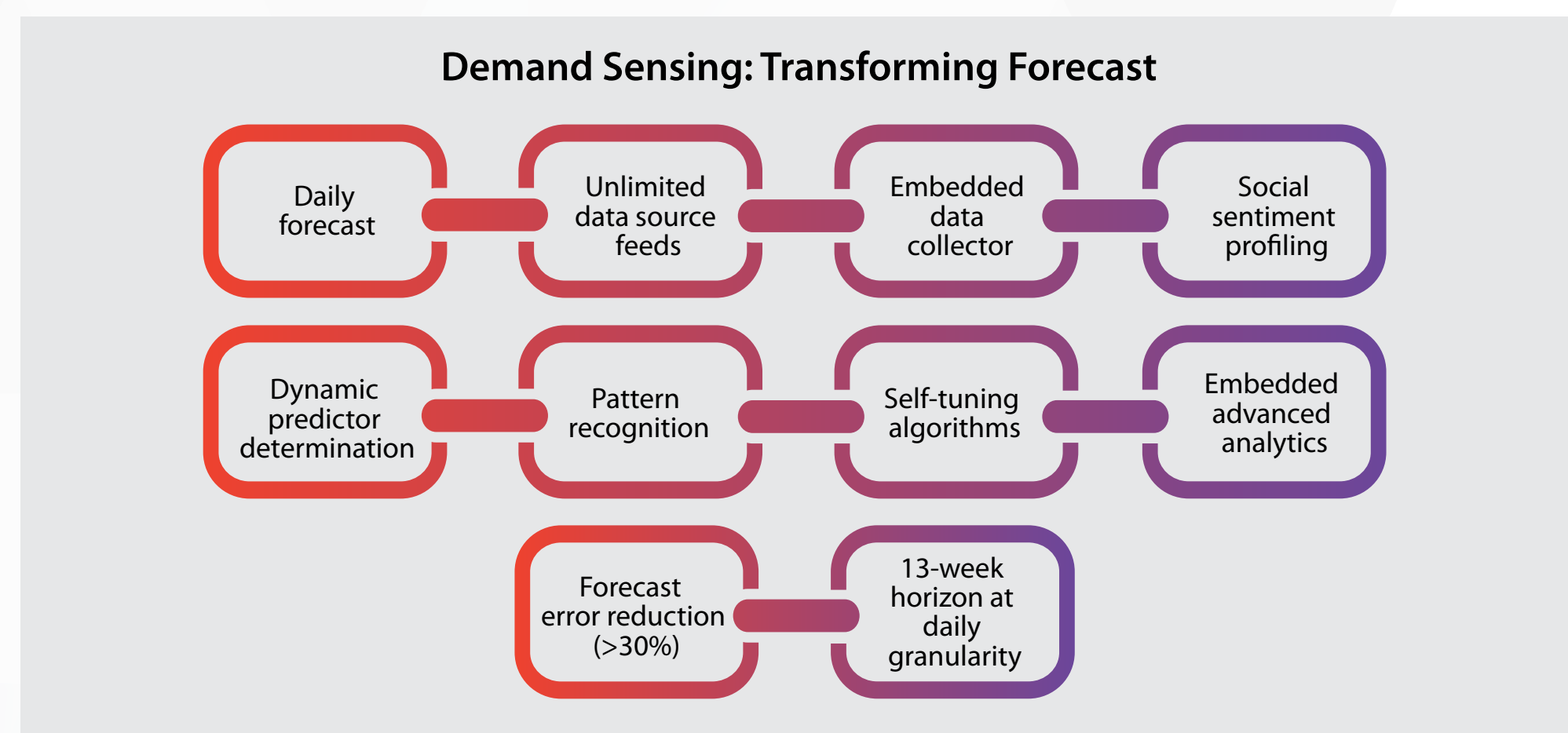
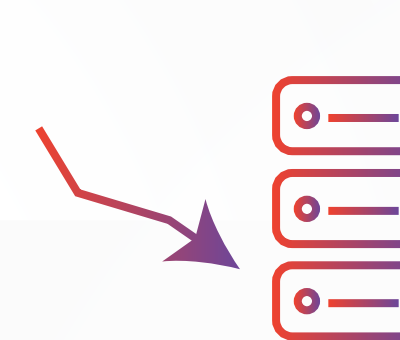


Figure 1: Key advantages of cognitive demand sensing

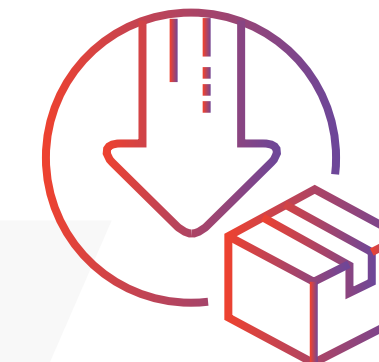
The demand sensing led forecast becomes even more relevant in these uncertain times. Take the case of fashion houses who are grappling with piles of unsold inventory after missing out on their spring and summer launches. They need accurate and real-time forecasts of consumer preferences to minimize losses, adjust product mix, and plan their promotion campaigns. Traditional forecasting tools will not be able to give such granular insights into customer behavior, while demand sensing using a range of external data sources such as social media and sentiment profiling combined with AI algorithms will be able to give a more accurate picture.



A consumer goods
major cut forecast
errors by more than
40%,



decrease safety stock
by more than
30%,



and reduced finished
goods inventory
by about
\$100 million
through demand
sensing.



Scenario: How Demand Sensing Works for an Automotive Major

The predictors or the parameters that are tracked for a successful demand sensing implementation varies from industry to industry, and even company to company. Selecting the predictors can also be done using machine learning. For an automotive company, for example, the predictors could include oil prices and disposable income among external data sources, while internal data sets included production plan data (see Figure 2).

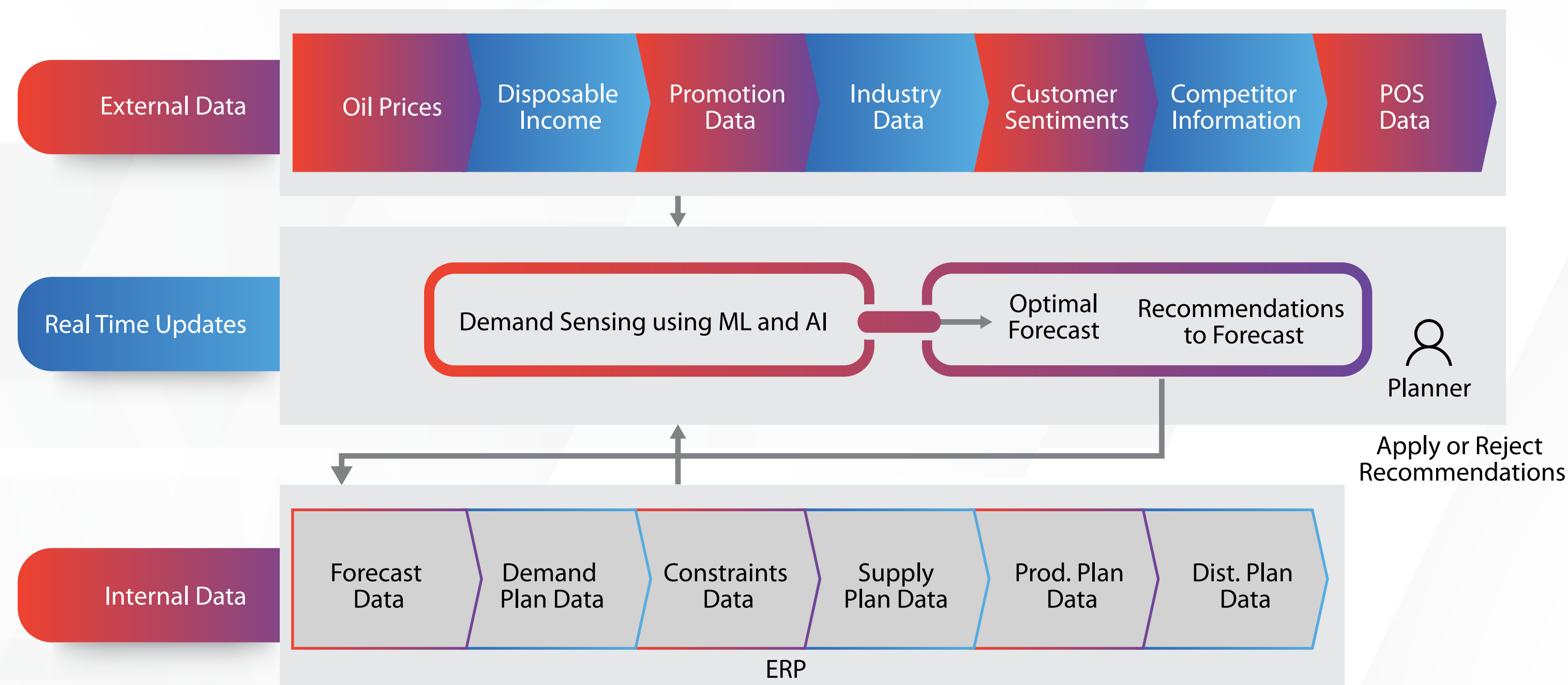
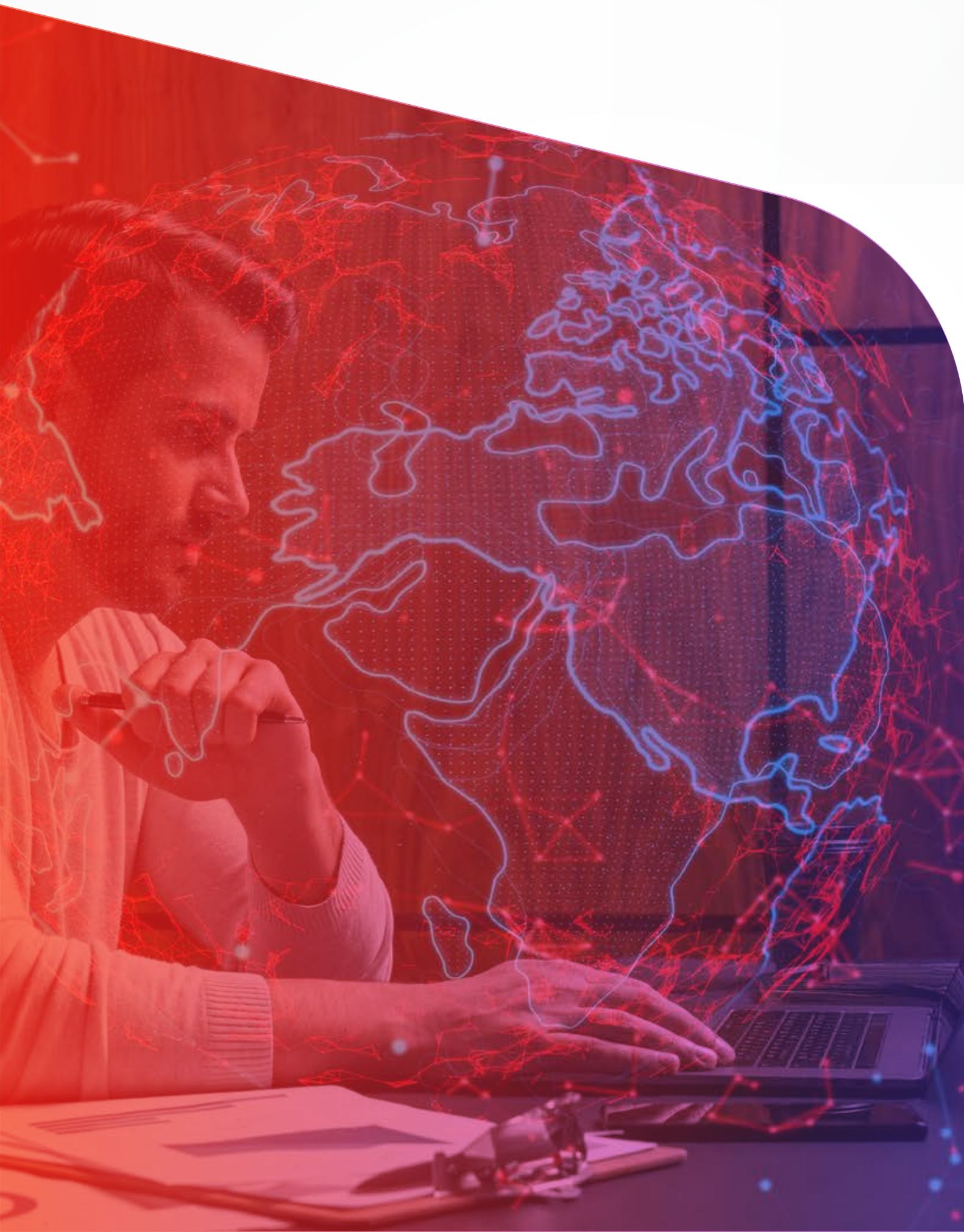


Figure 2: Cognitive demand sensing for an automotive major



While a rise in oil prices is likely to push down demand, especially in the commercial vehicle segment, disposable income is directly proportionate to demand. Competitor information such as new product launches, their unique selling propositions, or customer loyalty information all contribute to the richness and granularity of the demand forecast. Even data on unforeseen events such as natural disasters can be tracked to draw insights into the changes in demand pattern.

To define the impact on each product or car model, the external data must be juxtaposed with the statistical forecast, sales forecast generated by the existing ERP or planning systems. The level of importance, the probability of occurrence, the variations in data and the impact on the forecast have to be calculated for each product (see Figure 3).

Product	Data Element	Level ofImportance	Probability of Occurance	Market Data Change	% Impact to Forecast
Product 1	Oil Prices	Medium	0.25	+ 10%	-2%
Product 1	Self Promotion	High	0.50	- 2%	+8%
Product 1	Competitor Promotion	High	0.30	- 5%	- 10%
Product 1	Customer Sentiments	High	0.60	+10%	+15%

Figure 3

Once this is defined, a machine learning algorithm can be modeled to derive continuous insights into the degree of impact on forecast data.

Based on these insights, adjustments can be made to supply chain execution and order fulfillment. Further, machine learning algorithms can be used to assess the impact and check the accuracy of the model and provide prescription to absorb the volatility in external data elements.

Demand Sensing’s Impact on Supply Chain

Organizations using traditional demand planning tools tend to experience a large gap between the demand planning forecast and actual shipments, which has a cascading impact up and down the supply chain. In contrast, organizations using AI-driven forecasting tools with real-time visibility into the changing demand patterns can reduce the gap between demand planning forecast and actual shipments. These gains are reflected in supply chain efficiency.

Market research and advisory company Gartner in their Supply Chain Top 25 Rankings 2020 found that “advanced supply chains are pressing forward, and in some cases, accelerating investments in real-time visibility, planning and agile supply execution capabilities that are well-suited for supporting uncertain demand mixes and volumes.”³

Real-time visibility is one of the key benefits of demand sensing and that leads to building resiliency in the supply chain through:

Optimizing inventories: Accurate demand forecast helps in projecting optimum inventory levels, safety stock and inventory obsolescence leading to **increased revenue, profitability and working capital.**

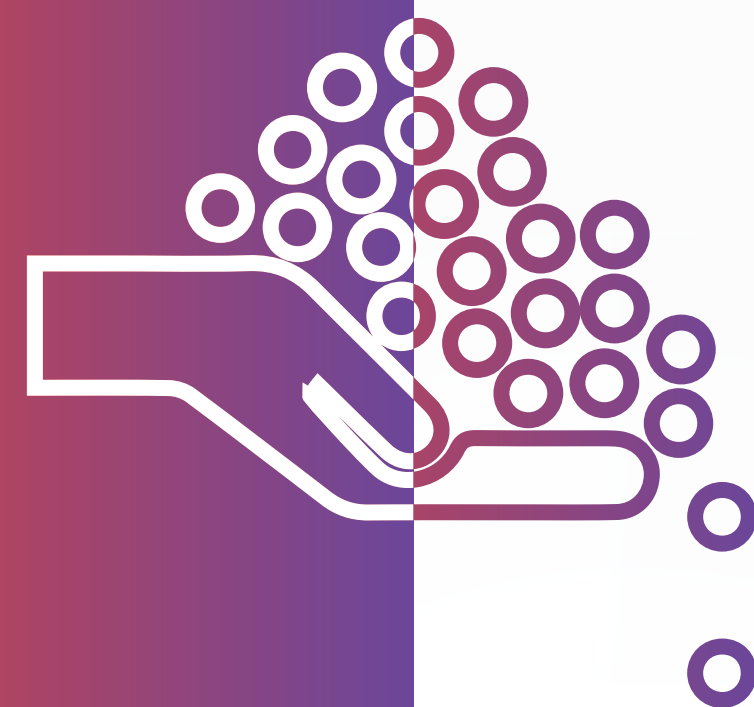
Improving product mix: At the level of product variants, forecasts using traditional tools have a high degree of error. Cognitive methods that map customer sentiment and behavior can predict demand and customer preferences at granular level helping **improve the customer experience.**

Informed decision making: Accurate and real-time information empowers decision makers at the leadership level and at every level of the supply chain enabling strategic and timely decisions. This, in turn, leads to On Time in Full (OTIF) deliveries **improving customer satisfaction, better pricing and brand loyalty.**

Factoring in consumer sentiments: Automation allows tracking of large volumes of data, while machine learning and algorithms enables tracking at a granular level and removes human errors and individual bias (see Figure 4).

Traditional forecasting	Cognitive demand sensing
Manual data collection and processing	Automated data collection and processing
Data collection at a point in time	Real-time data collection
Personal biases	Eliminates personal biases
Tribal knowledge used for impact assessment	Algorithmic impact assessment provides accuracy
Historical data errors, causals and outliers not eliminated	Requires fixing data errors, causals, and outliers
Single method of forecasting applied to all products	System determines best-fit forecasting models based on pattern recognition

Figure 4: Cognitive demand sensing versus traditional forecasting tools



Recommendations

Transforming demand forecast and deriving accurate market insights, however, are only the first steps of the journey in harnessing the abundance of data to harvest business and customer value. To put in place an efficient and robust demand sensing mechanism and translate the advantage into a resilient cognitive supply chain, companies need to:

- ✓ Accelerate adoption of AI-driven processes, reporting and seamless information flow across the enterprise.
- ✓ Integrate analytics and insights in decision making.
- ✓ Adopt agile business planning, decision-making and change management processes.
- ✓ Active leadership buy-in and adoption

Digital technologies are transforming the ways of business and hold the promise of competitive advantage and sustainable growth. Demand sensing and cognitive supply chain are critical links to realizing the digital advantage.

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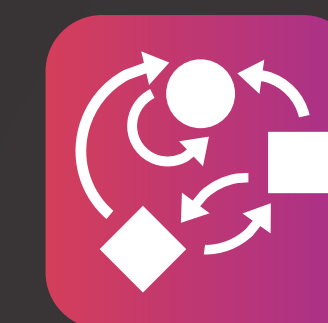
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