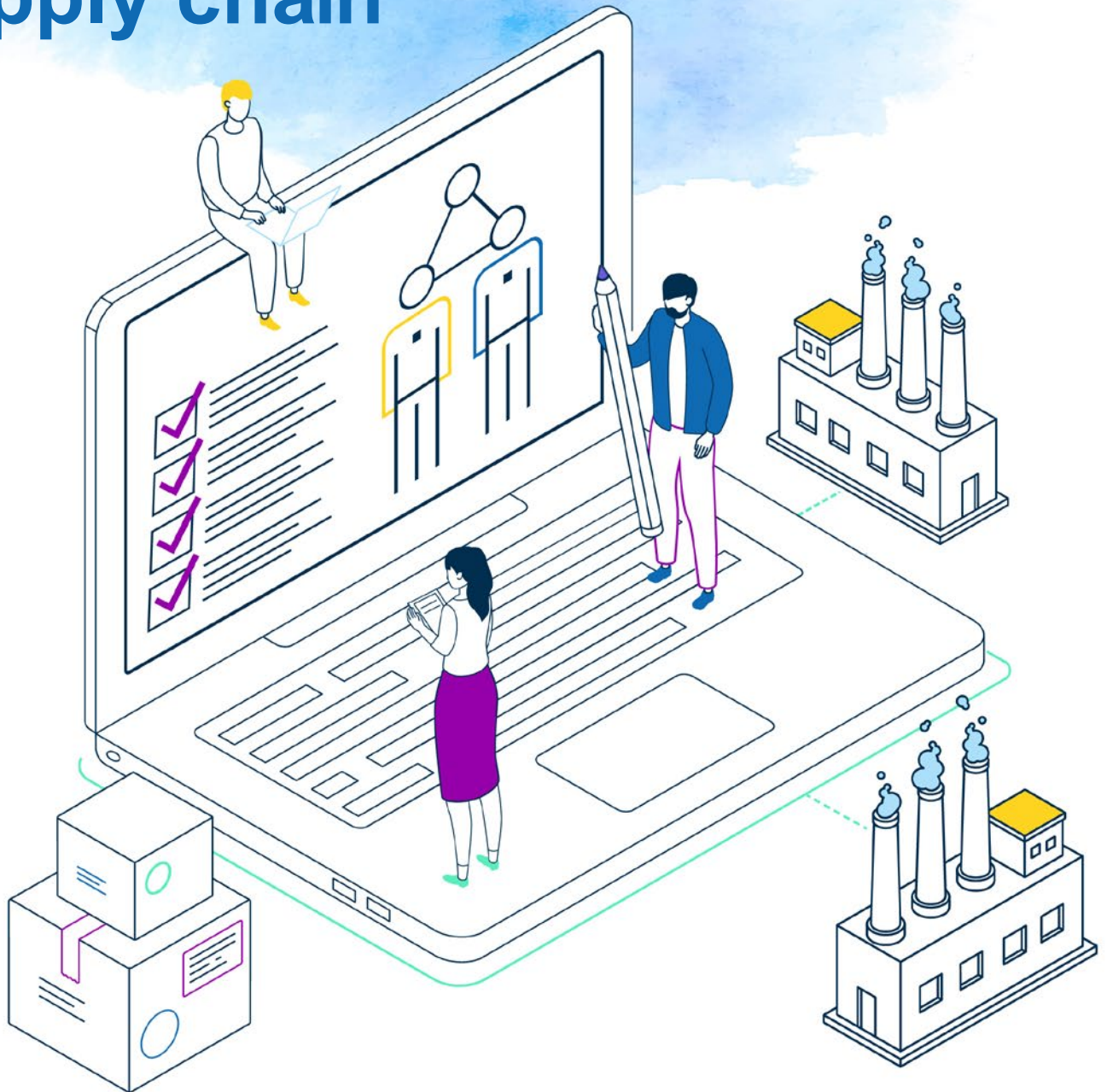




Attribute-Based Planning— Critical to every supply chain





Attribute based planning is a novel planning technique to reduce SKUs, adapt to changing needs of the supply chains and business rules, avoid commoditization, ensure the product is made from the very beginning for the right customer. It is much more than just having finished goods *attributes* to match demand and supply.

Attributes are treated as properties of objects such as resources, suppliers, products, WIP and raw material inventory that must be considered and planned for at every stage of the supply chain. They are a true representation, or the digital twin, of the supply chain and manufacturing.

They provide intelligent constraints that define the capability of each part and element of the supply chain including suppliers, manufacturing, distribution and transportation.

Before you read beyond this first sentence, pick which of the diamonds in the picture below you would rather buy for the same amount of money. Not sure?

Would it help if you knew that both were SKU number DIA8734556 – Pure hard cubic crystalline carbon?

I didn't think that would help, although this is the way that most companies' systems, ERP or SCP, are designed to support their customer needs.

In this case, anyone looking for a diamond wants to know the four C's (Carat, Color, Clarity, Cut). These are the attributes of a diamond—perhaps the most famous attributes in the world.



The diamond on the left is 1.4 carats, clarity – VVS2, color - K, cut - Brilliant



The diamond on the right is 1.2 carats, clarity – VVS1, color - J, cut - Brilliant

Beautiful! Aren't they? However, there still is no clear cut "winner" as to which one to buy, since the first is the biggest, but the other has better color and clarity.

The decision as to which attributes are more important is dependent on individual needs and preferences of the customer.

Is bigger better? Or is color, and fewer flaws, more important to the person that will be showing off the stone?

What is essential is understanding the needs of the customer, and selling the inventory and capacity in your supply chain that most closely matches what is important to them, at an appropriate price. This is the best way to keep your customers happy and protect your margins.

What Is Attribute-Based Planning?

Attributes have traditionally been used as a way to manage the supply chain of products with complex technical specifications. Besides diamonds, other examples are electrical properties on high-tech components, and chemical properties on specialty chemicals.

These types of products command higher margins and premium prices because they meet some specific needs of the customers, and resist the profit-eroding effects of commoditization.

More and more businesses are realizing that Attribute-Based planning should be applied to a much broader range of products than ever before.

This enables an enterprise to charge premium pricing and offer a tailored customer experience for products that were previously treated as stock items, or were threatened by commoditization.

Companies that have turned to Attribute-Based planning usually increase top-line sales revenue, and simplify the management of their supply chain to lower operating costs.

However, offering your customers a tailored experience also adds a whole new level of complexity to your supply chain that needs to be planned and managed.

The secret of how Attribute-Based supply chain planning allows a company to increase revenue is very simple. Highlight the hidden value (i.e. attributes) of what you produce, and sell it to a customer that needs those attributes, charging them a premium price.



For those customers that do not care, sell the units containing characteristics that other customers do not value, at a non-premium price.

Let's look at examples of some important attributes by industry. In the semiconductor industry: speed of the die. The faster die command the higher prices.

In Steel industry: width, grade, length. In textiles Industry: color, texture, finish.

In Chemical Industry: fluidity and consistency.

In CPG: Manufacture-Date. And I am sure there are many other ways that customers may feel that they can gain advantage by having specific attributes on the product. Can you think of some attributes, right now, to better meet your customer needs, and keep commoditization at bay? Here is an easy way to get started...

Benefits of ABP

- Reduction of SKUs by orders of magnitude
- Otherwise exponential growth of data resulting in poor system response
- Significant reduction in data maintenance effort
- Master data size reduction by as much as 50%
- Much easier to run scenarios by simply changing value of attributes
- Constantly adapting to the new business rules and priorities
- NPI, new customer specifications, quality requirements, regional regulations, supplier qualifications
- Pegging the right raw material and intermediate products to the right customer order
- Serialization, change in speed, finish, texture, wavelength, supplier qualification

Here is why the benefits

In order to get premium pricing and provide highly-tailored customer service, the strategy of product attributes adds complexity to the enterprise. For example, instead of just taking

any inventory item from stock, we are going to offer the units that most fit a customer's needs.

Instead of producing goods on a resource of our choosing, or a process that is most available, we are providing a premium option to choose where a product is made, to ensure consistent quality.

This is the exact opposite of the product rationalization efforts that companies utilize in order to simplify and lower costs. But in turn, you can use Attribute-Based Planning to lower the cost of operations. In effect Attribute-Based Planning breaks the traditional trade off between product proliferation and added operations cost. This is done in a number of ways.

First, a company must move from traditional item-master management to a product-master. This is because traditional item-masters cannot handle the combinatorial- explosive nature of the alternative choices.

In order to offer a customer, the exact units of inventory that they may want, a company may need to track many different attributes.

One example is high tech component manufacturer. A typical need in this industry would be for 7 to 12 attributes with an average of 10 choices for each attribute to fully describe the product to customers (Example are: memory size, alternate components, speed designation, place of manufacture, and package type).

If traditional or smart part numbers were used for master data management, between 10 million and 1 trillion part numbers would be needed. Thus, cost on data maintenance, software complexity, and hardware required is enormous. Instead, a company can manage with just 7 to 10 attributes.

The only data that is required is what attributes a customer wants with each order. The rest should be handled by the Attribute-Based logic in your planning system.

Second, attributes can also significantly increase a company's ability to manage finished-goods and intermediate inventory, so that higher service levels can be achieved at lower inventory levels.



Attributes allow a company to look at inventory as different pools of similar items that can be managed against customer orders and manufacturing requirements.

This logical inventory pooling helps to hold down the natural fluctuations in demand and allow inventory managers get the most out of the available supply.

The ability to allow a system to analyze targeted demands against specific available supply and perform rebalancing of supply vs. demand is what makes Attribute-Based inventory management very efficient.

Attributes apply to the entire supply chain—Not just finished goods

Production costs in the supply chain can be lowered through Attribute-Based *supply* planning. Attributes on demand (i.e. customer orders) describe the request for premium production services (e.g. preferred location, process, or resources) that have been promised to a customer.

These requests can be propagated through the supply chain planning process so that where choices are available, the appropriate selection for location, or production, process can be made.

The user- attributes and costs will allow production planning to make sure that a customer gets what they have paid for, and the company can save by selecting lower cost alternatives when no preference has been purchased.

In the same way that resource and location, choices are facilitated, materials management can be enabled with attributes. As an example, a company may purchase an environmentally friendly product at a premium price.

Attributes can be used to show this preference on the customer order, which commands extra charges. If there is no designation on the order regarding this, then lower cost materials could be used.

Another way that materials can be managed with attributes is to manage materials for consistent engineering specifications on the delivered item. If a company charges a premium price for a specific engineering tolerance on a part, it may be necessary to control the specifications of the materials that go into the product to a tighter range.

Attributes can be used to only select the materials that will hold to this more limited engineering specification during a manufacturing process. Once again, these materials should only be used if the customer is paying a premium price.

In summary the use of Attribute-Based planning allows a company to manage the complete supply chain in alignment with the premiums that a customer has paid to receive. This includes managing inventory, production, distribution, or materials.

Attribute-Based planning is not only an enabler for protecting your margins, but it is also a way for a company to manage costs. It is the way to enforce: “You get what you pay for”.

Why does my current system come up short?

Over thirty years ago when computers had less power than your common TV set, MRP systems came up with the data model architecture that starts with an item-master and the SKU-number.

This same design has been kept through the evolution of MRP into ERP systems, and was copied by almost all enterprise planning systems that are in use today.

This item-master and SKU-number data model is the very core reason of why these systems are not able to effectively deal with attributes. The problem is that you have to give every possible combination an SKU-number to differentiate it.

You can see how difficult that can be if you do the math. Let’s take the following example:

1000 products x 10 grades x 30 speeds x 10 locations =

3 million combinations of products

If 100 customers want a little something different on each product =

300 million combinations

If they want to track the 4 possible manufacturing location =

1.2 billion combinations

And if they want to track the 3 possible material sources for just one component in the product then you have =

3,600,000,000 combinations!



Now It's easy to see why traditional systems fail when you are trying to plan and commit to your customers with this kind of mind-boggling number of product combinations.

Traditional systems hurt profitability

A Traditional system that does not utilize native Attribute-Based planning capabilities tends to negatively impact customer service levels, and drive excess inventory. Why?

Such a system cannot accurately determine if there is enough inventory on-hand to meet an order—it will either over promise, or requires extra inventory to cover up the problems.

This says nothing about the ability to source to a certain manufacturing location properly, selecting material from an approved vendors list, or meet any of the many other preferences that a customer may have.

A simple example can highlight typical issues with a traditional planning system, lacking Attribute- Based capabilities:

Table 1 shows a sample order (D1) for a product, with customer-requested *attribute* Q1, entered into the order entry system.

Table 2 shows a typical supply-statement from a traditional planning system. Without attributes, this system will quote availability date of 1/12 to the customer. Note that the ERP warehouse system has the attribute information, but the planning system cannot support it. On the other hand,

Table 3 shows a *supply*-statement from a planning system with attributes, which clearly indicates the availability date of 1/18.

The damage to the company from this very common problem is real and felt at the bottom-line. Usually, a company will compensate with extra inventory to avoid the problem.

There are many other examples of such problems that are similar in nature, including not knowing if the specified materials are on hand, not sure if the capacity load on a plant is accurate, or not sure if a specific resource is overloaded in a plant. *If you cannot see it, you cannot plan it.*





Get Started

The first step for advancing the use of attributes is to identify the attributes that are required to provide a technically acceptable product, a premium product, or a customized product to your customer. This may be done to satisfy the engineering specification for a product, or in turn offer your customer something to sell that differentiates them from their competitors.

For quality and consistency purposes for the customer the attributes can be used to specify the raw materials used in the product, like the location of manufacture, or the method and resource used.

All these things can command premium charges. Why give away products made on your most expensive machines, at no extra charge?

Examples of this are companies using qualification matrices for manufacturing location and raw material identifiers to track the type, origin, or properties of materials used to make products.

The next step is to put in place a process of using the attributes to provide a premium experience while selling. This occurs while negotiating contracts, collaborating over forecasts during the sales- and-operations (S&OP) plan, and when a customer is placing the order.

With Attribute-Based S&OP Planning, attributes can be used to differentiate the available product into finer categories.

This product availability statement along with the associated target pricing which utilizes attributes can be used to create an S&OP plan that will generate the most revenue.

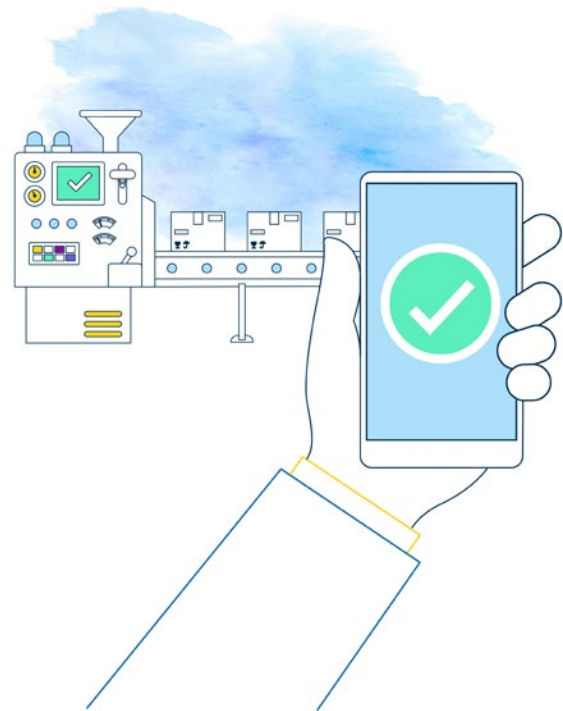
A S&OP planning process without the use of attributes cannot keep track of what segments of the expected product supply will be available for premium pricing.

At order entry time, attributes can be used to find the right units of products to meet the customer's immediate need. Attribute-Based Available-to-promise (ATP) and Attribute-Based vendor managed inventory is the process of using attributes to match your customer's specific needs with your available product supply.

With Attribute-Based ATP, customer service representatives offer suggestions as to what alternatives are available in case a preferred configuration is not available as requested and/nor on-time.

Thus, if the customer desired a lower grade product, the response from your representative could be: "based on availability of material and capacity, this can be delivered in 6 weeks or a higher grade product can be delivered in three days." Attributes are essential to making this work.

Bottom line, make sure you do your homework when it comes to a planning system. Insist on a demo with some of your prototype data in it. Note how easy it is to change your attributes and related business rules. Pay attention to the depth and breadth of data that the system propagates back into your supply chain processes.



Attributes ensure the right customer gets the right product at every stage of the supply chain from sourcing to delivery. It is not just matching finished goods to customer order.



Preferably, you want to see a connection from your customer orders, all the way back to your supplier purchase orders. And don't forget, speed is a huge factor. You want answers for your customer in seconds, not hours—specially, when you are committing an order.

Conclusion

The need to differentiate products and give your customers a unique offering is critical to avoid commoditization. This is driving more and more companies to manage products with attributes.

Most companies that do not move down this path are probably giving away hidden value in their products for free, or not putting forth the kind of customer experience that they are truly capable of providing.

In order to manage the planning complexity that attributes bring to the supply chain, software specifically designed to handle Attribute-Based planning is required. And remember, ***you can treat your products like Diamonds, too!***

Let's make **accurate** plans together!



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