IO TECHNOLOGY VALUE MATRIX 2018

NUCLEUS RESEARCH

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THE BOTTOM LINE

Inventory Optimization (IO) solutions are a value-driver for customers with significant amounts of capital devoted to keeping stock on hand and service levels high. In preparing the 2018 edition of the IO Value Matrix, Nucleus found that some vendors are looking beyond the mathematics and modeling that calculate the optimal inventory and focusing on delivering additional value with flexibility and automation. Leading vendors have customers that are automating parts of their inventory optimization efforts, leaving their software to set and manage stocking levels.

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MARKET OVERVIEW

In the 2018 edition of the Inventory Optimization (IO) Value Matrix, Nucleus analyzed solutions in the market that are designed to minimize inventory across the value chain while maintaining or increasing service levels for customers. Based on their ability to deliver value through the usability and functionality of their solutions, some vendors featured in this year's Value Matrix are focused on providing capabilities to their customers that increase both usability and functionality by allowing software to manage inventory levels and reduce human input (Nucleus Research, *R59 – Understanding the Value Matrix*, April 2017. While the goal of IO solutions is to ensure the right amount of stock at the right location at the right time with the lowest capital investment, customers are expecting solutions which enable them to achieve that while addressing only the exceptions to exceptions and requiring less heavy lifting to get up and running.

IO VALUE MATRIX
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FACILITATOR

LEADER

Greater Usability △

Logility

LLamasoft

ToolsGroup

One Network

Kinaxis

E2open

Blue Ridge

JDA Software

Vanguard

GAINSystems

Oracle

Infor

SAP

Manhattan
Associates

4R Systems

Slimstock

Smart Software

CORE PROVIDER

EXPERT

Better Functionality ▷

The Value Matrix is an assessment of the state of the market and indicates the functionality and usability of a solution. An arrow indicates future movement of a solution relative to others. Solutions without an arrow are projected to keep pace with the increase in functionality and usability expected in the overall market.

While this Value Matrix continues to differentiate between solutions that offer inventory management rather than inventory optimization, Nucleus found a persistent trend among customers: the synergies between modules adjacent to the inventory optimization tool. Rarely purchased as a stand-alone module, customers saw increased benefit when IO solutions were informed most immediately by demand planning and pushed the optimal inventory levels to a supply planning module.

Although the optimization engine is key to analyzing all the constraints within the supply chain, if the forecast is wrong then the optimized stocking levels are wrong. Integrating point solutions from different vendors has become easier with many

solutions designed to connect with other solutions out-of-the-box; however, sourcing adjacent capabilities from the same vendor often means using a single data model across modules, which delivers a single version of the truth to planners. With this Value Matrix, Nucleus analyzed how customers are using multiple pieces of a vendor's technology offerings together to ensure they are getting the most accurate optimization recommendations and realizing the greatest benefit.

Since the last IO Value Matrix, vendors have focused on several areas to improve the usability and functionality of their offerings, such as improved modeling and visualizations, machine learning algorithms, and multi-enterprise collaboration. On the automation front, vendors have begun to take their capabilities out of the lab and into full operation, enabling users to set the inventory and service policies they wish to achieve and allowing the software to determine the optimal path forward with no human intervention necessary. Customers have left parts of their supply chain running autonomously for months at a time, optimizing inventory targets for replenishment plans for example.

Although there is enormous hype around technologies like machine learning (ML) and artificial intelligence (AI), there are limits on what customers are doing with the capabilities and how much value they realize. Currently, supply chain vendors are deploying capabilities that use pattern recognizing algorithms to look for outliers and anomalies and analyze the baseline assumptions and policies established by the planner. While we are a long way off from having software completely manage the inventory and service level targets, some of the vendors featured in this Value Matrix have customers who are starting to use these capabilities today, reducing their workload and providing analysis that leads to better results for their organizations.

Looking forward, the inventory optimization vendors are continuing to look for ways to connect their planning tools more closely with point-of-sale (POS) data and other demand signals to make their solutions more responsive and enable customers to operate in real-time. Even in scenarios where lead times are weeks or months, improving forecast accuracy into the future allows suppliers to have a better idea of what demand will be and plan accordingly, reducing risk to the buyer. Vendors are tasked with leveraging machine intelligence to better predict demand while giving the customers agility in reacting to issues which arise. These capabilities surround the inventory optimization engine, where automated best-fit model selection is a table stake and a more holistic view of inventory in the supply chain network is gaining more interest from customers.

In terms of usability, vendors are focused on better reporting and modeling tools to give users a better picture of where they stand instead of just providing a spreadsheet of numbers. User adoption is also undergoing a shift, as vendors are investing in ways to help planners trust the recommendations coming from the IO tool. This is of critical importance as more calculations are informed by machine learning capabilities that continually test and challenge the underlying assumptions planners have had. Configurability and fit-for-purpose flexibility from the planning tools should come standard, especially if the vendor is offering a cloud deployment with industry best practices. Vendors that have been able to make the shift to cloud are better positioned to leverage the analytic capabilities that will drive value for inventory optimization solutions in the years to come.

LEADERS

Leaders in the Value Matrix include E2open, GAINSystems, JDA Software, One Network, ToolsGroup, and Vanguard.

E2OPEN

E2open continues as a Leader in the 2018 edition of the Inventory Optimization Value Matrix, offering a cloud-based multi-enterprise inventory optimization (MIO) as a piece of its overall capabilities which includes Sales & Operations Planning, Supply Planning & Response, Demand Planning & Sensing, and supplier and channel management across multiple tiers. Consistent with its end-to-end solution, E2open's MIO solution sits between demand planning and supply planning, pulling in data from the enterprise resource planning (ERP) system, channel management solution, and demand planning & sensing, helping companies set optimal inventory and safety stock levels that are fed into the supply planning and response module as well as further upstream to suppliers.

The value proposition for the MIO capabilities rests on its roles as a core planning component of the integrated solution, offering closed-loop analysis of stocking levels by monitoring execution of inventory targets and collecting data such as lead times, SKU-location interdependencies, and policy violations. The tool shows inventory at customer-facing and interplant locations with the demand planning forecasting using demand propagated throughout the value chain, eliminating the need to pool risk and resulting in more accurate supply plans allowing customers to cut inventory holding levels.

E2open has made several acquisitions that have added to its footprint and helped it address its customers' needs, including Orchestro for point-of-sale data collection, Zyme for channel data management, Terra Technology for demand sensing, and

Steelwedge for sales and operations planning (S&OP) (Nucleus Research, *R42 – E2open merges with Steelwedge*, February 2017; Nucleus Research, *Q41 – E2open acquires Terra Technology*, March 2016). Last year the vendor debuted its new user interface which ties together the acquisitions it is integrating into a seamless experience. As a result, users progress through a planning cycle without switching between applications and data moving between modules. With a focus on extending inventory optimization efforts to include upstream supply networks and downstream demand channels, E2open gives its customers the chance to perform a single solve across their entire value chain.

GAINSYSTEMS

GAINSystems continues as a Leader in the 2018 edition of the IO Value Matrix, offering an integrated multi-echelon inventory optimization (MEIO) solution, along with demand planning and forecasting, replenishment and production optimization, and sales, inventory, and operations planning (SI&OP). Delivered on-premises or in the cloud, GAINSystems' forecasting engine draws from 40 statistical models to automatically select the most plausible demand model to use when building a forecast focusing primarily on distribution, manufacturing, and maintenance, repair, and operations (MRO).

Forecasting can be performed from the bottom-up, starting with granular SKU-location or channel-level data, that can then be aggregated based on SKU attributes to ensure the forecasts preserve the characteristics of the items. GAINSystems can also determine the most profitable distribution options for each SKU across the customer's network. Customers use GAINSystems' inventory optimization capabilities to determine the optimal replenishment quantity and service stock parameters to minimize total annual costs. The optimal stocking level can be made at the SKU-location level while incorporating comprehensive errors from supply and demand variability, which analyzes historical data to project uncertainty tolerances across cycle count error, forecast error, lead time uncertainty, and demand variability.

On the automation front, GAINSystems has a few applications that seek to eliminate manual processes through supervised machine learning. In addition to enabling customers to use no-touch purchasing with automated replenishment planning, GAINSystems is automating forecast approvals, master data management, and demand outlier detection. GAINSystems has also been investing in UI improvements that require no coding to configure. The system has 20 default visualizations that can all be tailored to the user needs. Additional UI investments should help GAINSystems' positioning in future editions of the IO Value Matrix.

JDA SOFTWARE

JDA is a Leader in the 2018 Inventory Optimization Value Matrix, based on the value customers realize using its Inventory Planning module, which can be delivered as a point solution or as part of JDA's end-to-end planning solution suite. Inventory Planning shares the same schema and data model as JDA's other modules, which cover network design, S&OP, demand planning, master planning, replenishment planning, factory planning, scheduling, and order promising.

In Inventory Planning, users can perform inventory reviews at multiple levels, from strategic to tactical to performance. In addition to traditional forecasting methods, JDA is leveraging machine learning techniques to detect planner bias as well as feeding actual demand levels to an algorithm that generates stocking level parameters. Additionally, JDA customers can use machine learning to predict service failures and offer prescriptive remedies.

On the roadmap, JDA is looking to introduce inventory planning algorithms for slow moving and lumpy items as well as visualization and root cause analysis usability enhancements. Looking past 2018, JDA is working on furthering its segmentation capabilities with an algorithm that automatically clusters items based on their attributes as well as holistic inventory optimization throughout the entire network to facilitate a single solve across multiple trading partners and stakeholders.

JDA has partnered with Google to leverage its Cloud Platform capabilities, on which JDA is delivering its software-as-a-service (SaaS) applications. The partnership is moving JDA towards more cognitive demand planning, which will take advantage of real-time demand sensing, impact analysis of external influences, and digest large streams of data such as Internet of Things (IoT) signals. Although it is too early to tell how much extra value this will deliver for customers, JDA's investments in machine learning are proving beneficial and driving better performance for those customers that have implemented them.

ONE NETWORK

One Network is a Leader in the 2018 IO Value Matrix, with customers realizing value from the multi-enterprise network capabilities delivered by the vendor's Real Time Value Network (RTVN). Connecting planning with execution, One Network leverages each execution cycle as an opportunity to tune the planning software, which includes control tower, demand and supply planning, forecasting, and simulation in addition to inventory planning and optimization.

Drawing its model directly from execution and transactional data derived from connected downstream trading partners, One Network customers can forecast with

real lead times and variability, rather than assumed values. One Network also deploys learning agents that analyze transaction data to discern demand patterns that are fed into the forecast. The solution also runs micro-simulations to evaluate the targeted inventory levels against the end-to-end execution details. The simulations are analyzed with a machine learning algorithm to evaluate the outcomes from each planning cycle with the outcomes.

One of One Network's stand-out strengths is its automation capabilities which allow customers to operate parts of their supply chain with little to no user intervention. With AI deployed to capture demand sensing as well as execution details, One Network enables customers to automate replenishment plans based on visibility of demand and on-hand inventory within the extended value chain in conjunction with real lead times and logistics information. Based on the business rules established by the user, the software can independently manage and fine-tune the safety stock levels, leaving planners to address exceptions to the exceptions. Continued investment in automation and low-touch capabilities will see One Network's place in the Value Matrix improve further.

TOOLSGROUP

ToolsGroup continues as a Leader in the 2018 edition of the Inventory Optimization Value Matrix after making strides to productize its machine learning capabilities into a suite of applications that address specific situations within a customer's supply chain, such as new product introductions and seasonality clustering. Delivered as part of its Service Optimizer 99+ (SO99+) solution, ToolsGroup's inventory optimization capabilities can be delivered as a stand-alone offering, but partners with the vendor's demand planning, supply and demand collaboration, production planning, sales, inventory, and operations planning (SI&OP), and demand sensing capabilities on a holistic platform. Sold predominately as a SaaS solution, ToolsGroup leverages a single data model that ensures the distribution model is preserved throughout the entire planning solution, so information is not lost as the planner moves from demand planning to inventory optimization to supply planning.

An area of focus for the vendor has been around its machine learning engines which can support several scenarios. Some of the capabilities draw from non-traditional inputs and data streams such as weather, web sentiment, IoT data, and customer segmentations. The applications cover advance forecasting, early signals, events forecasting, events auto-detection, new product introduction, and seasonality clustering.

To aid usability, ToolsGroup uses several visualization engines including Microsoft Power BI, delivering data to the user that is easily digestible and flexible, as well as

ePlanner which helps users manage events and promotions. ToolsGroup also uses Microsoft Azure Cloud services to store data for use in machine learning scenarios as well as delivering the compute to power its simulation capabilities. With the strides it has made in bringing insights to users with machine learning products, ToolsGroup is making it easier for customers to derive value from the solution and realize better forecasting and inventory optimization results.

VANGUARD

Vanguard moves into the Leaders quadrant in the 2018 edition of the Inventory Optimization Value Matrix, with customers leveraging the MEIO capabilities as part of its Forecast Server product line. In addition to inventory optimization, Forecast Server delivers sales forecasting, demand planning, S&OP, integrated business planning, and financial planning and analysis. Customers derive value from Vanguard's analytics capabilities, which draw on a suite of forecasting models and AI-assisted automatic selection, as well as the flexibility of the system to match a variety of industries and customer use-cases.

With a focus on reducing forecast error to minimize safety stock, Vanguard draws on 33 time-series forecasting methods to address scenarios such as seasonality, business cycles, and demand trends. Customers can run simulations based on discrete events or use Monte Carlo methods to dynamically measure the potential impact on key performance indicators (KPIs). Deployed on-premises or in the cloud, Vanguard's platform delivers a single data model across all its modules, which ensures that planners see the same version of the truth. Additionally, Vanguard has invested in the power of its platform to manage up to 16 million SKUs, ensuring that customers with complex product-mixes can plan down to the most granular level.

Delivering a web-based user interface, Vanguard supports mobile users and allows for multi-enterprise network capabilities where users can integrate suppliers and trading partners into the planning process. The flexibility of the platform helps with user adoption, as Vanguard works closely with customers to ensure that the workflow is correctly configured to the use-case. Vanguard is also providing automation capabilities based on business rules that are managed by an AI engine. Additional investments in automation will see Vanguard's position in the Value Matrix continue to improve.

EXPERTS

Experts in the Value Matrix include Infor, Manhattan Associates, and SAP.

INFOR

Infor continues as an Expert in the 2018 IO Value Matrix, having kept pace with the market as it integrates capabilities from acquisitions it has made and continues its push toward the cloud. Offering a networked supply chain, Infor has capabilities that span supply chain planning, execution, finance, and procurement, all underpinned by a multi-enterprise business network, leveraging capabilities it acquired when it purchased GT Nexus in 2015. Having migrated many of its legacy capabilities to its cloud offering, Infor is positioned to deliver faster time to value for its customers.

Within supply chain planning, Infor has modules that cover demand planning, supply planning, production planning & scheduling, and S&OP. The vendor's IO capabilities start with segmentation and include simulations, stock rebalancing, and cost-optimizing. Infor offers visibility outside the enterprise with its multi-enterprise network as well as distributed order management to help with orchestration and fulfillment. Infor has been investing in its usability, adding more workbenches and visualizations to help planners be more efficient, such as side-by-side inventory simulation comparisons. Additional investments in cloud verticals are paying dividends for customers who have more of their industry-specific needs met out-of-the-box. Continued acceleration of its cloud business should see customers achieving value more quickly and improve Infor's position in future editions of the IO Value Matrix.

MANHATTAN ASSOCIATES

Manhattan Associates is an Expert in the 2018 Inventory Optimization Value Matrix, delivering a suite of planning tools that enable its omnichannel inventory optimization (OIO) capabilities. With its solution, Manhattan Active Inventory, Manhattan Associates aims to link customer fulfillment experience initiatives with inventory optimization strategy, accounting for the changing requirements of companies—particularly in retail—that are focused on offering multiple fulfillment channels to their customers. The vendor wraps inventory optimization around modules addressing S&OP, assortment planning, promotional planning, demand forecasting, replenishment, vendor managed inventory, and multi-echelon inventory.

In addition to investing in OIO, Manhattan Associates is bringing analytics to its solution that helps planners evaluate the impact of promotions and maintain visibility of the larger inventory picture. With promotional event analysis, the vendor is leveraging machine learning to identify the extent to which promotions shape demand, providing feedback to marketing departments. The capability also considers third-party data to add context to the demand signals, such as weather data.

To improve end-user usability, Manhattan Associates has also embedded intuitive data visualizations directly into commonly used workflows. For example, visualizations added to the suggested order approval workflow dramatically reduces the time spent reviewing orders. For executives and supply chain leaders, they've also added dynamic dashboards to ensure that financial performance from inventory is constantly aligned with overall enterprise strategy. While its investments are encouraging, Manhattan Associates' path to the cloud has been slow, which impacts how quickly customers have been able to achieve value. As its cloud business accelerates, Nucleus expects Manhattan's value proposition to improve.

SAP

SAP is an Expert in the 2018 edition of the IO Value Matrix. SAP delivers IO capabilities as part of its Integrated Business Planning (IBP) solution, which covers five planning modules: S&OP, inventory, demand analytics and sensing, control tower, and supply planning and response. Available on the HANA cloud platform, SAP IBP is focused on end-to-end supply chain management, with customers realizing greater benefits when they have more than just the inventory optimization module and can feed forecasts and demand sensing data into the optimization engine.

Since the last edition of the Value Matrix, SAP has focused on bringing usability and algorithmic enhancements to the IO product. Scenario planning and side-by-side what-if analysis are driving better usability for customers, who already use the Fiori user interface. As part of its continuous efforts to improve its forecasting and optimization algorithms, SAP is looking to enable demand-driven material requirements planning (DDMRP) to the solution suite as well as additional machine learning capabilities.

Continued investment by SAP in increasing the level of automation and machine-driven insights that customers can leverage will help SAP deliver better value. SAP has made strides to ease the implementation complexity for customers by offering a cloud deployment option, further investment in helping customers get established and operating quickly will accelerate customers' time to value. As the solution matures, customers will be able to take advantage of the larger SAP ecosystem of partners and user community to extend the value they get from the solution.

FACILITATORS

Facilitators in the Value Matrix include Blue Ridge, Kinaxis, LLamasoft, Logility, and Oracle.

BLUE RIDGE

Blue Ridge moves into the Facilitator Quadrant in the 2018 IO Value Matrix. As a cloud-native vendor, Blue Ridge focuses predominately on helping customers manage finished goods in wholesale distribution and retail. Leveraging a single data model, Blue Ridge delivers all its capabilities through one solution rather than integrated modules. With a suite of forecasting methods, item modeling, and product lifecycle management, the vendor has automated steps of the inventory optimization process which allows customers to set stocking policies and leave the solution to manage the activation, purchase, and deactivation of items based on the prescribed parameters.

A significant focus of Blue Ridge has been to deliver enterprise-grade capabilities through applications that resemble those on mobile devices, with simplicity and usability being central to its development efforts. Blue Ridge has also been enabling customers to perform continuous end-to-end planning, which requires prescriptive analytics connected to financial objectives and visibility across the supplier, distribution center, and storefront. Deployed in the public cloud on Amazon Web Service, Blue Ridge is bringing greater flexibility to its users, allowing them to perform planning tasks and reconfigurations through any web browser. Continued investment in functionality that provides automation and prescriptive action recommendations will help Blue Ridge deliver additional value and improve their position in future editions of the Value Matrix.

KINAXIS

Kinaxis is a Facilitator in the 2018 edition of the IO Value Matrix. The Canada-based vendor focuses on supply chain planning, offering 13 different applications that make up its RapidResponse solution. Kinaxis' inventory planning and optimization (IPO) application can be delivered as a stand-alone point solution, but in general, customers use the optimization engine in conjunction with other applications delivered the Kinaxis platform, thereby deriving better value. For example, users can generate the demand forecast with the demand planning application, where the tool automatically selects the forecasting method that best fits the demand pattern of each SKU. The forecast is then brought into the IPO application, where users can optimize inventory levels to meet projected demand. Kinaxis leverages a single data model across all its applications, which helps users move more seamlessly from one application to another as they go through their planning processes.

Since the last iteration of the IO Value Matrix, Kinaxis has delivered some of the usability enhancements that were on its roadmap in 2017. In its August 2017 update, Kinaxis added new business process flow building capabilities to help users set up and start using the application faster, speeding their time to realize value. Additional

usability improvements allow users to set up rules-based processing and product segmentation more easily, with the same goal of helping users get up and running more quickly. From a functionality standpoint, Kinaxis released several improvements to helping users cleanse and prepare their data. New tools that detect and correct outliers and analyze data integrity were also included in the August 2017 update.

On the roadmap for 2018 and beyond, Kinaxis is planning to make usability improvements such as network visualization capabilities within IPO. Additional roadmap elements include the ability to add group-level service levels, thereby helping users segment and aggregate by service requirement as well as cost modeling that quantifies the entire product lifecycle, so users can review total item costs and associated trade-offs. Finally, Kinaxis is looking for practical ways of applying machine learning capabilities such as investigating future product lead times based on analysis of historical data. The vendor is also developing an analytic tool that looks for potential risks in the inventory optimization plan, so users can decide what level of risk they are willing to accept.

Focused squarely on the planning side of supply chain management, Kinaxis relies on its integration capabilities to provide the feedback loop from a customer's execution system, such as an enterprise resource planning solution. Kinaxis' continued investments in helping user adoption should pay dividends by ensuring that customers realize value from the IPO application quickly. Additional investments in automation capabilities will help Kinaxis' positioning in future editions of the Value Matrix.

LLAMASOFT

LLamasoft is a Facilitator in the 2018 IO Value Matrix, focusing on supply chain network design that enables customers to make tactical decisions and optimize inventory. LLamasoft provides a suite of technologies that help customers in addition to network design, including MEIO, service level optimization, inventory simulation, and scenario analysis. The vendor has vertical capabilities covering manufacturing, retail/consumer and packaged goods, healthcare/pharmaceuticals, and chemicals.

Since the last Value Matrix, LLamasoft has released capabilities that allow customers to build disposable applications. Customers can configure thresholds and automated alerts with the applications to facilitate a self-healing supply chain, driving value through greater user productivity. LLamasoft is also deploying machine learning in its demand modeling to analyze predicted lead times and prompt re-forecasts when the values change. Customers realize value from the

solution by evaluating network changes for alternative strategies that can lower costs and improve efficiency. LLamasoft's position in the Value Matrix should improve as more customers start to use the application to build functionality.

LOGILITY

Logility is a Facilitator in the 2018 IO Value Matrix, delivering the market standard for usability. With its Voyager Solutions, Logility has product capabilities that span supply and demand optimization, replenishment planning, manufacturing planning, assortment and allocation planning, and transportation and shipping optimization. Offering customer-centric continuous planning, the vendor delivers a platform that enables companies to integrate with suppliers, collaborate with their customers, and leverage analytics that draw on data from outside the enterprise including social sensing and unstructured information.

The vendor helps customers with master data management using capabilities delivered by Voyager AdapLink, which it deploys as the integration layer between the supply chain and the enterprise's data. In addition to offering out-of-the-box templates for connecting with ERP systems and reducing data lags between systems, the integration allows for multi-enterprise collaboration. Logility has also been investing in its analytics capabilities that are embedded in Voyager Solutions. Drawing on external sources such as syndicated market data and specialized data for verticals, Logility is applying machine learning to deliver automated simulations rather than manually created scenarios. A focus for the vendor moving forward is integrating its latest acquisition, Halo Business Intelligence. Nucleus expects Logility to push software usability forward, as well as deepen its analytics functionality, as it continues to invest in bringing Halo's capabilities to its core products.

ORACLE

Oracle is a Facilitator in the 2018 edition of the IO Value Matrix, offering a suite of value chain planning tools. Though predominately installed on premises, Oracle has made significant investments to build its Supply Chain Planning (SCP) Cloud solution from the ground up. It has also taken best practices from its cloud user interface back to its on-premises deployments to increase the usability of the product. Within SCP Cloud, Oracle has simplified the solution landscape, so the users see only the functionality they need rather than switching between modules. Offering its capabilities as cloud-based services rather than individual applications, Oracle is focusing on ensuring that its capabilities are fit-for-purpose to increase the value customers realize.

Since the last Value Matrix, Oracle has continued to make its user experience a highlight of its product, offering contextually driven charts, graphs, and

visualizations that help users move through the process with a better understanding of where they stand on KPIs of their choosing. As Oracle's cloud business continues to accelerate, its ability to deliver value will improve. In the meantime, its steps to help customers transition to the cloud via hybrid deployments and modernized UI ensure it is keeping pace with the market.

CORE PROVIDERS

Core Providers in the Value Matrix include 4R Systems, Slimstock, and Smart Software.

4R SYSTEMS

4R Systems remains a Core Provider in the 2018 IO Value Matrix, delivering a cloud-based inventory solution for retail customers. With the goal of maximizing profitability, 4R Systems has capabilities that include forecasting, assortment optimization, seasonal allocation, vendor order optimization, and assortment optimization. The vendor has been focusing on enhancements to its replenishment capabilities, applying machine learning to predict where customers might have issues with their replenishment plans.

4R Systems delivers additional machine learning capabilities that test a customer's historical understanding of settings such as thresholds. The software analyzes changes at various levels of inventory such as categories and SKUs and then feeds the changes back into the threshold definitions for use in creating future forecasts and demand. The system develops overrides to improve and hone the definitions set by the user.

Currently, 4R Systems has a service team that designs the solution for customers to get optimal results and allows the user to see the financial impact of a deviation from the original plan. The vendor uses a suite of simulations in its service delivery. It is looking to give users more control over the simulations the software provides. As a SaaS offering, 4R Systems can be deployed quickly and can scale as the business needs evolve. Moving forward, additional investments in capabilities such as space optimization should expand the functionality of the solution.

SLIMSTOCK

Slimstock is a Core Provider in the 2018 IO Value Matrix, offering its Slim4 product which includes demand profiling, forecasting, demand planning, S&OP, replenishment planning, and MEIO planning. Slimstock services the needs of customers from many industries including automotive, retail, wholesale,

manufacturing, spare parts, industrial, consumer packaged goods, construction, and healthcare.

Since the last Value Matrix, the vendor has been investing in updating its UI to be web browser-based as well as in a performance monitor application that is configurable to show the user the most relevant KPIs. Operating as a knowledge partner with its customers, Slimstock offers fixed-fee implementations and customers generally go live in three to four months. The vendor is positioning itself to deliver more SaaS in the future and already offers a plug-and-play connector with ERP systems. The investments Slimstock is making in updating its UI should improve its position in the IO Value Matrix in the future.

SMART SOFTWARE

Smart Software is a Core Provider in the 2018 IO Value Matrix, with its Smart Inventory Optimization (SIO) solution offering inventory planning policy decision support and impact tracking. Users can provide their own planning parameters or allow the software's optimization logic to prescribe planning parameters and service levels. Delivered through web-based UI, Smart Software's cloud products include demand planning and forecasting in addition to inventory optimization.

Since the last Value Matrix, Smart Software announced plans to deepen its partnership with Epicor, an ERP software vendor. The goal of the partnership is to integrate Smart Software's inventory planning and optimization capabilities into Epicor's ERP solution. The integration is designed to better link operational planning with execution. However, additional investment is required for the vendor to keep pace with the technologies being deployed in the market by other vendors.