Market Guide for Retail Forecasting and Replenishment Solutions

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Initiatives: Supply Chain Technology Strategy and Selection

Planning across multiple sales channels while dealing with disruptions has forced retailers to accelerate demand-planning and replenishment capabilities. Supply chain technology leaders can use this Market Guide in their search for optimal forecasting and replenishment solutions.

Overview

Key Findings

- Four benefit areas continue to drive forecasting and replenishment initiatives — revenue lift, reduction in out-of-stocks (OOS), inventory optimization and margin improvement. An analysis of technology provider responses shows improvements averaging 7.1% for sales, 32% for OOS, 20% for inventory and 5% for margin.

- Adoption of leading forecast quality measures grew compared to 2019 responses. Technology provider responses indicated that 78% of retail customers are measuring forecast accuracy (up 16%), 40% are measuring bias (up 68%) and nearly twice as many (34%) are measuring forecast value-add (FVA) compared to 2019.

- Retail interest in SaaS-cloud-based implementations continues to grow with 88% of technology provider respondents indicating more than 12% growth in SaaS requests, up from 68% 2019 responses.

Recommendations

Supply chain leaders focused on supply chain technology strategy and selection should:

- Determine your organization’s current demand-planning maturity, and identify people, process and technology gaps by conducting Gartner’s demand-planning self-assessment.

- Identify specific applications of algorithmic planning technology by evaluating emerging use cases such as weather effects, attribute-based forecasting and incorporation of unstructured data. Validate technology providers that have customer examples of the use cases that are relevant to you.
Improve replenishment capabilities by using technology to incorporate returns and utilizing fulfillment forecasting to enhance e-commerce execution capabilities.

Improve planning accuracy by collaborating with your technology partner to understand 2020 disruption impacts and sales data, and incorporating lessons into 2021 plans.

**Market Definition**

Retail forecasting and replenishment solutions cover and support four distinct core business activities:

- Demand planning (e.g., constrained, unconstrained, multiple levels of aggregation)
- Supply planning (e.g., capacity planning, available to promise, asset utilization)
- Inventory planning (e.g., inventory policies, multiechelon optimization, flow sequencing, returns impacts)
- Planning and execution alignment (e.g., sales and operations execution [S&OE], sales and operations planning [S&OP])

Solutions must also support multiple planning dimensions, such as:

- **Time** — planning horizons that include day, part of a day and through 12 to 24 months
- **Locations** — (i.e., online, stores, distribution centers [DCs])
- **Aggregation Levels** — (i.e., item, category, department, business unit, geography, company)

**Market Description**

The extent of supply chain planning processes for mature organizations is more than just creating a unit plan for replenishment. It could include creating insights into capacity or upcoming labor requirements, providing inputs into joint planning with suppliers, or making longer-term planning decisions on network capacity. To account for this expansion, the logical architecture of planning has evolved to include consideration of the user experience (UX), specific characteristics of planning science and optimization, a management center, and specific forecasting and replenishment engines (see Figure 1).
This architecture provides a structured way to evaluate providers when conducting a search for a planning solution. All providers in this Market Guide have functionalities that span the four key areas mentioned above: UX, science and optimization, management center, and forecasting and replenishment engines. While these functionalities are not “commoditized,” the capabilities identified, such as rule engines, forecasting and replenishment parameters, classification and clustering, seasonality, rebalancing, and review and approval, are standard in most providers.

When reviewing the provider RFI responses, the differentiators typically appeared in capabilities such as weather analysis and fulfillment forecasting. Although most respondents can speak to this area within their solution, the depth and sophistication of capabilities vary. Retailers should closely evaluate these capabilities for fit with their business needs.

What to Look for — Demand-Planning Building Blocks
As retailers’ demand-planning maturity continues to evolve from Stage 2 to Stage 3, organizations must ensure that they have the appropriate building blocks, as follows (see Toolkit: Self-Assessment of Retail Demand-Planning Maturity):

- Standardized Process — demand and supply planning integrated together
- Consistent Metrics Definitions — forecast accuracy, bias, FVA
- Consistent Data Sources — single database and data model, single source of truth
- Focus on Rules and Policies — managing inputs not overriding outputs

In addition to these four building blocks, forecasting and replenishment technology providers continue to evolve their advanced analytical and science capabilities, particularly in the areas of artificial intelligence (AI) and machine learning (ML). As AI and ML become more prevalent in technology providers’ talk tracks, retailers should use the following criteria to assess and validate a technology provider’s capabilities:

- Process large sets of structured and unstructured data, such as social media comments
- Perform setup and maintenance with limited human intervention needed
- Identify interdependencies within the dataset
- Propose real-time recommendations, decisions or dynamic changes to the plan
- Enhance decision making by making data available to augment and/or automate planning decisions more quickly

Building the AI and/or ML business case is important; and technology partners can provide knowledge on benefits based on prior projects with other companies. Also, to establish use cases, supply chain planning leaders need to ensure that the business problems determine the technology as a solution, rather than the reverse. Several AI and/or ML use cases continue to emerge as follows:

- **Consumer behavior (decision tree, demand transference):** AI can help in understanding consumer behavior, whether using macroeconomic elements (e.g., COVID-19 impact) or competitive activities. An example could be to predict the impact of a price change (increase or decrease). How would that change the sales volume and value potential, and, therefore, market share? How would that also grow or shrink the overall market? These are questions for which AI can help simulate the answers, based on previous price changes in the market.

- **Product clustering:** Planning at an SKU-level misses the opportunity to find the relationship between the behavior of different SKUs, limiting the ability to develop a product family demand plan. Using AI techniques, different products can be clustered together in an automated and dynamic way to reflect similar and contrasting product behaviors. Based on such insights, automation can help demand
planners address the products in terms of product families, not as singular SKUs that are isolated from each other.

- **Automated decision making**: Companies often struggle when determining which decisions to automate and communicating the change management impacts. One best practice is to automate the simple decisions where the cause-and-effect relationship is clear, accepted by the organization and the decision is not questioned. Based on that, more time is freed up for planners to focus on articulating and escalating more complex decisions when a cause-and-effect relationship is not as clear.

We also see some specific applications and use cases emerging by segment of retail (see Table 1).

<table>
<thead>
<tr>
<th>Retail Segment</th>
<th>AI and/or ML Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E-Commerce</strong></td>
<td>■ Short-term forecasting models incorporate website traffic, click rates, marketplace prices from competitors and recent trends and pricing.</td>
</tr>
<tr>
<td><strong>Fashion Apparel</strong></td>
<td>■ Attribute-based forecasting used in future assortment planning to recommend buy planning quantities by color option and size, taking into account impacts of significant store-level stock-outs in early weeks of the similar item’s life cycle and adjusting for missed sales in recommending buy quantities.</td>
</tr>
<tr>
<td></td>
<td>■ Incorporating visual-recognition technology used for tracking competitor’s prices for similar products and incorporating it into the markdown optimization solution.</td>
</tr>
<tr>
<td><strong>Grocery and Convenience</strong></td>
<td>■ Life cycle and cannibalization modeling in new product introduction (NPI) for fast-moving consumer goods (FMCG). Learning from life cycles of new products and how they impact the sales of the existing products during a transition period, and applying them for similar items during new product introduction.</td>
</tr>
<tr>
<td></td>
<td>■ Attribute-based forecasting for seasonal and in-out items.</td>
</tr>
</tbody>
</table>

Source: Gartner (February 2021)

**Market Direction**
As the forecasting and replenishment (F&R) market continues to evolve, the following three factors will affect the direction of the market:

1. The scope and focus of demand planning evolves to delivery of a consensus demand plan that is aligned across merchandising and supply chain, and is inclusive of all sales channels. This alignment enables demand and supply matching as well as providing early demand signal disruption analysis (e.g., “turns” impacts).

2. The demand-planning process is more end-to-end orientated and includes internal and external inputs and channel aggregation. Replenishment strategies are aligned across DCs and stores, and support multiple sales channels. Unified commerce execution is enhanced as fulfillment forecasting capabilities begin to emerge.

3. An F&R technology platform emerges to enable internal and external collaboration. AI and ML use cases are well-understood and incorporated into the planning process. Automation opportunities have been identified and implemented, where appropriate.

RFI responses show a large segment of technology providers’ customers are between Stages 2 and 3 (see Table 2).
Table 2: Retail Demand-Planning Maturity

Moving the market from Stage 3 to Stage 4 is driven by a mix of process improvements as well as technology investments. Process improvements manifest in areas such as:

- Establishment of planning and execution alignment (S&OP, S&OE)
- Utilization of enhanced forecast quality metrics
- Use of demand plans to drive space, labor capacity and planning initiatives

Advances in technology can be used in areas such as fulfillment forecasting, attribute-based forecasting and deweatherization of sales history.
Market Analysis

Forecasting and replenishment technology providers’ capabilities tend to be retail-segment-specific. For example, providers with strong capabilities for grocery retailers may not have capabilities suited for specialty apparel retailers. Nine of the 26 vendor respondents have deployments across all seven retail segments. Each segment of retail has its own set of Critical Capabilities that the market looks to address:

- **FMCG (includes grocery, convenience and chain drug stores):** Promotional forecasting, attribute-based forecasting for new items, algorithms for intermittent demand, fulfillment forecasting, decision tree analysis and demand transference.

- **Specialty apparel and/or footwear, and department stores:** Size, style and/or color planning, store-specific allocation logic, short life cycle planning, weather effects, and the incorporation of return insights.

- **Mass merchants:** Multiechelon inventory optimization, short and long lead time item forecasting, large forecasting algorithm library, and fulfillment forecasting.

- **Wholesalers:** Forecasting and aggregation capabilities for multiple business units, forecasting in units and dollars.

While the market continues to evolve, significant gaps exist between end-user organization’s capabilities and those required to support planning over the next three to five years. As part of this research, technology provider respondents provided comparisons of their retail clients’ current capabilities compared to a set of four late Stage 3 early Stage 4 capabilities (see Table 3):

1. **Master Data Management (MDM)** — MDM and the ability to consistently cleanse, maintain and enhance planning data.

2. **AI and/or ML** — Technology is used to enable cross-channel planning and internal collaboration. Use of AI and ML capabilities begin to emerge.

3. **Organization** — Demand and supply planning (across all channels) is migrated to a supply chain responsibility. Training and career path mapping is provided for planning roles.

4. **Talent** — With the increasing use of AI and/or ML within the planning process, the demand and supply planning roles will require more analytics skills than needed in today’s environment. These skills include leadership capabilities, communications, problem-solving and consensus-building. The role is about plan management, not plan creation.
Table 3: Retailer’s Readiness for Advanced Demand-Planning Capabilities

Viewing partial table. Click here to view full table

<table>
<thead>
<tr>
<th>RETAIL SEGMENT</th>
<th>MDM</th>
<th>AI/ML</th>
<th>Organization</th>
<th>Talent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Late Stage 3, Stage 4 Maturity</td>
<td>&lt;1 Year</td>
<td>1 to 3 Years</td>
<td>3 to 5 Years</td>
<td>1 to 3 Years</td>
</tr>
<tr>
<td>Grocery</td>
<td>53%</td>
<td>53%</td>
<td>47%</td>
<td>53%</td>
</tr>
<tr>
<td>Convenience</td>
<td>81%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Chain Drug Stores</td>
<td>65%</td>
<td>47%</td>
<td>47%</td>
<td>47%</td>
</tr>
<tr>
<td>Specialty Retailers</td>
<td>65%</td>
<td>44%</td>
<td>48%</td>
<td>52%</td>
</tr>
<tr>
<td>Mass Merchants</td>
<td>68%</td>
<td>53%</td>
<td>63%</td>
<td>53%</td>
</tr>
<tr>
<td>Department Stores</td>
<td>53%</td>
<td>58%</td>
<td>53%</td>
<td>68%</td>
</tr>
<tr>
<td>Wholesalers</td>
<td>52%</td>
<td>48%</td>
<td>43%</td>
<td>43%</td>
</tr>
<tr>
<td>Online Only</td>
<td>64%</td>
<td>47%</td>
<td>47%</td>
<td>47%</td>
</tr>
</tbody>
</table>

Source: Gartner (February 2021)

To further their planning capabilities, retailers should focus on the following:

- With approximately 59% of respondents one to three years away from possessing the required MDM capabilities, organizations must see MDM as a critical enabler to planning success.
- Chain drug stores, department stores, specialty retailers and wholesale organizations must accelerate their AI and/or ML initiatives. Responses indicate that these segments could be at least three years away from possessing sophisticated capabilities.
- Defining the span and scope of the demand-planning organization must be a priority. Only 20% of respondents are less than a year away from the required organizational capabilities.
Representative Vendors

Market Introduction

The 26 vendors named in this Market Guide were selected because they possess the four key solution capabilities (demand planning, replenishment [supply planning], inventory planning, and planning and execution alignment) discussed in the Market Definition section (see Tables 4 and 5).

Table 4: Number of Customers of Technology Providers by Retail Segment

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Grocery Stores</th>
<th>Convenience Stores</th>
<th>Chain Drug Stores</th>
<th>Specialty Apparel/Footwear</th>
<th>Mass Merchants</th>
<th>Department Stores</th>
<th>Wh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aigo</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>++</td>
<td>+++</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Anaplan</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+++</td>
<td>+</td>
<td>+</td>
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<tr>
<td>antuit.ai</td>
<td>+</td>
<td>-</td>
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<td>+</td>
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<td>Aptos</td>
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</tr>
<tr>
<td>Blue Yonder</td>
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<tr>
<td>Churchill</td>
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<td>+</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Data Profits</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Impact Analytics</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

Source: Gartner (February 2021)
Table 5: Technology Provider Customers by Geography

<table>
<thead>
<tr>
<th>Vendor</th>
<th>North America</th>
<th>South America</th>
<th>U.K.</th>
<th>Europe</th>
<th>Asia/Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algo</td>
<td>+++</td>
<td>+</td>
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<td>++</td>
<td>+</td>
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<tr>
<td>Anaplan</td>
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<tr>
<td>antuit.ai</td>
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<td>Aptos</td>
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<tr>
<td>Blue Yonder</td>
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<tr>
<td>Churchill</td>
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<tr>
<td>Data Profits</td>
<td>+</td>
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<td>Impact Analytics</td>
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<td>Infor</td>
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<td>-</td>
<td>+</td>
<td>+</td>
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<tr>
<td>John Galt</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
</tr>
</tbody>
</table>

Source: Gartner (February 2021)

The vendors listed in this Market Guide do not imply an exhaustive list. This section is intended to provide more understanding of the market and its offerings.

Market Recommendations

Maturing company’s forecasting and replenishment capabilities is a journey that often spans multiple years. It typically takes nine to 12 months to advance to the next maturity level. A roadmap advancing demand-planning maturity can take the following path:

- Get to a Stage 3 level of maturity as quickly as possible. Gartner research shows that a consistent Stage 3 demand-planning process supports companies in their efforts to link planning and execution activities, as well as optimize supply networks across all sales channels. Stage 3 also supports the alignment of strategic and operational objectives, as well as the coordination of interdepartmental or
functional objectives. This internal alignment helps companies plan for expected demand variability by passing more accurate demand signals through the supply chain to other business constituents and trading partners. This alignment results in higher forecast accuracy, less bias, improved product availability and inventory productivity.

- The planning evolution journey requires a commitment to MDM as well as transactional data quality. MDM disciplines must become more mainstream for retailers to complete their journey to Stage 3. Mature MDM capabilities provide a consistent and uniform set of identifiers and extended attributes that describe the core entities (for example, products or suppliers) of an enterprise. For retailers, this data can include a point of sale (POS), item, customer and supplier attributes, as well as unstructured data. This continued evolution requires retailers to map their MDM journey, including transactional data, across the following three distinct phases:

1. **Cleanse (stabilize):** Identify current and future data elements and ensure their accuracy. For example, are pack sizes correct, product descriptions consistent across all channels, and promotional attributes captured and aligned with POS transactions?

2. **Maintain:** Maintenance of the data requires the distinction between governance and stewardship. Data governance provides the rules for master data, while stewardship ensures the rules are followed. This data governance process results in an agreed-to master data blueprint for everyone to follow.

3. **Enhance:** Moving toward 2025, new data types (for example, competitor pricing at time of promotion), both structured and unstructured, will emerge. To take full advantage of ML and AI advancements, data elements (for example, weather), social commentary, competitor pricing, and shipping and return policies must be captured and incorporated into the governance and stewardship process.

- Stage 3 maturity shifts the focus of the planning organization from people-centric to decision-centric. Planners shift from tactical creators of forecasts to becoming orchestrators of information. With this shift come new focus areas, as follows:

  - **Increased Data Literacy:** With the increasing use of AI and/or ML within the planning process, the demand-planning role will require more analytics skills than needed in today’s environment. A data science background will be extremely helpful to interpret and contextualize the output for business subject matter experts (SMEs). Gartner recommends taking an experienced business expert and enhancing the average demand planner’s understanding of where to access data, how to analyze it and perhaps how to construct simple data models.

  - **Shifting Role Focus:** The role shifts from creator to orchestrator, focusing more on tuning the system and algorithms, rather than trying to predict the future. Provide input to feed in certain decisions that the system cannot predict. Planners focus more on enhancing inputs and less on outputs. With automation freeing up time, building stronger collaborative relationships with suppliers, conducting scenario planning, and providing visibility to risks and opportunities become higher priorities.
- Increased Requirement for Interpersonal Skills: As the role evolves to more orchestration and less execution, the ability to communicate with business stakeholders and SMEs becomes paramount. These skills include leadership capabilities, communications, problem solving and consensus building. The role is about plan management, not plan creation.

- Rightsizing the new planning organization will move from volume as a chief determinant, to ownership influenced by the nuances of the data. The nuances may include diversity of assortment, varying store formats, promotional activity and multiple sales channels.

Evidence
Research for this note was obtained by sending a PowerPoint RFI to the 26 representative vendors for completion. The completion window was December 2020 through January 2021.

Note 1
Representative Vendor Selection
The vendors profiled in this Market Guide have featured most prominently in inquiry calls from Gartner clients, and demonstrated a commitment to the forecasting and replenishment market through continuous delivery of new functional capabilities over the past 12 to 18 months.

Note 2
Gartner’s Initial Market Coverage
This Market Guide provides Gartner’s initial coverage of the market and focuses on the market definition, rationale for the market and market dynamics.

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Market Guide for Retail Forecasting and Replenishment Solutions - 30 October 2014

Recommended by the Author
Toolkit: Self-Assessment of Retail Demand-Planning Maturity
Retail Demand Planner 2025: From Creator to Curator
Toolkit: Building a Retail Demand-Planning Organization