The supply chain transformation sequence matters.
Transformation sequence

Introduction

Some supply chain professionals and even academics get lost in the detail of their job or area of research and don't have a clear view of how the various elements of a supply chain / operations environment should work together. It's not easy to know how to integrate the myriad of processes, plants, warehouses, tools, improvement initiatives, systems, data & analytics. This knowledge is not only vital to the company's performance but also vital for job satisfaction. Everyone needs to know how their efforts are contributing to the greater good.

When a surgeon performs surgery, the order of the activities matters. The surgeon washes his hands, uses pre-sterilized instruments, has the patient anesthetized, has the operating room prepared, maps out the surgery to be performed.....and many more steps are followed, in sequence. It matters that surgeons wash their hands before performing surgery. And, we could use many other examples from baking bread to starting and driving a car and so on. There are some very fundamental elements, that if not followed in proper sequence, will ruin the proverbial loaf of bread. And so it is with building proper supply chains...an ad hoc approach can be ruinous.

We see today that most supply chain models, processes, designs and structures have simply evolved over time from a series of isolated decisions and reactions to mergers, acquisitions, new customers, suppliers, etc. They were good decisions at the time, but what is the result of all of these isolated decisions and actions? Usually, it's a dis-integrated, tangled web of activities that depends upon highly-customized software and all sorts of manual machinations in order to simply process orders, manufacture products and ship to customers.

Most the time, the priority projects within the supply chain are reactive, based upon an executive's or customer's complaint. Think for a moment about the recent or current supply chain projects underway at your company. Do any of these look familiar?

• Reduce inventory
• Improve customer delivery times, service levels, order to deliver times...
• Improve forecast accuracy
• Do something to help us be "bi-modal" - operating the day to day whilst still focusing on game-changing innovation.
• Focus on the latest technology. Digital supply chain, supply chain digitalization or something of the sort.
  • Leverage big data and analytics, or even cognitive analytics to improve operations
  • Can we use Blockchain?
  • How about artificial intelligence, machine learning, machine to machine connectivity...?
  • IoT?
• Robotics, virtual reality, 3D printing?...the list could go on and on.

These projects are probably all good, deemed as important, and ones that executives want to see implemented or tested. However, all the buzz about new technologies and supply chain innovations will ultimately be hinderances unless they are built upon or are enhancements to a solid supply chain foundation. They will in fact become counter-productive, contributing to the tangled web of activities, technologies and disintegration if not built on a proper foundation.

In the midst of all of these projects and improvement efforts, there is usually a call for a reset - a supply chain transformation or holistic operational improvement effort. We’ve been involved in several of these activities over the years, across several companies. We’ve followed enterprise process frameworks and process maps to improve and move to standard, ”best-practice” processes. We’ve used assessments and maturity models, value stream mapping, and many other tools and approaches to create the right supporting operational structure for a given company. These valiant efforts usually improved supply chain performance, but usually fell short of the transformational effect we were pursuing.

We’ve learned through these experiences that there are critical elements that must be in place for a supply chain to operate at optimum levels. This short paper is an attempt to outline these elements and describe the sequence of activities we recommend to ensure a properly aligned and optimized supply chain foundation. The largest gains in operational efficiency, cost structure, and service levels are only possible through these foundational improvements.

What follows is a short summary of the steps and then a paragraph giving a brief overview of each principle activity. There are some activities which must be done in exact order. There are also cases where activities can be performed in parallel or in a slightly varied sequence.

The Sequence:

1. Ensure the company’s strategy and its Customer Value Proposition (CVP) are in-sync.
2. Align the operating strategy.
3. Analyze and optimize the portfolio.
5. Map the current supply chain & identify the optimal network design.
6. Optimize inventory.
7. Measure, mitigate, monitor and manage risk.
8. Implement a configure price quote (CPQ) engine or update the one you have.
9. Automate the order management system.

1. Ensure the company's strategy and the customer value proposition are in-sync.

Does the company have or know its unique "customer value proposition"? It may be a given and understood by everyone in the company. In some companies, however, there's not a clear understanding as to why customers really buy the primary products or services. Companies often fool themselves into thinking that they are or can become all things to all people: That they can be 1) the most innovative, 2) the lowest cost and 3) have the highest levels of customer service in their industry and beyond.

We often see the company strategy being overly aspirational. Having an aligning, long-term vision is good, but there also needs to be a clearly stated understanding about the core of the business and which of the 3 value propositions will be the overriding target.

If you suspect there is a lack of alignment here, start by simply asking a sample of customers why they are customers, and check the corporate strategy to gauge alignment. If there is good alignment between the CVP and corporate strategy, go to the next step in the sequence. If not, highlight the issue, tell the corporate strategy team to get it fixed and base your CVP and next step alignment on what you heard from the sample of customers.

2. Align the operating strategy.

Aligning the operating strategy is very intuitive. The chart above provides some well-known examples. Be sure that the operating strategy simply supports the CVP. If the customer value proposition is "be the best in customer service", make sure the operating model is one that provides the highest levels of customer service, minimum order to delivery times, etc. From the chart, notice that Walmart's operating strategy firmly supports their customer value proposition of everyday low prices. Ensure the company's strategy is as clearly aligned.
Once the operating strategy is well aligned, it’s time to identify the best supporting operating model(s) and then perform portfolio analysis and supply chain segmentation. In these steps, we determine which products and offerings are best supported by which operating model. See the following white paper on the subject of segmentation for a more comprehensive explanation. http://vchain.blogspot.com/2013/04/supply-chain-segmentation-whitepaper.html. We start with portfolio analysis.

3. Analyze the portfolio.

Be sure to work in-conjunction with product management to improve the portfolio and through the processes of consistent evaluation, introduction, and end-of-life of products/offerings. Let the analysis be a guide and try to have a data-driven discussion. Here are the primary steps to follow:

1. Plot a recent demand profile graph of finished goods, components or common raw materials where there may be an opportunity for consolidation. Consider starting with a particular component or group of products. Plot by average demand (y-axis) and variability of that demand (x-axis). Use the standard deviation of demand divided by the average demand to calculate variability. What you will see will be something along the lines of this graph here. Notice which products are high volume/low variability "high-runners" and which are your low volume and high variability "low-runners". A lot of insight can be gathered from just this first simple graph. The high runners always have an understated profitability because of the way costs are mis-applied on a per unit basis. The low runners always have overstated profitability because on a per unit basis they are bearing too little of the overhead costs.

2. To identify proper costs and profitability, start by doing some sample ABC costing on representative products from the high and low runner categories. If you need some help with how to do ABC costing correctly, there are plenty of articles that can point you in the right direction. But the task is to track how much of the overhead costs (manufacturing, production line set up, inventory management and control) these sample products consume on a per unit basis. It’s much more efficient on a per unit basis to manage the
high-runner products than it is to manage the low-runner products. Thus, the overstating of per unit profitability. Determine the right cost allocation percentages and apply those to the high runner and low runner products being analyzed.

3. With this analysis in hand and costs corrected, begin to discuss ways to simplify the portfolio. Are there components or products from the low runner category that can be eliminated in favor of a high runner component? As components are analyzed, one goal should be the identification of the core building blocks used to create products. A rationalized set of components becomes the standard building blocks of the portfolio. They serve as the basis for the configure - price - quote engine described in more detail below.

4. Portfolio analysis also helps to finalize the operating model identification and segmentation. High-runner products and components should be held close to customer demand, while low-runners should be held back in the supply chain until demand is realized. So a "BTS-build to stock" model for high-runners and a "MTO-make to order or ETO-engineer to order" model for low-runner products. These assignments will serve as a key input into final segmentation and operating model assignments.


To finalize the decision of which operating model(s) are most appropriate for which parts of the business, consider segmentation. Segmentation assigns customers, products and suppliers to the appropriate operating models.

- Let's start with the products as this will drive the customer and supplier assignments as well. When the products and components are grouped into the high runner and low runner categories and the rationalization process is sufficiently performed, this provides the initial segmentation decision. The high runners receive a push (build to stock or make to stock) assignment whilst the low runners receive a pull (configure to order, make to order, engineer) to order assignment. There are also cases when a configure to order model may be assigned to high runner products when final differentiation is delayed until the point of order.
- Once the product push/pull boundary assignments are made, assess lead time, planning horizon, where inventory should be held, production batch size, and product...
characteristics to further refine the assignments. See the chart above for further guidance. This chart comes from segmentation performed at Dell by Professor David Simchi-Levi.  

- Next, consider the supplier groupings and model assignments. Analyze which components are now coming from which suppliers. Are they providing high runner or low runner components? Consider changing sourcing policies accordingly. Pool sourcing around those high runner components. Ensure risk is assessed and mitigated (more info on this below) with high runner components being held close to points of assembly. 

- Finally, consider the customer groupings and model assignments. Analyze which products customers are purchasing. Are they purchasing high runner or low runner products? Do an updated cost-to-serve analysis now that product and component costs are more accurate. Assess customer profitability. Also analyze the customer service level or lead time requirements for different customers and customer groups in light of the updated cost to serve and customer profitability insights. 

- Finalize the operating model assignments and continue to improve and refine as new data and insight arises.

5. Map the current value stream & identify the optimal network design.

First a comment about data readiness. Data readiness and quality gaps will start to be exposed in the portfolio analysis and segmentation exercises. Ideally, companies have a well integrated data platform or an enterprise data warehouse that aggregates data from source systems and keeps it fresh for data models to consume and feed analytics tools and optimization engines. However, this is rarely the case. 80-90% of the time and effort spent on most operational optimization projects is gathering, cleansing, de-duplicating data in order to build accurate data models. To be effective, data models must be an accurate representation of the business performance. Otherwise, they cannot be an accurate predictor of future performance.

Once data is gathered, cleansed, de-duplicated...as needed, use one of the leading network optimization tools or services. Consider a representative product or two if you want to pilot the use of the tool, but be sure to quickly move to a holistic approach. Identify a 6 month or more demand profile, identify customer locations and the current physical footprint of plants, assembly facilities, warehouses, etc, then start to expand across the highest priority suppliers and distributors. The data model for the optimization tool will serve as a guide for the data collection based upon the required fields.

Once an accurate map and model is achieved, the tool will provide several insights. 

1- Based upon the current locations, plants, warehouses, etc, which customers should I serve from which locations. And which logistic routes or modes should be used in that fulfillment.
2- Next, if I could move my current facilities, where would I optimally locate my plants, warehouses, etc to further maximize fulfillment service levels and minimize costs. This map can serve as a model for moving current locations or adjusting physical facilities over time.

Eventually, an optimized network map that looks something like this will be achieved. Be sure the data model is accurate and constantly updated based on demand history and forecast information.

Finally, be sure to perform inventory optimization. The goal with network and inventory optimization is to run them together so we can determine... how much of a given product or component should be produced and stored in order to maximize customer service levels and minimize costs?

6. Optimize inventory.

Here again, let the optimization tool and data fields serve as a guide. Maybe start with a representative product family or two and perform a pilot, but be sure to quickly take a holistic approach to inventory optimization. Again, we want to identify how much of what product (finished good, component, raw material...) to hold and where it should be held / produced / assembled to maximize our customer service and minimize our costs. The wider the scope of the optimization, the more optimal the result. So, start with a specific product or component group, then quickly incorporate the entire portfolio. Once internal inventory is optimized, move quickly to include contract manufacturers, tier 1 and critical parts suppliers, and downstream channels.

The inventory model will leverage the information and data provided for network optimization.

The first run of analytics will produce what we call an optimized baseline. It will show how much inventory is in the system today for a given lead time or customer service level.
It highlights the product or component set being analyzed and the mismatch between this inventory level, current customer service level and the "optimized baseline". The optimized baseline shows the customer service level or lead time that could be achieved with proper inventory levels and positioning. Scenario analysis is then run against the model for further investigation and refinement. To the extent the model is extended across more products and supply chain tiers, the more efficiencies across the value chain are identified.

Keep the network and inventory models constantly up to date by using live data feeds to enrich the model. Planners and forecasters should become familiar with how to read the common base of analysis that the tools run. They should also familiarize themselves with how to run scenarios of their own. This is far and away the best way to improve forecast accuracy. If demand for this product climbs or dips, the tool will be able to give guidance on the adjusted inventory that needs to be held. If lead time increases or decreases, if customer delivery location changes...etc, etc. Any number of scenarios can be run.

7. Measure, mitigate, monitor, and manage risk.
Once the locations and inventory are optimized, the network design work and mapping of nodes afford the opportunity to measure and manage risk more quantitatively. Many companies ignore the measure part completely, but this may be the most important step. This allows for a proactive approach to risk management instead of constantly responding to events as they occur.

1. Measure. Using the network model to identify nodes in the supply chain will provide a good foundation. Quantify an amount of risk at each node. Do this by assessing the lost sales that would occur during an outage at each location. (Use lost hours, days or weeks as appropriate.). Find the hot spots in the network, those that create the greatest exposure. Proactively target those hot spots to tamper or mitigate the risk. This quantitative approach to risk measurement was pioneered by my former colleague, David Simchi-Levi².
2. Mitigate. Address the hot spots across the supply base in priority order. Consider duplicate or alternative sources of supply, duplicate locations, other materials or components and other sourcing strategies to mitigate risk.

3. Monitor. Add monitoring capabilities and data feeds that raise alerts to potential disruptions. Disruptions can be events out of our control (weather, geopolitical, economic, market...) or they can be somewhat known and controllable risks. Resilinc and other software tools can be used to monitor and keep the information together.

4. Manage and look to "machine" risk. There is still the need to respond to events as they occur. Having a monitoring platform in conjunction with risk planning and response mechanisms in place is helpful. Follow response protocols and tools in tandem to respond to disruptions as they occur. By machine, we mean utilize machine-to-machine communication and automation in order to trigger alerts and responses to events across the supply chain. Responses that will occur immediately and automatically, without the need for human recognition and involvement.

8. Implement configure price quote (CPQ).

Because of the hard work of portfolio analysis and rationalization previously performed, a configuration engine is the next prioritized task. A configuration engine based on those standard building blocks allows sales teams, engineers or even customers to dynamically configure solutions. If a configuration engine already exists, be sure it is updated with the standard building block components. Multiple configurators are sometimes appropriate for product segments that don't share the same standard building blocks. The configuration engine with configure-price-quote (CPQ) functionality is the heart of order management and ecommerce systems.

9. Automate the order management system.

With a configurator in place, we can now automate order management (OM) and fulfillment process. What may take multiple manual touches, validations, and interventions today, can quickly be automated because of the preceding steps performed. This is where the benefits of the preceding steps starts to really shine. The order management system is the beating heart of the supply chain. It should be tightly linked to the configuration engine so that when a solution is configured, an order may be immediately placed.

Today’s order management systems will dynamically fulfill orders based upon optimized inventory and locations; pulling or assembling orders based upon the most optimal route of fulfillment, assuming the network and inventory optimization was previously performed. These new platforms are capable of handing orders from all different sales channels. They are also able to send dynamic sourcing signals to optimized supplier locations to replenish or source inventory to optimally fulfill customer orders.
Conclusion

Once these steps are followed and the foundational elements are in place, then all of the latest and greatest tools and techniques can be explored and incorporated into the supply chain as appropriate. It makes no sense focusing on anything else until the steps of the sequence have been followed and this foundation is in place.

But notice the power of having a solid foundation. If strategies are aligned, segments defined, portfolios, networks and inventory optimized, risk measured, mitigate and proactively managed and the core technologies of CPQ and automated order management in place...it will be the best performing operation in the industry. Customer service levels and costs will be optimized, revenue and profits will soar. Familiarity with the sequence will help identify missing foundational items and highlight needed course corrections whilst creating a clear vision and roadmap to follow.

As supply chain professionals, we are often lost in our own world of process improvement or focused on a specific project or aspect of the operations of the company. It helps tremendously to see the relationship between activities, and the overall goals, and objectives amidst the daily work and tasks. Familiarity with the sequence will help anyone involved in the supply chain understand the importance of their individual contribution.

Feel free to share your experience and insight:
- What steps have you followed that have proven successful?
- Would you insert any additional steps into the sequence?
- What tools/techniques have proven beneficial in your transformation journeys?

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https://apps.wpcarey.asu.edu/directory/people/profile.cfm?person=2259333

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Works Cited: