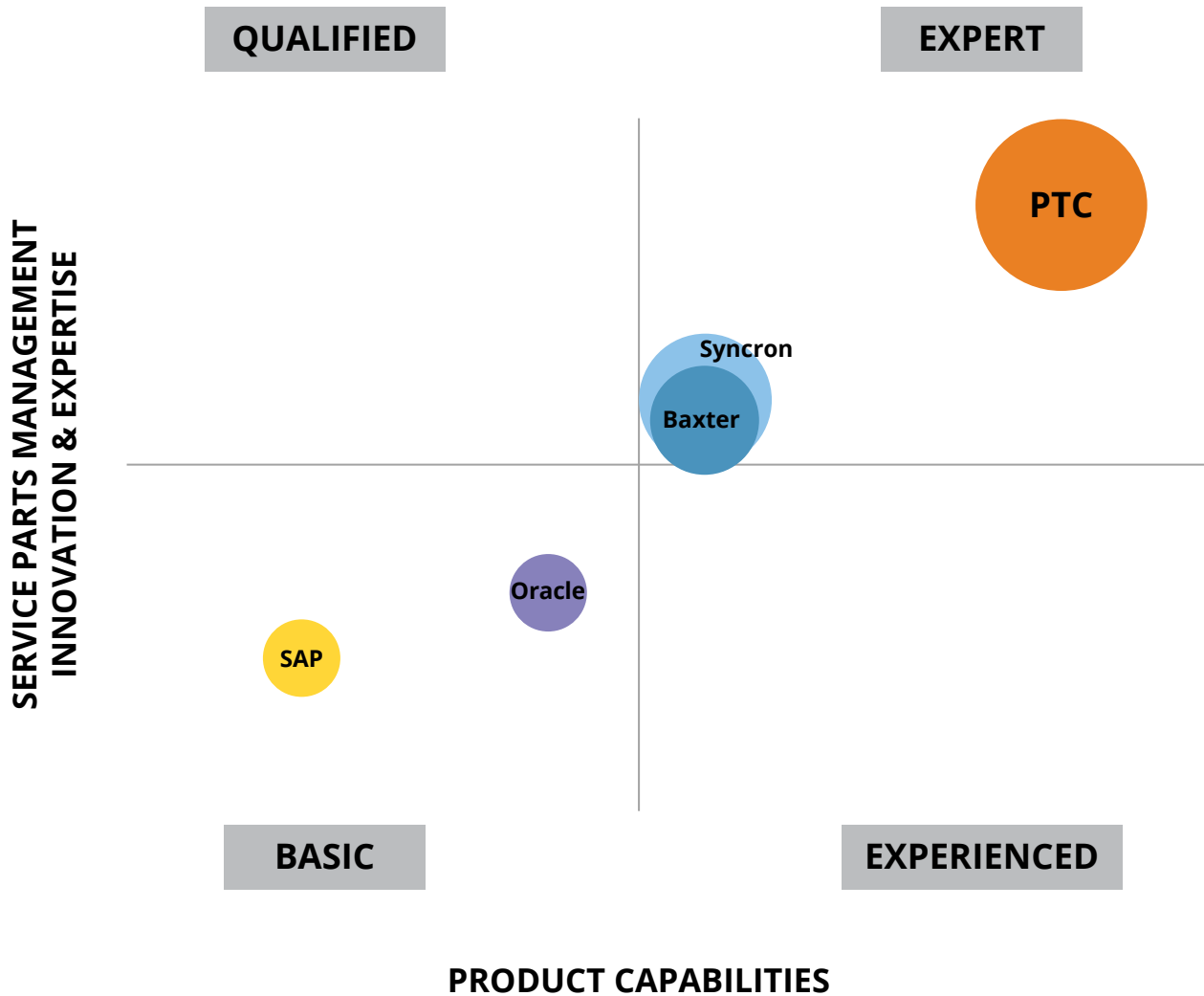# SPARE PARTS MANAGEMENT SOFTWARE STATE OF THE ART BENCHMARK EVALUATION

Blumberg Benchmark Evaluation Figure

Figure 1: Service Parts Management (SPM) State of the Art Benchmark Evaluation

Unique Characteristics of Spare Parts

Aftermarket Service is highly dependent on the availability of spare parts. Indeed, a significant amount of capital and resources are tied up in managing these assets. This is evidenced by the fact that spare parts represent the single largest investment and second-largest expense when running a service function. This is true regardless of whether Aftermarket Service operates as a cost center, revenue center, or profit center. Therefore, it is incumbent upon Service Leaders and Supply Chain Managers to be as effective as possible when forecasting, managing and ordering spare parts.

At the most basic level, achieving an optimal inventory level requires that logistics personnel maximize customer satisfaction while maintaining high service business profitability levels within a rapidly changing market environment. This presents a real challenge for service logistics personnel as these goals are often in conflict. Parts need to be available at the right place and at the right time. However, carrying too much inventory on the balance sheet negatively affects the income statement and other financial performance metrics such a return on assets and return on invested inventory.

Another challenge is that service parts have unique characteristics that are not present in other types of inventory. Unlike finished goods inventory, spare parts can be repaired and reused by the same organization. Also, spare parts serve a dual purpose in that they represent both a source of revenue and a mechanism by which service issues are resolved. Benchmark studies indicate that spare parts are required 55% of the time, on average, to resolve service events and represent 10% - 20% of a manufacturer's overall revenues and as much as 30% - 50% of profits.

A few other characteristics add to the complexities of Service Parts Management. First, service parts must be managed against many key performance indicators and constraints that don't exist with other inventory types. For example, equipment uptime, SLAs, fill rate, availability levels, cost, and space. Second, it is difficult to predict the demand for spare parts. It is both intermittent and causal. Just in time management techniques don't apply. Just in Case is the operative term when it comes to spare parts management. These characteristics underscore the need for industry-specific software to manage the unique complexities of service parts management.

Impact of Trends on SPM

Several key trends are influencing Manufacturers and Service Providers to pay closer attention to Spare Parts Management. The first of these trends is the Servitization of products, which places greater attention on generating additional revenue through the sale of spare parts. This capability is typically one of the first steps in the Servitization Journey. To succeed, companies must become proficient in planning, forecasting, and managing spare parts. They must balance inventory so they satisfy an uncertain level of demand at the lowest possible cost.

As companies progress along their Servitization Journey, they emphasize monetizing the value of their install base. This takes the form of providing value-added and advanced services. For example, vendor managed parts inventory and pay per use services. These offerings place even greater pressure on manufactures to optimally plan, forecast, and manage parts inventory against key performance metrics and constraints. Stock-outs and parts delivery delays can have devasting consequences on service performance, result in financial penalties, and negatively impact the bottom line.

The second of these trends is the emergence of the circular economy whereby companies create value by repurposing, reusing, and recycling products. Aftermarket Service is no exception. Supply chain managers can replenish their spare parts inventory by repairing and refurbishing defective parts. This creates more complexities for service parts planners as they need to consider the availability and cycle time of these assets in the planning scenarios.

The third and most significant trend is the tsunami of new technology available in recent years. Innovations such as 3D Printing, IoT Connectivity, Mobility, Machine Learning, and Artificial Intelligence enable Digital Transformation and help companies deliver an improved customer experience. More importantly, these technologies dramatically impact service supply chain operations' efficiency and productivity and provide an Uber-like service experience to end-customers. As a result, companies have increased interest in implementing purpose-built tools that improve the accuracy, reliability, and quality of decisions concerning parts forecasting, resource allocation, and inventory management.

Spare Parts Management State of the Art

There are several core capabilities and functionalities that companies should consider when investing in a Spare Parts Management solution. These include:

- **User Interface**: Refers to the flexibility of the user interface configuration, the array of data stores that can be associated with a part, the capabilities available in the user interface screen for assembling a comprehensive data set associated with a part, and how the system handles exception management processes.

- **Parts Management and Grouping**: This capability is critical to forecasting demand and managing inventory. Our vendor evaluations examine the flexibility level within the system for creating parts groups, ABC code classifications, parts chains, and the type and breadth of pre-defined business rules for parts management.

- **Forecasting**: Service parts usage is characterized by a high intermittent demand level, so it is essential to evaluate how the vendor forecasts intermittent demand and the breadth of forecast models employed. Critical to the forecast processes is the planning models and techniques utilized to forecast demand when there is no historical data to rely on. Other key considerations include the method used for determining the accuracy of forecasts, the systems' ability to recommend the best forecast, how the system incorporates IoT data, and how returns are incorporated into the forecast.

- **Inventory Planning & Optimization**: This function determines how many parts should be stocked at each location to meet various financial constraints and performance objectives. There are always trade-offs to be made. The goal is to minimize parts investment while maximizing different service goals and objectives. These goals can be achieved by stocking parts in locations at various levels or echelons within the service logistics pipeline. How these decisions or calculations are made by an SPM solution and produce different results is an important consideration when selecting an SPM solution. Vendors incorporate different optimization models and techniques with varying degrees of complexity, including single item, multi-item, Multi-echelon (MEO), Multi-Indenture/Multi-Echelon (MIME), and asset availability optimization. Key considerations include the process and techniques for stocking target inventory levels, types of probability distributions utilized, and types of constraints and service goals that can be optimized.

- **Supply Planning (Order Plan)**: Forecasting inventory requirements and planning stocking locations is only part of the SPM equation. The stocking locations still need to be replenished to meet performance objectives. Key considerations are the processes used within the system to supply new, repairable, and returned parts. The key issue is understanding how these assets are accounted for in the planning process.

- **Reporting & Analytics**: When evaluating the reporting & analytics function within an SPM solution, it is essential to consider the types of standard and custom reports that can be created, the KPIs that are monitored and how they are tracked, the availability of interactive dashboards, and advanced analytics. It is also essential to consider if the analytics and reporting can evaluate the parts planner's performance and provide recommendations (i.e., material required, financial implications) associated with proposed strategic changes (e.g., service goals, network configuration, etc.).

The capabilities identified above represent basic requirements for supporting Spare Parts Management within an Aftermarket Service environment. Typically, the greater the complexity and flexibility in the optimization models and forecasting techniques, the more effective the system can meet performance goals and objectives. In other words, it is essential to consider how well the system can model and handle the nuanced level of forecasting and planning that can occur between organizations in different vertical market segments or range of parts characteristics (e.g., lifecycle, value, volume, etc.).

Additional Considerations

There are, of course, other aspects of an SPM solution that are important to consider. The first and foremost is if the solution was developed specifically for managing the Aftermarket Service Supply Chain. A solution designed for other types of use cases, for example, manufacturing or retail distribution, will result in sub-optimal results at best when applied in a service supply chain environment. A second aspect to consider is the vendor's experience and expertise within a vertical market. A third aspect is if any independent organizations validated the math behind the inventory planning. If yes, then by which organization. This provides a de-facto certification that the models meet other companies' requirements similar to this organization or operate within the same industry or vertical market. Fourth is the vendor's philosophy toward planning and optimization. This helps shed some light on what objective the vendor's application is trying to accomplish.

In addition to these aspects, a buyer of SPM software might want to investigate an SPM solution's ability to keep up with the pace of new technological developments and incorporate them into optimization and planning scenarios. For example, the capability to forecast parts demand directly from IoT data. A vendor's total corporate revenue and revenue attributable to SPM software, number of employees, and years in business are essential considerations but not exclusive of the basic capabilities and other aspects identified above.

Vendor Profiles

This section provides a profile of each of the vendors evaluated for inclusion in this report. We have evaluated each of the vendors against the feature functionalities and capabilities described above. The profiles also include analyst commentary on each vendor's relative strength and weakness related to these criteria.

Baxter Planning

Overview

Baxter Planning (Baxter) is a privately held vendor of advanced planning software for Service Parts Management. The company is headquartered in Austin, TX, and was founded in 1993 by Greg Baxter. Before starting Baxter Planning, Greg Baxter worked as a planner at Texas Instruments, Inc., where he developed a streamlined process for managing worldwide spare parts inventory. This framework formed the basis of the Prophet By Baxter software solution he later created. Mr. Baxter now serves as Chief Product Officer for the company. Baxter employs a total of 75 people.

Since its inception, Baxter has stayed focused on solving service supply chain problems and building long-term relationships with customers in the market. Baxter serves more than 60 customers worldwide. The majority of these customers are in North America (64%), followed by Asia/Pacific (19%) and Europe (17%). Information Technology, including Storage and Printers and Telecommunications/Network Connectivity, represents the two largest vertical market segments in terms of market penetration, representing 34% and 35% of Baxter's customer base. Managed Service Providers, Medical Device/Life Sciences, and Machinery account for 12%, 11%, and 8%.

As a privately held company, Baxter does not report revenue numbers. However, the company has sustained a 20+% growth rate for the last three years. It maintains a positive outlook for 2021 and beyond based on an increased sales pipeline of new accounts and a highly referenceable customer base. Baxter's customers include Advantest, Arista, Avaya, Bio-Rad, Extreme Networks, Riverbed, Smiths Detection, Johnson & Johnson, Stanley Black & Decker, and Becton Dickinson.

Core Capabilities

Baxter provides a SaaS-based application that offers both inventory planning and execution capabilities. Prophet by Baxter contains an integrated set of feature functionalities that support Logistics Network Optimization, Forecasting, Inventory Planning, Replenishment and Redeployment, Supply Order Automation, Lifecycle Management, Excess Management, and Planning Analytics. Core to Prophet's capabilities is its Total Cost Optimization approach, which considers part, site, and customer criticality attributes to meet supply chain cost objectives.

Baxter views its TCO approach as a critical strategic consideration and the availability of a suite of professional services, including implementation, support, consulting, and planning as a service. Baxter currently does not have any business partnerships with 3rd Party Consultants or Systems Integrators. Utilization of Baxter's services, particularly planning as a service, helps customers save money, ramp up quickly, and obtain additional expertise and coaching needed to accelerate the adoption of the Prophet solution.

Prophet is among a limited number of inventory planning solutions on the market today explicitly developed for use in a Service Supply Chain environment. The solution incorporates operations research techniques for forecasting and planning. Prophet was created by the company's Founder and Chief Product Officer, who has advanced degrees in this field of study. Additionally, members of Baxter's technology team have master's degrees and doctorates in related fields, including mathematics and computer engineering.

The Prophet By Baxter system uses proven mathematical models for forecasting and inventory optimization. Baxter's culture, which values "Partnerships," builds relationships with customers based on an operational mindset. This ensures an outcome-driven approach centered on working with customers to validate results. Unlike a simulation-based method typically used by independent organizations, it has earned Baxter the reputation as "your partners in planning." Facilitating this process is a Center of Excellence methodology to define and track progress towards supply chain objectives used to support all customers. In 2020, Baxter was recognized for the 17th year in a row on SupplyChainBrain's list of 100 Great Supply Chain Partners, an award based on customer ratings.

Unique Attributes

A prominent aspect of Baxter's' Prophet By Baxter SPM solution is the Total Cost Optimization approach to inventory planning and management. TCO balances the cost of inventory (i.e., material costs, carrying costs) with the cost of not having inventory for each part at each location within the supply chain network. This is done sequentially, and Target Stock Levels are determined by cost. Prophet does not optimize echelons simultaneously, nor does it determine stocking levels by service level goals or objectives. However, Prophet does calculate service goals based on an analysis of costs. TCO can also support min-max constraints associated with service level, period of supply, stock level months of demand, and stock level by various aggregation levels (e.g., site, region, commodity, and company).

Additionally, TCO supports partial autonomous planning as many decisions for forecast, inventory planning, replenishment, and supply planning are made by the system based on algorithmic logic. This capability has been available in Prophet since the inception of the Prophet By Baxter model. Baxter has plans to expand these capabilities through the incorporation of AI/ML technology.

To support the planner, Baxter offers an easy to use, customizable, and flexible user interface. Auto alerts based on the perceived risk cost of not handling an issue provide planners with a Management by Exception feature. A logical, configurable user interface provides full visibility to necessary inventory data elements.

The parts grouping and parts relationship capabilities within Prophet are fairly extensive. As an alternative to ABC code classification, the system uses a attribute based classification that considers part cost and demand volume on a continuous basis. Instead, each part is for each location based on criticality at that location. For example, not all parts with a part classification would warrant the same service level at each location depending on the customers supported, their SLA contracts, etc. Parts can also be grouped by a select number of pre-defined business rules. Baxter's parts chaining functionality is also viewed as a plus by its customers. It includes advanced substitution capabilities for two interchangeable, two way obsolete, and one way replaced.

Prophet By Baxter contains a forecast engine that supports a broad array of deterministic and statistical methods appropriate for intermittent, low, and high demand parts. It is also capable of providing Install Base Demand forecasts based on failure rates. Demand forecasts can be part or location-specific. The Supply Planning and Reporting & Analytics capabilities meet a baseline of those offered by other SPM products on the market.

Key Considerations

While the majority of Baxter customers are Enterprise size with $1B+ in revenue, it has also managed to carve out a niche with mid-size companies within Information Technology and Telecommunications verticals. Many of Baxter's customers also prefer to augment their internal service parts planning teams with an outsourced, planning as a service option.

Baxter's TCO approach also resonates well with both Managed Service Providers and Manufacturers in the market segments identified above. Although SLA compliance is critical in these segments, Baxter users value the TCO approach because it is aligned with business objectives that all stakeholders in the organization can easily understand. Additionally, Baxter's customers are concerned with achieving inventory cost optimization at Forward Stocking Level (FSL) locations rather than at higher levels within their supply chain network. In some cases, these stocking locations are supported by other enterprise systems operating within the client organization. In other cases, the network itself is not that complex in terms of tiers and locations within an echelon making MEO less of a concern for these organizations. For a large percentage of Baxter's clients, the primary way in which spare parts are distributed to end-customers is through a company-operated Field Service Organization with relatively shallow supply networks, which may explain why FSL cost optimization is enough for these companies.

Oracle

Researchers Note: Oracle declined our invitation to participate in our benchmark study. The information contained in this section was obtained from primary and secondary research sources, including but not limited to internet research, vendor marketing collateral and resources, and conversations with industry participants.

Overview

Oracle is a leading provider of Cloud-Based Enterprise Resource Planning (ERP), Enterprise Asset Management (EAM), Supply Chain Management (SCM), Human Capital Management (HCM), and Customer Experience (CX) solutions. The product portfolio also includes legacy-based software applications that were either acquired by Oracle or developed internally. These products include E-Business Suite (EBS), JD Edwards, People Soft, and Siebel; all of which can run on Oracle's Cloud Infrastructure.

Oracle provides defined SPM capabilities through the Value Chain Planning (VCP) functionalities within Oracle EBS. Oracle Spares Management (SM) is a complete solution covering key processes and functionality required to manage serviced parts within a service supply chain. Oracle is a $39 Billion company. Its Supply Chain practice accounts for approximately 3.8% of total corporate revenue. Spare Parts Planning generated one-third of this business. However, most of this revenue is from companies that manage the sale of retail parts, and these capabilities are within Oracle's Cloud Fusion Supply Chain Management (SCM) solution.

Core Competencies

The Oracle SM solution integrates with Oracle Field Service and covers both service logistics and inventory planning capabilities. It contains basic inventory planning capability that enables manufacturers to plan and replenish warehouse inventories, plan and replenish technician inventories, process priority orders for field technicians, manage parts returns for excess and defective, and execute repair for warehouse replenishment. Oracle Service Parts Planning (SPP) is an SM component that uses feature-functionalities from within VCP to provide parts demand and returns forecasting inventory planning, and ordering planning.

Oracle SPP helps manufacturers forecast service parts demand if historical parts usage data are available. It can support intermittent, seasonal, and fast-moving demand patterns. Manufacturers can use Oracle's Demantra solution for additional capabilities. Demantra supports a broad array of forecasting techniques associated with planning parts where no previous demand history is available.

Unique Attributes

Oracle SPP became available in 2016 with the release of Oracle 12.2. The user interface has not been updated since then. It offers basic features as well as management by exception capabilities. End-users can simultaneously analyze forecast and replenishment decisions as well as release plan recommendations for execution.

The parts grouping and parts relationship capabilities within Oracle SPP is extremely basic. Parts can be grouped according to usage pattern and parts criticality. The only way to identify parts' relationships is by whether it supersedes another part or repairable. While Oracle claims that it can handle unique parts characteristics through Oracle Demantra, we could not find explicit evidence through our research

The parts forecasting capabilities are limited to SPP. It offers a broader array of forecasting techniques when Oracle Demantra is added to the mix. The addition of Demantra provides manufacturers with the ability to perform time-phased forecasts based on installed based historical data. It includes many of the forecasting techniques that other SPM vendors include, including handling time-phased forecasts based on install base failure data. SPP also does a good job of incorporating return forecasts to predict repairable products' flow back into the supply chain.

The supporting architecture behind SPP is not well suited for Service exposing scale challenges and processing time issues. The functionality unique to Service are all bolt-on capabilities (reverse logistics/repair, rebalancing inventory, multiple echelons, low volume demand, etc.).

Although one of Oracle's value propositions is that it enables users to manage multi-echelon service supply chain challenges effectively, we found no evidence that it possesses true multi-echelon inventory optimization capabilities. Instead, it optimizes each level of the echelon sequentially as opposed to simultaneously.

Key Considerations

Manufacturers should consider Oracle SPP if they are already on the Oracle platform. Bearing this in mind, manufacturers need to recognize that Oracle SPP is available in the Cloud through a legacy system initially designed as an on-premise application. However, the solution integrates effectively with Oracle Field Service and Service Logistics (Spare Management) applications. It incorporates parts returns into the forecasts and can forecast technician trunk stock, which is also a plus.

PTC Servigistics

Overview

PTC's Servigistics software is a purpose-built Service Parts Management (SPM) solution that incorporates the broadest and deepest features in the marketplace. Before PTC acquired Servigistics in 2012, Servigistics had consolidated the service parts management space by merging with Xelus (Click Commerce) in 2009 and acquiring MCA Solutions in 2012. PTC has successfully integrated the best of Xelus and MCA functionality into Servigistics' technically robust architecture. The result is the best-of-breed service parts management solution. An essential underpinning of the Servigistics offering is the application of advanced data science. The forecasting, optimization, and analytics modules take advantage of artificial intelligence (AI), machine learning (ML), and big data analytics. Servigistics has also capitalized on PTC's investment in IoT (ThingWorx) by creating a connected extension that harvests data directly from assets to improve forecasting and positioning inventory.

PTC generates over $1B in annual revenues each year from its broad software portfolio. Servigistics represents approximately 10% of PTC's business, making it by far the largest Service Parts Management (SPM) solution provider. Servigistics has a diverse and global customer presence with a high concentration of customers in North America, Europe, Asia Pacific, and a minority in Latin American and the rest of the world. Servigistics serves customers within multiple vertical market segments. The top four (4) segments in terms of client concentration are Aerospace & Defense (where their FedRAMP 5 SaaS security certification is unique in the industry), High Tech, Heavy Equipment & Machinery, and Medical Devices. The market leaders in these verticals tend to be Servigistics customers. There are a growing number of Servigistics implementations in industrial vehicles / automotive due to extended capabilities into dealer stock planning and collaboration. Servigistics is also increasingly deployed in mid-size and emerging companies. Servigistics has over 200+ customers including John Deere, Komatsu, Boeing, Lockheed Martin, Cisco, Trane, Sysmex, Philips Healthcare, Thermo Fisher Scientific, and the US Air Force.

Core Competencies

Servigistics offers the broadest, deepest, and most configurable array of Service Parts Management (SPM) functionality available in the market. Servigistics leadership and in-house experts, in collaboration with forward-thinking clients, continuously challenge the status quo, which has earned Servigistics the leader distinction in every analyst report ever produced. Differentiating functionality includes parts segmentation, low volume, sporadic demand forecasting, multi-echelon optimization (MEO), multi-source supply planning, connected service parts management, and performance analytics. They also offer an integrated parts pricing tool that shares the Servigistics database. These capabilities were developed over 39 years by acquiring multiple innovative technologies, including LPA, Click Commerce, Xelus, Servigistics, and combined with PTC's acquisition of ThingWorx IoT technology (recognized as the industry-leading IoT platform by Gartner, IDC, Forrester, and others).

By contrast, the next closest vendor has 27 years of development in service parts management technologies and 90 customers. In 2015, PTC successfully merged all of these functionalities into a single unified code base, which equates to nearly $1B in service technology investments. PTC is committed to continued innovation, and the Servigistics solution remains an integral part of PTC's strategic growth goals.

Servigistics' introduction of advanced data science, including machine learning and artificial intelligence, is well documented since 2006. Their strategic vision is to leverage math and data science to change the planning tool and change the way parts planning is done. Their ambition is to achieve semi-autonomous planning, where the combination of human capital and adaptive systems achieve next-level results.

Their optimization engine is the only true multi-echelon tool for a service network available in the market. The ability to optimize all parts across the entire network in one processing run is a crucial distinction. Their multi-echelon optimization (MEO) can simultaneously evaluate an array of service goals, including multiple service level agreement (SLA) / performance-based logistics (PBL) commitments, customer wait time, fill rates, and others. It also supports strategic analysis by modeling changes to the planning model's inputs such as the forecast, service goals, installed base, network configuration and cost, and cube constraints. Organizations who may be new to outcome-based planning could make great use of the modeling capability to evaluate various SLA commitments and the associated parts requirements before offering them to their customers. While Servigistics' algorithms and high-order math are highly sophisticated, the user interface is designed so that planners can rapidly use the tool without extensive training or a comprehensive understanding of statistics.

PTC has worked with recognized academics to accelerate and validate the sophisticated algorithms required to plan complex, multi-echelon networks. The two major contributors are Dr. Jack Muckstadt from Cornell University, Operations Research Department, and Dr. Morris Cohen from the University of Pennsylvania Wharton School of Business. Additionally, their math has been vetted by four independent organizations, including Logistics Management Institute (LMI), Capgemini, Boeing, and Lockheed Martin.

Unique Attributes

Successfully merging three best-of-breed solutions into the current Servigistics code base has created an impressive superset of robust and extremely flexible functionality. Servigistics is the most capable software to deal with the complexities and nuances of service supply chains, elegantly adapting to network configuration, install base size, vertical market focus, demand drivers, and other characteristics.

Servigistics excels in several functional areas. It receives the strongest marks in the areas of inventory optimization. The software can support a broad array of optimization approaches, including but not limited to a single item, Multi-echelon (MEO), Multi-Indenture/Multi-Echelon (MIME), and asset availability optimization. Supply chain experts and academicians agree that MEO/MIME represents the best type of optimization. It is the only model that can achieve service goal targets across all locations and parts simultaneously while recognizing trade-offs between stocking at various locations within the supply chain. This produces the best results for companies that operate large, complex, multi-tier supply chain networks.

Another critical attribute of Servigistics is its ability to run optimization scenarios for any type of part or group of parts. This is made possible through Servigistics Parts Grouping and Parts Relationship functionality, which is extremely flexible. Parts planners can segment or group parts by any type of part attribute, including cost, criticality, demand volumes, etc. There is no limit to the number of criteria for how parts can be segmented or grouped. It can also support part/location groups to represent how planning and service goals would vary for the same part at different echelons/locations (e.g., central stores vs. branch or truck stock).

Servigistics' user interface facilitates the software application's ease of use. The highly configurable interface approaches parts planning from the planner's point of view and role. It allows a planner to see everything within one layered screen. The management by exception criteria within Servigistics is both broad and flexible, allowing the

system to do the bulk of the planning, freeing up the planners to work on the day's critical issues. These issues are presented in a prioritized work queue that is re-evaluated each day, focusing on the most critical issues.

While all service parts management solutions on the market today possess basic demand forecasting capabilities, Servigistics' advanced features make it the industry leader. They have developed unique models for low-volume and sporadic demand and can break the reliance on historical data through the installed base, causal, and IoT connected forecasts. The supply plan efficiently sequences through the sourcing options to maximize the utilization of assets already owned and consequently minimize the requirements for new part orders. When combined with multi-echelon optimization, this holistic approach to supply planning reduces inventory costs to their least amount while maximizing availability. Servigistics has Service Parts Pricing (SPP) capabilities, used by some of the largest parts providers like General Motors, Komatsu, and Nissan. These pricing capabilities can be integrated with parts planning or used standalone.

Servigistics offers a ground-breaking Performance Analytics and Intelligence (PAI) module. Big data analytics, machine learning, and artificial intelligence expose sub-optimized performance with PAI, highlighting opportunities to refine the model or adjust the parameters. This proactive approach to macro-level performance results is the taking-off point for semi-autonomous planning.

Key Considerations

Servigistics is a heavyweight in the Service Parts Management (SPM) market. Multi-echelon optimization (MEO), forecasting and supply planning are fundamental value drivers and differentiators, making it the best fit for companies that manage large, complex supply chains or where service levels agreements or connected assets are significant considerations. These factors have skewed their customer base to large, global companies, but packaging and pricing options make Servigistics a viable option for mid and small-market service organizations. The depth of functionality allows new installations to adopt the capabilities at their own pace. Many customers choose a crawl, walk, run approach, which accelerates deployment and value capture, growing into more sophistication over time. Scale is not an issue as Servigistics optimizes the world's largest service supply chain (US Air Force with over $76B of assets) in one hosted instance of the software. Its strategy of continued innovation and collaboration with the industry thought-leaders in their customer base ensures that Servigistics continues its leadership position.

SAP

Researchers Note: SAP declined our invitation to participate in our benchmark study. The information contained in this section was obtained from primary and secondary research sources, including but not limited to internet research, vendor marketing collateral and resources, and conversations with industry participants.

Overview

SAP, a leading ERP software vendor, delivers Service Parts Management capabilities through its Extended Service Parts Planning (eSPP) and Integrated Business Planning (IBP). These applications work together to deliver the full breadth of capabilities found within a typical SPM solution. eSPP provides basic parts planning, inventory management, and distribution capabilities, while IBP adds advanced inventory planning and optimization feature-functionalities. eSPP was developed in the early 2000s timeframe. The IBP capabilities were added to SAP through the company's acquisition of SmartOps, a leading provider of inventory and service-level optimization software solutions, in 2013.

SAP had total corporate revenue of $33.6 Billion in 2019. The Supply Chain practice within SAP generates approximately $3.9 Billion in revenue in 2018. Supply Chain Planning software, which defines eSPP and IBP, accounted for 41% of this revenue. SAP does not report revenues from eSPP and IBP separately as they are integrated within SAP S/4HANA, SAPs base product. SAP serves a global customer base. Installations of eSPP and IBP can be found within the Aerospace & Defense, Automotive, Industrial Machinery, Hight-Tech, Utilities, and Oil & Gas vertical market segments. eSPP was initially developed for the Automotive Industry. However, it is not clear how many Automotive OEMs are still using this solution, given that SAP declined to share any customer information with us.

Core Competencies

SAP provides its ERP customers with SPM capabilities found within a standard SPM solution through its Extended Service Parts Planning (eSPP) and Integrated Business Planning (IBP) applications. eSPP is an on-premise application available in SAP S/4HANA that provides feature-functionalities for Inventory Planning, Parts Forecasting, Distribution Requirements Planning (DRP), Deployment, Inventory Balancing, Analytics Monitoring, Inbound Delivery Monitoring, and shortage analysis. eSPP was developed in the early 2000s through collaboration with Ford Motor Company and Caterpillar.

eSPP offers basic inventory planning capabilities. It allows an inventory planner to determine whether they should add stock or decrease stock at a specific location to meet demand requirements. IBP provides SAP customers who use eSPP with added enhanced functionality in multi-echelon inventory optimization (MEIO). IBP is a cloud-based solution for sales and operations planning (S&OP) within SAP S/4HANA.

Unique Attributes

Perhaps, the biggest strength of SAP's SPM applications is its seamless integration with broader ERP feature-functionalities found within SAP S/4HANA. However, we learned during our research that the integration between eSPP and IBP is a bit cumbersome. Also, the demand forecasting capabilities within eSPP only considers historical demand. The system doesn't effectively address intermittent demand or consider casual factors that may influence demand. This capability is advantageous when there is no demand history for a part.

One of the drawbacks of eSPP is that the user interface had not been improved since its launch almost 20 years ago. Also, the supply planning activities are performed through the Distribution Requirements planning functionality within eSPP. It relies on the bill of distribution (BOD) to specify how parts will be distributed throughout the supply chain once it is received from the supplier. It doesn't address the nuances and complexities of using returns and repairable/refurbished parts as sources of supply.

The supporting architecture behind eSPP is not well suited for Service exposing scale challenges and processing time issues. The functionality unique to Service are all bolt-on capabilities (reverse logistics/repair, rebalancing inventory, multiple echelons, low volume demand, etc.).

Although an MEO capability is available through IBP, the system has some limitations compared to other products that address MEO. First, eSPP, the system from which IBP receives its input, does not have robust parts grouping and parts relationship capabilities, impacting inventory optimization outcomes. Second, IBP was developed for MEO of finished goods. They are significant differences when it comes to inventory optimization of finished goods versus service parts. However, SAP's reporting and analytics are quite substantial as data warehousing features are embedded within the reporting functionality.

Key Considerations

Manufacturers should consider SAP's SPM product suite if they are already on the SAP platform and their IT department is not open to a third-party solution for SPM. Bearing this criterion in mind, manufacturers should also consider SAP if parts returns or repairs do not play a large role in replenishing or resupplying stocking locations. Furthermore, SAP is an appropriate solution for manufacturers with basic parts grouping requirements such as ABC codes.

Syncron

Researchers Note: Syncron declined our invitation to participate in our benchmark study. The information contained in this section was obtained from primary and secondary research sources, including but not limited to internet research, vendor marketing collateral and resources, and conversations with industry participants.

Overview

Syncron is a privately held company headquartered in Stockholm, Sweden. The company was founded in 1999 with the view that the Aftermarket represents a significant source of competitive differentiation, revenue, profits, and customer loyalty. Syncron has developed a portfolio of spare parts management solutions to support this perspective. These include Syncron Inventory™, a parts planning solution targeted toward OEM owned Supply Chain Networks; Syncron Retail™ for dealer managed inventory; Syncron Price ™ to optimize parts pricing and Syncron Uptime™, and Syncron's IoT solution for calculating uptime metrics. The IoT solution can be used on a standalone basis or as input to its Inventory™ solution.

Syncron serves a global base of 90+ customers, mostly in Europe and North America, with a few in Asia/Pacific and the rest of the world. The company has 12 offices dispersed throughout the United States, UK, Sweden, Italy, France, Poland, India, and Japan. According to Growjo, Syncron's revenues are approximately $66.3 Million. Syncron supports a broad array of vertical markets, including but not limited to agriculture equipment, automotive, energy, HVAC, high technology and electronics, industrial equipment, medical equipment, mining and construction, oil and gas, and railway and shipping. Syncron customers include Vaderstad, ELIT, Al-Futtaim, UNI Carriers, Mekonoman Group, Valmet, and Al Masaood.

Core Capabilities

Syncron Service Cloud serves as the platform for the company's modularized suite of products, including Syncron Inventory™, Syncron Retail ™, Syncron Price ™, and Syncron Uptime ™. These modules provide Syncron customers with capabilities in demand forecasting, inventory planning, stock replenishment, dealer inventory management, parts pricing, global planning, and reporting & analytics. These solutions integrate into existing IoT and Enterprise Systems (ERP, DMS, etc.), allowing end-users the ability to track service parts, eliminate excess and obsolete stock, and forecast parts.

Syncron's focus as an SPM vendor is working with manufacturers who view spare parts management as a competitive differentiator and a source of revenue and profits. The company is embracing the Servitization trend occurring with the manufacturing vertical, which involves the provision of product-as-a-service offerings. Syncron Price™ and Syncron Uptime ™ help facilitate this outcome and play a key in Syncron's Go-To-Market Strategy. Their approach starts with a focus on service parts pricing to improve sales margins. However, the impact of parts forecasting, planning, and stocking decisions is a secondary priority. Syncron Uptime considers available equipment data to

improve parts forecasting accuracy. One important note is that Syncron Price and Syncron Inventory appear to utilize separate databases requiring an additional integration.

Unique Attributes

Syncron emphasizes price optimization and IoT capabilities as key features, though they are not the only vendor to offer them. Syncron's philosophy leading with price optimization is a differentiation for the company. It's unclear the depth of IoT capabilities and how this contributes to service parts management outcomes. It appears to be disconnected from the forecasting of parts, which is a capability in alignment with industry trends.

Syncron's dealer module, Syncron Retail ™, has gained market adoption within industry verticals that go to market predominately through dealer channels. For example, Automotive, Heavy Industry, and Agriculture. The product allows dealers to plan their inventory and negotiate buy-back with the manufacturer.

Syncron scores well on its user interface feature-functionality. It has a simple to use exception-based interface which facilitates inventory management for millions of product locations across global supply chains. The Parts Grouping and Parts Relationship feature-functionality permit the parts planner to identify unique customers and parts across the entire supply chain.

Syncron is fully capable of supporting single item optimization and cost optimization models regarding inventory management and optimization. Although the solution is capable of planning parts within a multi-echelon network, the optimization algorithm plans stock level sequentially at each echelon level as opposed to simultaneously. It uses multi-Pareto product segmentation to calculate the right stock level for any given location as a function of targeted customer service levels. Syncron appears to offer basic forecasting capabilities, which are common in the SPM market. Syncron was initially developed for use in the Automotive and Agriculture industries where the OEM does not have much visibility or control over the install base. As such, we have not determined if Syncron can effectively address failure patterns and causal factors where demand patterns of the install base are known. Unlike best-of-breed solutions, which have independent 3rd party value validation, Syncron has only internal validation, a concern for many discerning manufacturers.

Key Considerations

Manufacturers attempting to generate a larger percentage of total corporate revenue from the sale of aftermarket spare parts should consider Syncron for its price optimization feature functionality. They could also consider Syncron if their products are IoT enabled and spare parts availability is critical to PaaS agreements. Syncron is also a viable choice for manufacturers who encourage their dealer channels to manage their own (dealer-owned) inventory and permit inventory buy-backs from their dealers.

FUNCTIONAL COMPARISON OF VENDORS
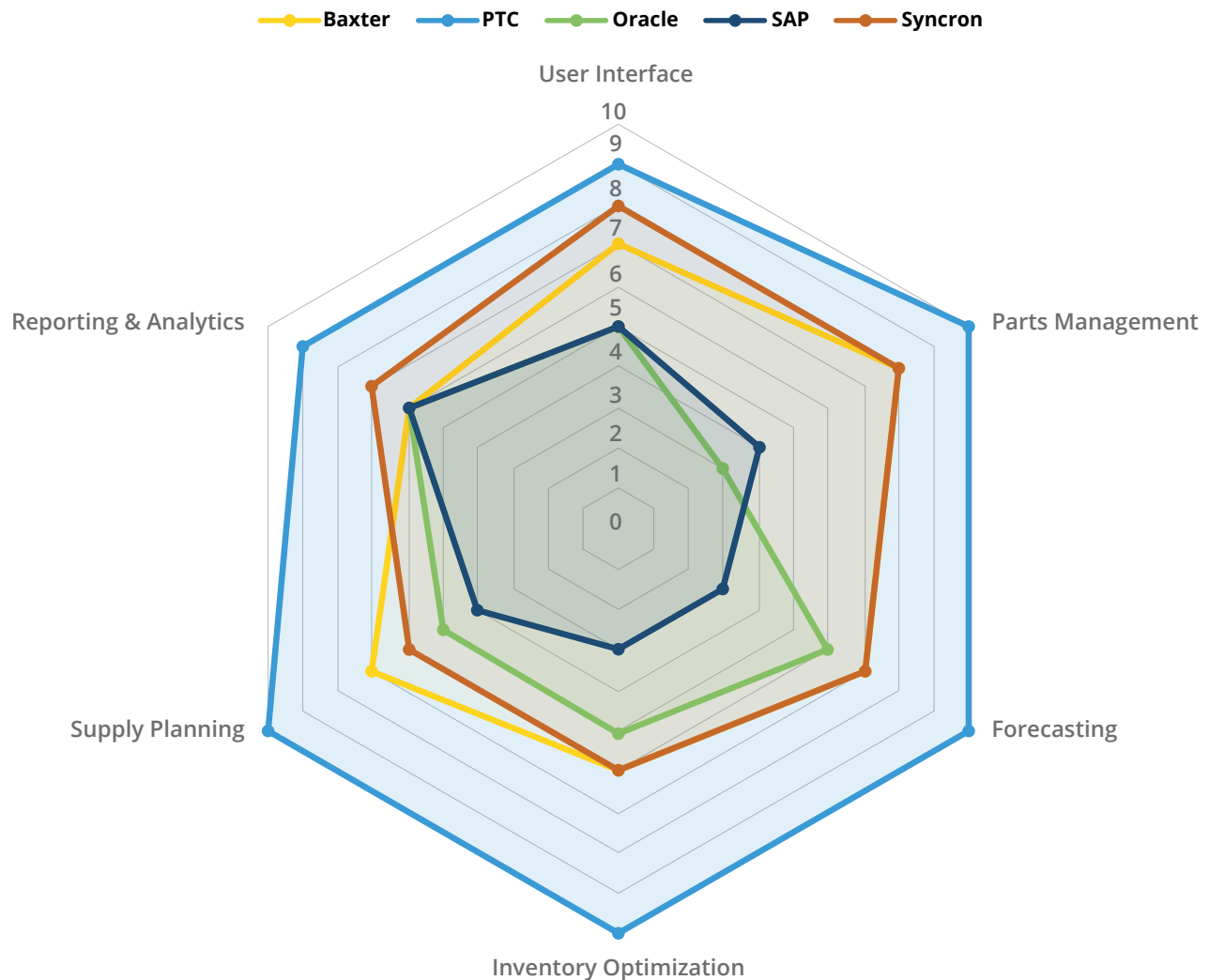
Appendix

Reading the Blumberg Service Parts Management (SPM) State of the Art Benchmark Evaluation Graphs

For this analysis, Blumberg divided potential key measures for success into two primary categories: Product Capabilities and SPM Innovation and Expertise.

Positioning on the y-axis reflects the vendor's product capabilities from a feature functionality perspective and how well aligned these capabilities are to meeting the service parts planning requirements of organizations with complex service supply chains. Blumberg considered several criteria in assessing product capabilities, including the vendor's optimization approach and forecasting capabilities, incorporation of data sciences, depth of features, system flexibility, and ease of use.

Positioning on the x-axis or strategies axis evaluates the vendor's Service Supply Chain focus in terms of their ability to meet current and emerging market needs. The Service Supply Chain focus category considers the sheer market presence and understanding, experience, and expertise in dealing with complex supply chains and product vision.

The Blumberg SPM Benchmark Analysis's vendor markers represent each respective vendor's estimated market share and revenue within the Spare Parts Management software market.

In this study, vendors ended up in either the Expert, Experienced, or Basic categories because of the ability to deliver to the varied needs and processes of Service Supply Chain issues across a wide array of vertical market segments and use cases.

In addition to the vendor positioning chart, Blumberg evaluated the product functionality within each of the vendors' solutions to support the forecasting, planning, and optimization requirements of very large, complex service supply chains. We also considered several aspects of the functionality, including but not limited to the level of flexibility, depth of features, degree of innovation, incorporation of data science techniques, and recency of updates or refreshes. For definition purposes, a large complex service supply chain is characterized by a high volume of SKUs, multiple locations, and numerous echelons. We used a rating scale of 1 to 10, where 1 equals low and 10 equals excellent.

Objectives

In conducting this study, Blumberg set out to accomplish several objectives. In general, the report is designed to educate Service Supply Chain Executives on the strategic value and importance of Service Parts Management (SPM) to a company's financial and operational performance. It is useful to define the core feature-functionality found within a state-of-the-art SPM solution to compare each vendor's breadth and depth better. These definitions also help Service leaders evaluate the potential impacts on Service Supply Chain operations and performance outcomes. More specifically, this report is designed to provide an independent benchmark evaluation and profiling of vendors based on the following criteria – feature functionality, vertical market focus, core competencies, use cases, current and planned innovations.

Methodology

Vendors selected for inclusion in this report were based on Blumberg's knowledge of the SPM market and well-researched judgment about specific vendors. Blumberg relied on a wide array of data sources in developing vendor profiles, evaluations, and comparison scores. These sources included reviewing publicly available information, whitepapers and literature, structured discussions and data collection processes with vendors, and interviews with thought leaders, industry consultants, and end-users.

Definitions

For inclusion in this report, vendors had to meet the following definition of Spare Parts Management: A software solution that contains critical feature functionalities to forecast, plan and manage spare parts demand, inventory stock levels and locations, and replenishment orders. Additionally, these activities must occur within the context of operating an aftermarket service supply chain.

Concerning specific evaluation criteria related to vendor capabilities, the following definitions were utilized:

- Optimization Approach: Refers to the array of inventory optimization models supported by each vendor, including single item, multi-item, Multi-echelon (MEO), Multi-Indenture/Multi-Echelon (MIME), and asset availability optimization.

- Forecasting Capabilities: Considers the range of demand forecasting techniques to predict seasonal, intermittent, and fixed demand. It also considers the system's ability to incorporate failure rate and casual forecasting techniques as well as the level of IoT enablement.

- Incorporation of Data Sciences: The amount of AI and Machine Learning capabilities integrated into system feature functionality, the length of time these capabilities have been present in the system, and the granularity of the vendor's roadmaps for adding new data science capabilities.

- Vision: Considers the vendor's pace of innovation, understanding of current and the emerging market wants and needs, and product road map concerning current and planned system developments and enhancements.

- Depth of Features: The level of complexity of the features that support vendor functionality.

- Vertical Markets Served: Considers the number of vertical markets where a vendor has a customer presence, the number of customers in each vertical, and how capable the vendor's feature functionality is in supporting the specific complexities and nuances of that vertical.

- Service Supply Chain Expertise: Considers if the vendor's SPM solution was developed explicitly for use in Service Supply Chain applications, the years of experience supporting Service Supply Chain SPM applications, as well as the depth of knowledge, experience, and credentials the vendor's team has in the area of Service Supply Chain Planning.

- Flexibility & Ease of Use: Refers to the user interface, system flexibility, and application ease of use. Also, it refers to the level of training and knowledge required by a planner to use the system and adopt the solution to their company's needs.

Definitions related to SPM functionalities are found in the Spare Parts Management State of the Art section of this report.

Synopsis

This Blumberg Advisory Group report is designed to educate Service Supply Chain Executives on the strategic value and importance of Service Parts Management (SPM) to a company's financial and operational performance as well as provide an independent benchmark evaluation and profiling of vendor capabilities.

"Spare parts represent the single largest investment and second-largest expense when it comes to running a product service business. This is true regardless of whether Aftermarket Service operates as a cost center, revenue center, or profit center", says Michael Blumberg, president, Blumberg Advisory Group. "Additionally, several industry trends including Servitization, Circular Economy, and a tsunami of technological innovations have placed even greater pressure on Service Leaders and Supply Chain Managers to be as effective as possible when it comes to forecasting, managing, and ordering spare parts."

About Blumberg Advisory Group

Blumberg Advisory Group, Inc. is a leading research and consulting firm in the Aftermarket Service Industry and a pioneer in helping companies operate Service strategically to increase profits. Through market research, benchmarking, and consultant studies, Blumberg helps companies identify, evaluate, and implement technologies to improve the productivity, efficiency, and quality of Field Service and Service Supply Chain operations. Blumberg works to improve company profits through strategic Service, assisting in developing and implementing profitable business strategies based on the principle that Service is optimal when managed as a separate, strategic, and profitable business. Visit http://www.BlumbergAdvisor.com.