Towards a Consumer-Oriented Supply Chain

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Topic Area: Strategy, Fulfillment, Forecasting

Summary: A retailer and a vendor, sponsors of this project, asked how a consumer (not customer) oriented supply chain is defined and what techniques can they use to effectively implement one? Our methodology to define one consists of interviews with key stakeholders/industry experts, literature research, value stream mapping and data analysis of historical sales and shipments between the sponsors. We define the consumer-oriented supply chain and propose a roadmap with short-term and long-term steps towards it.

KEY INSIGHTS

1. A consumer-oriented supply chain is triggered by consumer demand data and requires strong collaboration between retailers and vendors.

2. One of the most important parts of collaboration is forecasting.

3. A single, synchronized forecasting of consumer demand would help both retailers and vendors operate in a more efficient and collaborative way.

Introduction

Is a consumer-oriented supply chain the future of the supply chain industry? Our research examines how a consumer-oriented supply chain is defined and how retailers and vendors can move towards such supply chain. We conclude that a consumer-oriented supply chain is triggered by consumer demand data (point of sales-POS) and requires strong collaboration between retailers and vendors.

This research takes place through the sponsorship of two companies. Company A ("the retailer") is a multinational retail company that operates supermarkets on three different continents. Company B ("the vendor") is a multinational consumer packaged goods (CPG) company with global operations.

The major problem that we identified is the lack of meaningful communication between the retailer and the vendor, in terms of replenishment process. Our research focuses on how the retailer and the vendor can collaborate to build a more effective replenishment system. We built three different scenarios for future collaboration and
propose a high level roadmap with short-term and long-term steps to move towards a consumer-oriented supply chain.

Methodology

The methodology is based on a spiral approach, with three steps: define the present, analyze current conditions and depict the future. To define the present we used a Value Stream Map, for the analysis we collected data and assessed existing forecasts, and for the future state we used a Roadmap. The spiral approach helps us to learn from findings and to extrapolate results, aiming to find new insights. Initially, we focused on a single part of the existing supply chain, the ordering system. As we moved forward in the analysis, we included replenishment, forecasting and technology. This changed our perceptions of the real main issue.

The Value Stream Mapping is a tool that illustrates the existing process of replenishment between the retailer and the vendor. The Map helps visualize product and information flows. It is also valuable to assess the interaction of different systems such as replenishment, forecasting and communication. We used Value Stream Mapping to depict the existing conditions and future conditions. In addition, we employed systems thinking methods to enhance the understanding of information and product flow, and to identify feedback loops created in the system.

For the Analysis, we retrieved quantitative and qualitative data from forecasting, replenishment and POS systems. Additionally, a series of interviews with key stakeholders and visits to the premises of the retailer strengthened our qualitative understanding. Once the data was collected, the analysis retrieved insights of the replenishment process and the overall performance of participants. With the numbers, we evaluated the performance of Vendor and Retailer forecasts, this by comparing specific products in one category. To select the product, we performed SKU segmentation and defined comparison metrics. For the comparison, we used the Mean Average Percent Error (MAPE) metric. The analysis supports the main deliverable, the roadmap, and the conclusions.

Finally, the Roadmap incorporates the potential improvements of the forecast and replenishment processes. After identifying the potential future state, the final part of our method presents a proposal for improvement. These recommendations target people, processes and technologies, this will help both companies understand how their future collaboration could work. In this part we also present the short-term and long-term steps to shift from the existing to the future state.

Existing Value Stream Map

A Value Stream Map is a powerful tool that shows the conditions of business operations. It provides visual insights and ideas of possible corrections and improvements. Additionally, the map can function as a strategic management tool, an agreement document among the different actors.

The most common replenishment process used by stakeholders is a Vendor Management Inventory System (VMI). Figure 1 shows VMI process. Everything begins with a purchase by a consumer. The transaction is registered in a system as POS data. At the retail level, Computer Assisted Ordering (CAO) is responsible for store replenishment. On the store side, Tool #1a retrieves POS data from registers and provides information for stock, quantity on hand (QOH) and sales. On the DC side, ERP #1 gets daily information from Tool #1a. ERP #1 uses established planograms from category managers, sales history, price, promotions and delivery schedules to generate a weekly demand forecast. With this forecast and inventory position, stores generate orders for replenishment.

Tool #1c is the forecasting software that the retailer utilizes to create forecasts for the turn products and help the forecast analysts with the promotional and exceptional items (main input is the store pulls). The category management, pricing and merchandising departments of the retailer create the promotional information. Tool #1c uses the historical demand of the Retailer’s DCs and the promotional information to create a three-week forecast per product. The software creates red flags if it identifies significant changes in the forecast of a SKU. The inventory analysts receive the forecast for exceptions as well as red flags from Tool #1c.

The inventory analysts do not create a purchase order (PO) in the VMI process. On the contrary, analysts will use the information they receive (forecasts of exceptions and red flags) to resolve any issues that may come up in the weekly collaboration meeting between the retailer and the vendor.
To assess collaboration and performance under VMI, we carried out an analysis of existing forecast for four SKUs. In this paper we are showing only one. Figure 2 shows the forecasts, vendor replenishment and the POS data for the initial 25 weeks of 2014. With a CV of 0.76, this product has considerable volatility. The forecast with the lowest MAPE, 0.55 comes from the vendor, while the Store and DC forecasts have a MAPE of 0.64 and 0.74 respectively. Vendor replenishment is responsive, with collaboration during peak periods, following store forecasts. A product with this volatility requires collaboration, which sponsor companies are implementing, though there is room for improvement.

The AS-IS value stream mapping helped us understand the needs of the stakeholders, while the data analysis indicated a number of potential future explorations. By utilizing these tools, we identified opportunities to improve the existing replenishment process and accuracy. We created three alternative scenarios of future collaboration.

The main differentiation factor of the alternative scenarios is the forecasting process. The scenarios include Hybrid Forecast Replenishment Process, Retailer-Level Forecast Replenishment Process and Vendor-Level Forecast Replenishment Process. We incorporated these scenarios as steps into the roadmap towards a consumer oriented supply chain. The complete roadmap (Figure 3) consists of the scenarios and additional short-term and long-term steps as depicted in the following picture.

The first step is to establish the goals for the improvement process. KPIs will also be formed to evaluate the improvements.

The second step is to establish an initial collaboration. VMI is a good process to reveal whether the retailer and the vendor can effectively collaborate. The retailer and the vendor should also examine the compatibility between their Information

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**Figure 1 Existing VMI Process**

**Figure 2 Forecast Comparison SKU2**

**Future Roadmap**
Technology (IT) systems and identify future IT technological needs.

Figure 3 Roadmap towards a consumer-oriented supply chain

The third step is to perform a study to identify if the use of POS data (and/or store pulls) improves the forecast accuracy. The proposed study would compare the forecast accuracy of existing forecasts with future POS data driven forecasts for a long period of time.

The fourth step is to perform a study to identify if the deployment (store replenishment) system is flexible enough. A flexible deployment system equals to the capability of easy truck schedule changes and requires no store level forecast. As a result of the fourth step, the retailer and the vendor would implement the Hybrid Forecast Replenishment Process scenario. In this scenario a retailer- and vendor-level forecast will be created. The retailer team would collaborate with the vendor team in weekly meetings to reach forecast consensus and create the purchase order (PO).

The fifth step (first of the long-term steps) is to perform a study to identify per product category the company that makes a more accurate forecast. As a result of the fourth step, the retailer and the vendor would implement either the Retailer-Level Forecast Replenishment Process scenario or the Vendor-Level Forecast Replenishment Process. This means that only the retailer or the vendor will create the forecast and the other party will participate in the weekly meetings to give feedback on promotional products and new launches. The party that will do the forecast will create the PO.

The sixth and final step is to perform a study to identify what requirements the preparation of store orders in the mixing centers of the vendor creates. The goal is to understand whether there is a significant return on investment for the vendor to offer such a service and if there is real benefit for the retailer.

Conclusions

The questions raised in this thesis were: How is a consumer-oriented supply chain defined, and how can the retailer and the vendor move towards it? We conclude that a consumer-oriented supply chain consists of two elements. The first is that it is triggered by consumer demand data (POS). The second element is that it requires a strong collaboration between the retailer and the vendor.

Our research demonstrates that the forecasting process is a significant element of the desired collaboration. A single, synchronized forecasting of the consumer demand would help both companies operate in a more synchronized and collaborative way. This forecast would be the one and only truth that both companies would believe to plan their operations.

We propose a roadmap with short and long term steps to move towards a consumer-oriented supply chain. In each major step of the roadmap, a data-driven study needs to take place in order to justify the respective change. These studies are a reference for future projects and research for the two companies. The most crucial studies include in what extent the use of POS data improve the accuracy of the forecasts and which company performs a more accurate forecast per product category.