THE ART AND SCIENCE OF SUPPLY CHAIN PLANNING

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BUSINESS REPORTER KNOWLEDGE HUB

CONTENTS

INTRODUCTION

- The perfect world of the supply chain
- Obstacles we are tackling in this Business Masterclass
- Changes in operations and sales

Imagine a future for your business where your inventory is always holding a balanced number of items that you need. Imagine that your forecast of sales and production is so accurate that you have neither scarcity nor surplus inventory. And imagine that you have the highest resolution map of your markets, and you can always spot the most important segment of customers without any doubt. You can target the top decision makers with the perfect offer at the perfect moment in time.

We all want to live in this perfect world, but inefficiencies and risks are standing in our way. The good news is that we can identify and remove many of those obstacles. It's a bold mission. And we need to work hard to change the current supply chain and sales and operational methods, probably even changing mindset. But once we succeed, we will lead the pack in our markets. In this crash course, we identify the key obstacles and how to remove them one by one.

> "The good news is that we can identify and remove many of those obstacles. It's a bold mission."

We follow reversed order and start with the customers so that we can reach the internal organisation needs. First, we talk about your customers, markets, and demands. We share a few strong methods for the prioritisation and segmentation of them. Then we move on to discuss the products and their design that you offer to your market. Now that we know the products and to whom we are selling, it's time to analyse what strong inventory management needs.

For proper inventories, we must be accurate with forecasting, as well as understanding the details about inventories and planning where we can address the long supply chain tail. We should talk about the organisational heroes and the capacity models, as these represent everyday challenges in our organisation. Finally, we bring all these elements together and talk about sales and operational change management.

HOW TO PRIORITISE THE CUSTOMER

- The importance of profile building
- Prioritisation of customer segments
- Case study

It's a noble cause to aspire to be all things to all customers, but it can be very difficult to say no to a customer when it comes to supporting their requests. What are the considerations we need to take into account to better support your customers? This is really an exercise in profile building. Consider the following when identifying what makes the customer important to you. Is it volume, is it revenue, is it how much money you're making from them, or is it your strategic relationship with them?

We need to balance the qualitative as well as the quantitative attributes of what makes a customer important. And we need to remove some of the emotion that is typically involved. Multiple organisations prioritise for different reasons. Finance is obviously worried about how much money we are making, how much volume we are selling. Sales wants to be able to support that customer. And customer relations is involved with answering all the questions that they may have.

In order to meet these requirements, we need to find a scoring model that will place each customer into one of, say, three or four prioritised segments or groups. When applying that model, we look at how we sell to our existing customers, as well as acquiring new ones. The result is supporting the customers that are most important to you and balancing their needs.

"We need to find a scoring model that will place each customer into one of, say, three or four prioritised segments or groups."

Let's look at an example. We have two customers. The first customer buys large volumes of many different products month after month after month. The second customer only buys some products intermittently. We now have a case where both customers are buying the same product. We don't have enough to support both of their needs.

How do we prioritise? Through our segmentation, we've probably recognised that first customer as being a higher-segmented customer. They're high volume. They buy very frequently. So in that case, we would probably support that first customer.

But that doesn't mean we say no to the second customer, it just means that maybe they'll get a little now, a little bit later. And we'll still be able to meet their needs. Customer behaviours change, and so periodically, we need to re-evaluate the segment that that customer is associated with. A customer that is important today may not be tomorrow. A new customer today could be very strategic tomorrow, and we need to be able to recognise that.

The products customers buy are not necessarily equal in priority either. So how do we segment the products? We'll explore that in the next section.

SEGMENTATION OF THE PRODUCTS

- What's a product segment?
- Prioritisation of high-margin products
- The harmonisation of the priorities among products and customers

From a pure sales perspective, all products should be available for whenever they can sell them. But it's not possible to support that kind of model, for obvious financial reasons. Not unlike customer segmentation, all products are not equal.

What's a product segment? Think about a prioritised grouping of products. How would we prioritise or how would we segment products? Well, we have some products that give us high margin, that affect our bottom line.

> "What happens if we segment wrong or don't have any segmentation at all?"

We have some products that are very high volume. We have some sole-sourced products, that we are the only producer of. If we can't build that product, our customers can't go anywhere else. And we have brand new products.

We have products in design, that use resources as they are being built. And then we have products that are end-of-life that are being discontinued. What happens if we segment incorrectly or don't have any segmentation at all?

Well, we're going to miss our financial goals. If we don't prioritise our high margin products, we're not going to make our profits. And if we don't prioritise those new product launches appropriately, we're going to miss our product roadmaps and incur a great deal of financial pain. We may even realise low customer satisfaction because we're not meeting the requirements of those customers.

Think about products as they progress through a lifecycle. We need to re-evaluate that segmentation periodically. What is a new product that's being launched today is eventually going to be discontinued, and priorities will change as will the segment associated with them.

Segmented products and customers have very different priorities, so we need to understand how these work together. But there are other priorities as well. How do we bring them together? Let's discuss that in the next topic.

DEMAND PRIORITISATION

- A case study of demand prioritisation
- Customer and product segmentation within our type of demand
- How constraints push you to plan better

Now that we understand to whom and what we are selling, let's set an overall demand prioritisation plan. Let's look at a couple of examples. We have a high-tech company that produces computer processors. It is always looking to be leading-edge releasing new processors periodically. It will put a much higher priority on the release of those new products, regardless of customers buying the old products, because it wants to move the markets.

Meanwhile, we have a service-oriented company, or services, where a high-tech semiconductor producer is selling design services to support customers who will ultimately buy their chips. We want to make sure the customers using those services will get a higher priority. Organisations, depending on the type, will have different priorities.

All customers don't buy all products that are high priority, so we need to balance the segmentation between the two. Organisations must decide what's most important to them.

Additionally, there are different types of demands. A forecast from sales is something in anticipation of an order coming in. A reservation may have a higher priority. We may have service-level agreements that says to a customer we must deliver in a certain amount of time, which says we need to support that definitely. Customer orders are commitments from our customers to deliver product. Internal demand from product engineering is being used to support those new product launches.

> "...we want to make sure that those high priority customers get supported first."

So the plan needs to put everything together. We have customer priorities through segmentation, product priorities through segmentation - the different types of demands as we learned. But now we have to recognise the difference between them - forecast, which is anticipation or more of a plan, is different and a lower priority to a reservation or an order, which is more of a commitment to our customers.

Furthermore, we need to take into account customer and product segmentation within our type of demand. When we're looking at our plan and we're forecasting for both high priority and low priority customers, we want to make sure those high-priority customers get supported first. And that will depend on the organisation. And that's a decision that the organisation needs to make.

We need to know what your corporate objectives are, and your financial goals, in order to define the appropriate prioritisation model. Innovative product companies are going to be focusing more on product, and customer service companies are probably more focused on the customer than the product.

The key thing is finding a model that supports your goals. Without product constraints, we don't need prioritisation. Without prioritisation, everybody's equal, so there is no priority. But constraints regularly occur. We need to know our priorities before they happen. Without prioritisation, our goals are missed and chaos ensues.

Now that we have prioritised the demand, what does that mean to how we commit to our customers and their orders? Let's take a look at it in the next section.

AVAILABLE-TO-PROMISE SEGMENTATION

- How unpredictability and volatility challenge us
- The rules of flexibility
- When we learn too late about the demand for high priority products

One of the biggest challenges for all of us is that customer behaviours are ever-changing. We plan for customer orders based on a forecast, but we know those forecasts aren't always right. Available to promise, or ATP, is what we use to respond to those customer orders. It's a customer's prerogative to change, and it can be very unpredictable. Volatility varies by industry sector, and it depends on the relationship with your customer.

We can't control volatility, but we can control how you react to it. A retail environment is very fast-paced, very reactive, very short booking horizon. Their mantra is, don't let that peg on my shelf be empty. I've got customers to support. The white goods sector with large household appliances not so much, because it has a much longer booking horizon and can wait a little bit longer.

In previous sections, we discussed how we prioritise demand. Demand prioritisation used during planning is just as important during the order scheduling. ATP segmentation should support that overall demand prioritisation plan. But that's up to a point. We need to have rules to allow for a little flexibility, because we know that that forecast which drove our ATP wasn't necessarily right.

> "We can't control volatility, but we can control how you react to it."

As the orders come in, we use that prioritisation and segmentation of ATP to support those orders. Without segmentation, the alternative is a FIFO, or first-in-first-out, which means whatever order comes in first, will get product availability.

The problem with that is we can't control the sequence of how orders come in. A very low priority order through the customer and product may come in before a very high-priority customer, and that violates our demand plan. So we need to be realistic about our ability to be flexible in order to support the volatility and variability as those orders come in.

PRODUCT DESIGN

- What is good design?
- A case study with a new smartphone
- Sales consideration

What does good product design mean? Generally, we think of shape, colour, user-friendliness, or branding features. But is that enough? Imagine a great product, highly approved by focus groups, that recognised your great innovation.

But you must think about the sustainability of that production, as well as how that product is designed. Product design varies by organisation. Sales are looking for products that they can sell. Supply chain wants to make sure they can plan for that product and effectively manage the supply chain network, and also efficiently hold inventory.

Finance, are concerned about the cost of producing that product and the ability to support a positive bottom line. And then there's manufacturing - can they efficiently produce the product in order to meet the design?

> "...too expensive to hold inventory and it takes too long to get the product, so we can't keep up with the market demand."

Think of this fantastic smartphone that we're about to launch - with the latest technological advancements and features and functions, highly anticipated by the market. But the production of components takes a long time. Assembly is very complicated and personalization, to finished goods, occurs very early - meaning the minute we start that in production, it can only go to that one product and we have no flexibility.

The result? It becomes too expensive to hold inventory and it takes too long to get the product, so we can't keep up with the market demand. With a well-designed product we can learn from that example.

Although it is not bleeding-edge technology, we need to look at whether there is market demand to support it. Can the sales margins overcome the cost of that production? And can I stage production and hold subassemblies in inventory to reduce those perceived long lead times? Can I leverage components from other existing products for this new one? Most companies strive for this, but they don't always succeed.

We also need to think about this practise when we consider just minor revisions in existing products. We don't need to reinvent and develop new components to produce that product. Procurement lead time and manufacturing time can be very long, and it can't be avoided. Our next section looks at some ways in which we can deal with that.

ADDRESSING THE LONG SUPPLY CHAIN TAIL

- Reasons for delayed delivery
- The levers that can help in the slow supply
- Balancing the fiscal responsibility with reality

One more week. One more month. We are behind. We need to catch up. How many times have we suffered from delays in our supply chain? How many times have we felt that the control is not in our hands and we are only victims of these delays? Let's get control back. Let's start with the reasons for delays.

A manufacturing cycle can be very long, four months or more. Procurement of components can be equally as long. Capex planning, and getting funding to add additional capacity can take a year or more. And transportation lanes, moving product over the ocean could take six weeks or more.

So how can this be solved? Well, there are a couple of levers we can look at. We can improve our forecast and produce product exactly to meet the forecast as it comes in. We can hold extra inventory to account for the variability in demand, but there's only so much inventory we can hold. The last lever is to improve flexibility within the supply chain, but this generally requires significant product design changes if we haven't accounted for that in the very beginning.

All three of these solutions have practical and financial limitations. We need to balance the fiscal responsibility with reality. We should be utilising the customer and product segmentation to make sure that we're identifying the right products to hold in inventory and to balance the demand of the market with our market competitiveness. We also need to make sure that we have fiscal prudence involved so that we're holding the right inventory and balancing our financial needs. Now let's take a closer look at inventory management and effective forecasting.

EFFECTIVE FORECASTING

- Uncertainties in the market
- Science and statistics
- Forecast accuracy is achievable only to a point

Forecasting is always a challenge. Many say they are always wrong, or less than right. There are things we know and things we don't. We know that we've got committed customer orders out in time. We know that we've got contractual agreements with our customers that we need to support. We know sales events and promotions that are out in time. And we may have repeating seasonal events that occur year after year.

But there are things that we don't know. There are wild swings in the demand due to the whim of the market. We have unforeseen competition challenges in the market, M&A activity with customers, and even weather events cause severe disruption.

Forecasting is very emotional, but we need to add more science. We need to look at multiple inputs - forecasts from our customers, forecasts from sales, even knowledge from our supply chain. We should leverage statistical models to give us a better answer. And predictive analytics, which are improving over time, will also help us to give us a more accurate forecast.

But not all customers and products behave in the same way. Some are easier to forecast accurately. Focus on the unpredictable and let system models do the rest. Near-term forecasts are more accurate, but that's easier because they're mostly orders. We need to be more accurate in our longer-term strategic forecasts, not next week but many months out. The ability to forecast more accurately in the longer term allows us to improve our delivery in the near term. But that's the most difficult part.

> "We need to measure those multiple inputs and look at which one is giving us the best information and leverage that..."

Forecast accuracy is only achievable to a point. We need to measure those multiple inputs and look at which one is giving us the best information and leverage that to give us the answer. But we also need to be realistic about what is achievable. Think about a successful forecasting model. We have a small electronics device manufacturer that would forecast based on revenue not volume. We're not printing money, we need to know what product you want to sell. So, we moved the organisation from revenue to volume and product mix, and that allowed the supply chain to better support that demand.

We derived the revenue based on the average selling price applied to those quantities that were forecasted. In addition, we used statistical models that gave us better and more predictable results for a more accurate answer. The focus was then redirected to those products and customers that could be more accurately forecasted.

RIGHT-SIZED INVENTORY

- The real reason for holding an inventory
- Use the product segmentation to build the right inventory
- Volume, variability and location

Inventory is a necessary evil. Finance is usually focused on the cost of holding it, but why do we have inventory? Inventory should only exist for anticipated sales. We can use it to offset the volatility of customer demand. We can also use it to offset that perceived long lead time of components in a manufacturing cycle. We can also use it to level-load manufacturing, where capacity may be constrained in one period of time, and we can spread manufacturing orders out over time. But it's absolutely necessary to support customer service levels, and that's why we hold inventory.

So we need to think about the right inventory, not just inventory. We don't hold inventory for all products. We should use our product segmentation to identify the right inventory. Analysis may not change the financial valuation of that inventory, but it will change the mix. So we need to determine which products are most appropriate to hold.

The retail industry can be very challenging. There are so many SKU, or stock keeping unit, numbers that exist. The demand changes. What's hot this week may not be next week. We have many points of distribution. And long component and procurement lead times on top of long oversea transportation makes for a long delivery of product.

But the challenges are not insurmountable. We need to determine what are our high running SKUs. We should also determine the volume necessary to cover that variability and where we should be holding it. And having clear communication and collaboration with our customers will also help us to make sure that we get the product that they want, when they want it, and where they want it.

> “We need to determine what are our high running SKUs.”

FUNGIBLE CAPACITY MODELLING

- Flexibility and capacity
- How the fungible capacity model works
- Aim at reasonable accuracy

Now it's time to bring everything that we have learned together. In the following two chapters, we're going to explore how we build a smart model so we get what we want because that's what we're interested in - planning the best business that we can run and making sure that we can execute our plan without those unpleasant surprises.

What is the fungible capacity model? Fungibility can be used to describe flexibility. We need to look at how do we define capacity. Well, capacity comes in various flavours. We have internal capacity and external capacity - that capacity that is supported by our co-manufacturers. We have much more control in internal than we do external.

We also need to think about different types of capacity or capability. We may have machines and tools. We have labour and people. We have physical space as in distribution and warehousing.

And we also have transportation moving the product around. Time dependency is important as well. What I have available today may not be there tomorrow or vice versa.

So how does a fungible capacity model work? Well, first of all, we need to think about what are the key constraints? Where do we not have enough capacity? But we need to focus on those points that are constraining or could become constraining. If we have infinite availability, we really don't need to plan for it because it won't be an issue.

We also need to identify what capacity is available. All capacity. And we shouldn't hold back. If we get into a constrained scenario and product is not available, but we ask a second time, and we ask louder, suddenly capacity is available. All we've done is elongate the resolution timeline.

> “Be reasonably accurate, not precisely wrong.”

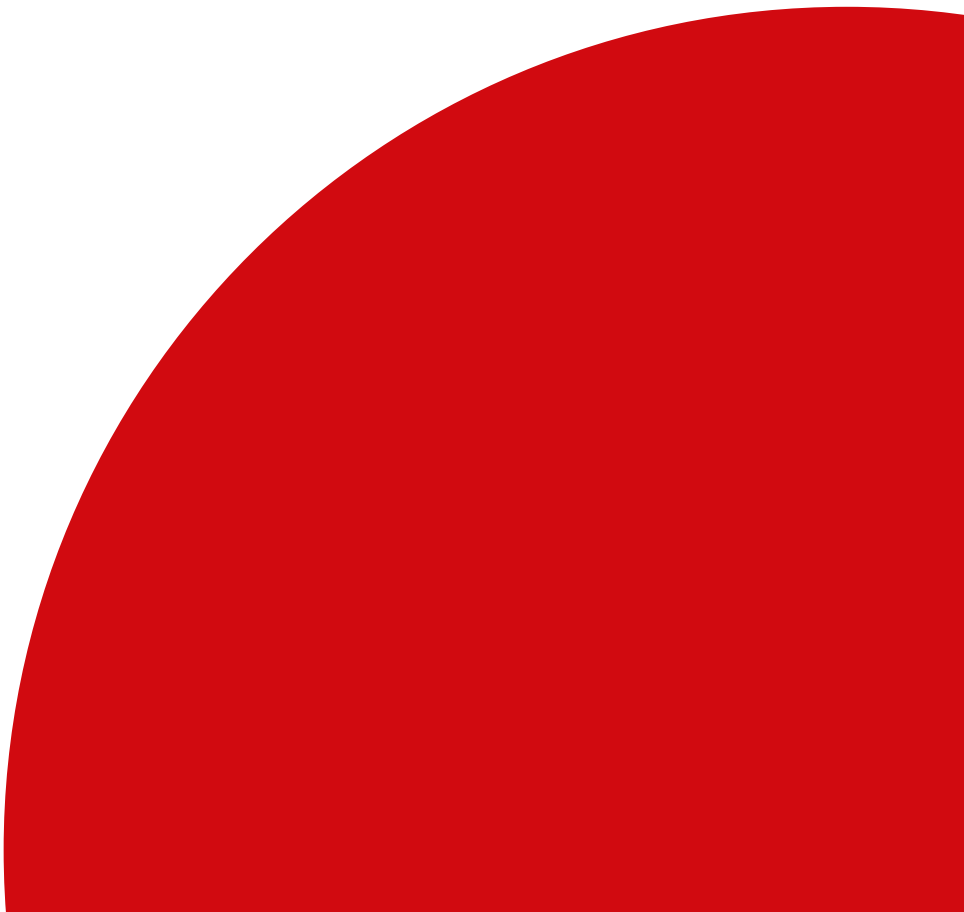
We also need to understand dependent relationships. If a product runs through multiple capacity points, what's the relationship to them? Do they need to be signed together?

We also need to define consumption rules based on product. Two products consuming the same capacity point. That capacity point, machine or tool, available 24 hours a day.

One product needs one hour to produce. I can produce 24. The other product is much more complex and takes two hours to produce. I can only produce 12. That consumption will dictate how much product we can produce based on our available capacity.

So, you need to plan for changes over time. Be reasonably accurate, not precisely wrong. What we mean by that is that we see many organisations spend hours and hours calculating the precise capability of a given tool.

We get into analysis paralysis where we can be reasonably right. We don't have to spend the science because we're just not going to get there. Planning is close enough.



ORGANISATIONAL HEROES

- Who is an Organisational Hero?
- Reaching the tipping point of human toll
- Change is difficult but achievable

No changes ever happened without a champion, and no failures happen without human mistakes. We depend on those champions in our organisation to help drive change, but we have to talk about the organisational heroes who are appointed to score those goals for us. We also need to discuss what happens when they are given the wrong target.

Who is an organisational hero? Everybody knows who they are. They are the ones who are working behind the scenes, solving those day-to-day problems. But in a very chaotic environment, senior management may not even know that they exist. They have no idea of the amount of time and dedication from the workforce behind the scenes that has gone into solving the issues that have occurred. The good news is the issue has been resolved. The bad news is you'll reach a tipping point. There's a human toll that will be taken, and there's only so much that you can repeat in terms of being able to solve those day-to-day problems.

> "We need to define a process across all organisations that supports integration and collaboration - harmoniously working together, all organisations marching towards that common goal."

The price for failures - missed goals, missed revenue, missed profits, lost market share, low customer satisfaction, or, even worse, lost customers. We need to define a process across organisations that supports integration and collaboration - harmoniously working together, all organisations marching towards that common goal. A top-level sales and operations planning programme is the glue that will hold everything together.

Change is difficult. It takes time, but it's achievable. There will always be heroes, but we need to move to an exception model and make their job easier, and be more responsive to our customers.

SUMMARY

- Identify the root of the problem
- Do not try to solve all problems
- Do not create point solutions

The first step to improvement is accepting that there is a problem. We need to start with identifying the key issues: are they low revenue or poor profits, poor customer service, or operational inefficiencies in building the products? Do we have any inventory issues - too much inventory, or not enough? Is our on-time delivery performance to our customers low? And do we have poor internal communication and collaboration across all the organisations within the company?

We need to understand the bigger picture and the integrated end-to-end relationship between them. Don't try to solve everything all at once. Create an incremental plan of gain. Don't create point solutions. Make sure that we understand the bigger picture. And technology won't solve all problems, but it will help with speed and accuracy. Define your process first. And finally, know when to seek expert help, and don't be afraid to ask.

> "The first step to improvement is accepting that there is a problem."

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