The Challenging World of Supply Planning.
Our vision at Solventure.

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+32 (0) 3 685 70 03 or contact@solventure.eu

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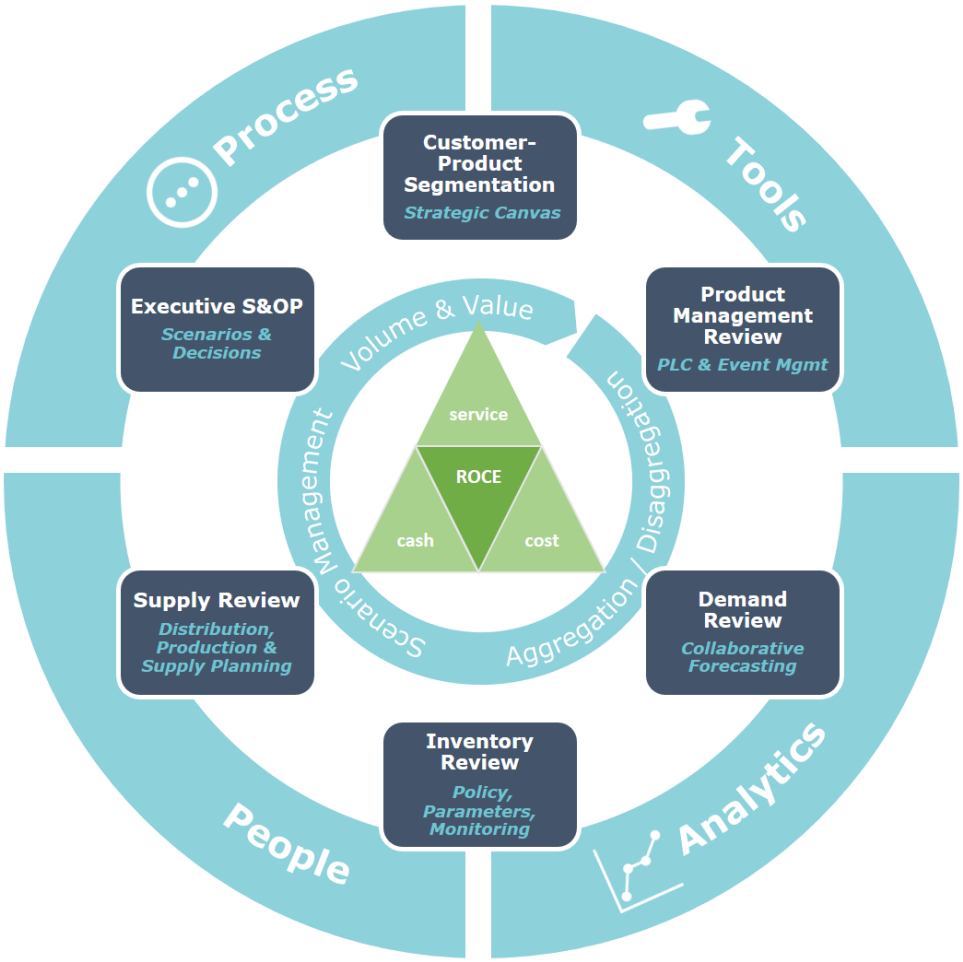
Our vision at Solventure.

At Solventure we take pride in being experts in designing and implementing Sales, Inventory and Operations Planning. Companies that have a good S&OP process can't imagine how to live without it. It is the key instrument for the CEO to navigate the business along the budget towards its strategic targets. For a summary of our vision on S&OP, we refer to our position paper "Sales and Operations Planning (S&OP). Our vision at Solventure." It can be found at www.slideshare.net/solventure and our website www.solventuregroup.com/.



In this vision paper, we dig into detail on how to organize supply planning. Supply planning is the most complex step in the S&OP process. It requires translating the demand throughout the distribution and manufacturing network up to suppliers. It requires the detection of issues like a shortage of capacity and the development of an appropriate response. The appropriate response needs to consider service, cost and cash (inventory). Supply planning is really at the heart of balancing our supply chain triangle. We will explain our vision on how to organize it.

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3 key dimensions in structuring your supply planning

Designing your supply planning process needs to be done along 3 key dimensions. Each of which will be further detailed in the next paragraphs.

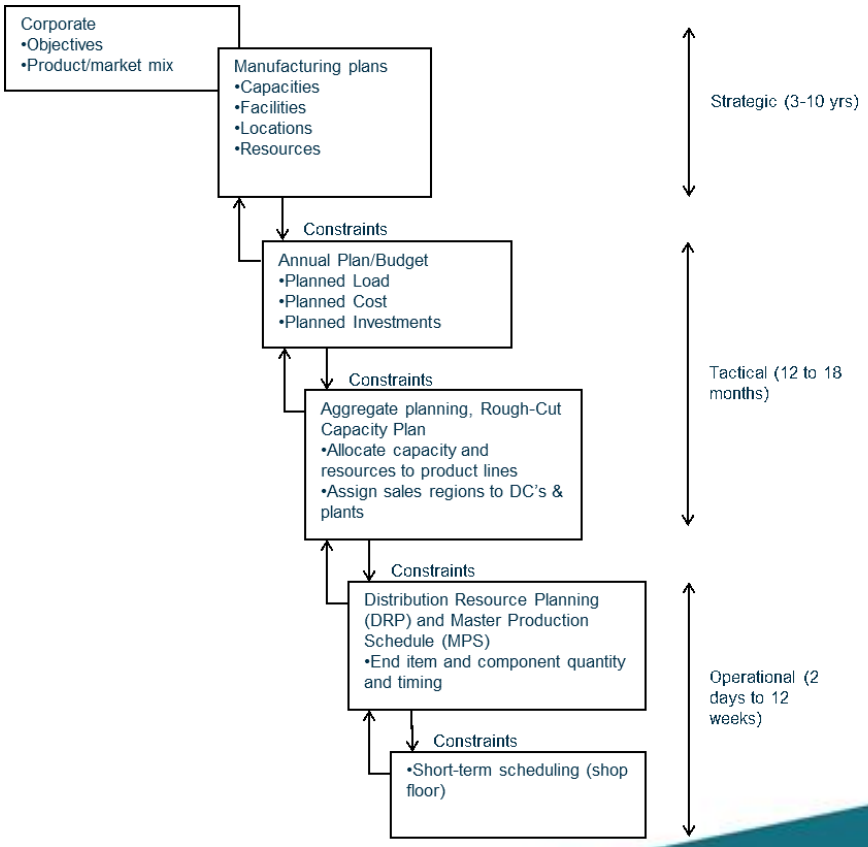
A first dimension is the 'vertical' or 'hierarchical' dimension. It is common to split complex problems into manageable pieces. That's exactly what companies have done with supply planning. We will discuss the need for the following separate layers in planning: strategic planning, budget planning, aggregate rough cut capacity planning, detailed master planning and detailed scheduling across the multiple steps in production.

A second dimension is the 'horizontal' or 'supply chain' dimension. Every company has a distribution network.

Even if you don't own distribution centers, you may want to consider the inventories of distributors and key customers as part of your network (cfr. our vision on customer-product segmentation).

Most manufacturers still own considerable production assets. Efficient use of these assets is key in controlling cost and generating margin. Every production company has key suppliers. As you segment customers, you should also segment your suppliers. A rough-cut capacity plan of those suppliers is the foundation for a collaborative S&OP with them. This becomes a pure necessity if a part of your manufacturing is outsourced.

A third dimension is the combination of complexity and maturity. We believe different complexities require different supply planning solutions. If your current maturity is low, getting to the more complex solution needs to be done in steps. If you skip a step, you risk it will not be successful. In change management any failed attempt may cost you 2-3 years to overcome. Crawl-walk-run is an old adagio. It certainly holds true in something as complex as supply planning.



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Dimension 1 – Hierarchical Planning

The vertical or so-called 'hierarchical' dimension of planning is summarized in the figure above. Though the concept of hierarchical planning is not new, many companies still struggle with 'what is in the different layers', 'which layers do we need' and 'how do they interact'. We refer to basic works of Miller[1] and Stadtler and Kilger[2]. We have summarized and further adapted below.

Strategic Planning

Strategic planning is about setting the commercial direction of the business, defining the innovation plans, the major capital investments, any acquisitions, divestments or partnerships. It has a long 3 to 10-year horizon, will look at the long-term market forecast, any market evolutions and possible scenarios. In general, it looks at the so-called 'PESTEL' factors: Political, Economic, Social, Technological, Environmental and Legal. These factors define the future context in which the company will operate. The strategic planning is driven by the CEO or the BU President, possibly with support of a strategy office. For the supply chain the strategic planning defines the footprint, where are and will be our customers, what will be our distribution and manufacturing footprint. Data is typically considered at the highest level of aggregation, for instance at the combination of region or sub-region.

Budget Planning

In many companies, the budget is a yearly exercise, starting around 3-6 months before the start of a new fiscal year. It will look at the next fiscal year, in monthly buckets. It is driven by the finance department and will make a bridge between the long-term ambitions of the strategic plan and next year's market outlook. It will define targets for volumes, pricing, costs, margin, …

It allocates financial resources through operational or so-called 'OPEX' budgets and investment or so-called 'capex' budgets. The result is a projected P&L, Balance Sheet and Cash Flow Statement. It defines a financially viable, but typically also stretched plan. As incentive schemes are often linked to the budget, it is an important steering factor. Any negative deviation of the budget is resisted and creates tension. To avoid this, people will make conservative estimates, so-called sandbagging.

There is an important element of so-called 'gaming' in the making and the follow-up of the budget. The data is typically on an intermediate level of aggregation, for instance a combination of the product group and the country or customer.

[1] Miller, T., Hierarchical Operations and Supply Chain Planning, Springer, 2002
[2] Stadtler, H., Kilger, C., Supply Chain Management and Advanced Planning: Concepts, Models, Software and Case Studies, 2002

Aggregate Rough-Cut Capacity Planning (RCCP)

The budget plan requires operations to get an idea of typical volumes, how they will be allocated to production plans and what will be the distribution cost to get them delivered to the customers. Where in many companies the budget is still static, or updated mid-year, the Rough-Cut Capacity Plan or RCCP is a monthly process, looking 12-18 months out, in monthly buckets. The key purpose is to identify bottlenecks early in the process, in the so-called free period, cfr. our outline on the typical planning horizons below. This is the period where all major supply chain parameters can still be changed. Example bottlenecks can be either structural or temporary shortages in capacity, due to seasonal demand or due to a plant shutdown. Possible solutions are to increase capacity by planning extra shifts, by offloading demand to an alternative production site and/or line, or by prebuilding inventory. Some companies have the option to outsource parts of their production, or to look for swap deals. Only in a last resort will we cut demand. If we do so, a customer-product segmentation is an essential instrument to do that in a fast and effective way (cfr. our vision paper, Segmenting Customers and Products in B2B environments, on how to set that up).

In many companies this tactical planning process is driven by the central supply chain department. It is based on an 'S&OP forecast', which gives the 'most realistic expectation' of the future demand. There may be a conflict with the budget, which as mentioned above may contain an ambition and be a target. Any differences should be revealed and discussed in the demand review and exec S&OP meetings. The RCCP should have scenario management capabilities to analyse different demand scenarios.

The overall goal of the RCCP is to define a realistic, cost-efficient and viable tactical plan. To simplify the gathering and processing of information, the data is typically on an intermediate level of aggregation, for instance the combination of product group and resource group per production plant.

OUTLINE – Planning horizons: Free, Flexible, Frozen

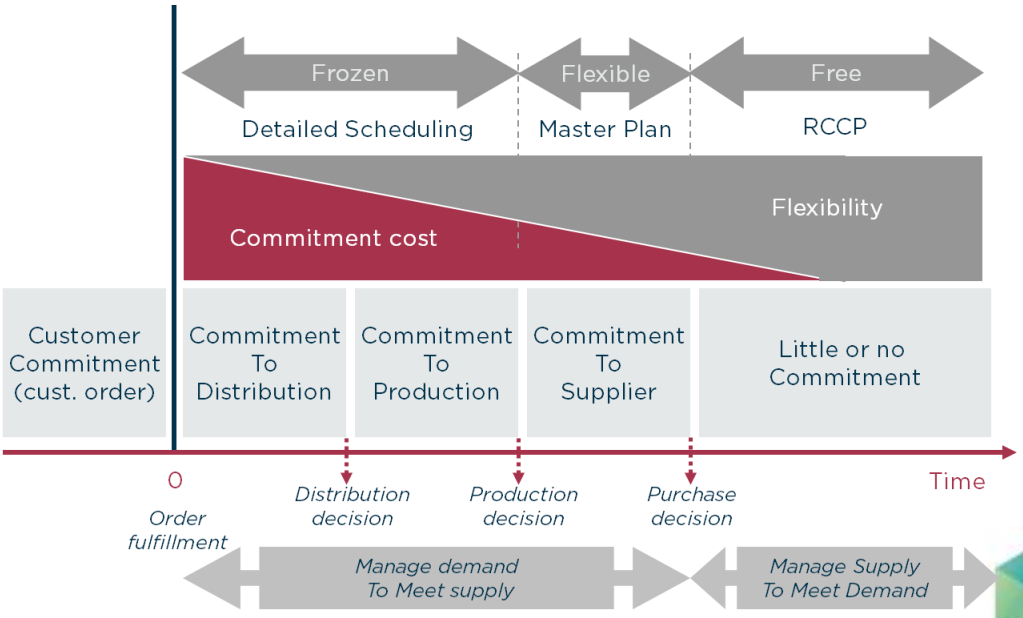
A common concept in planning is the definition of free, flexible and frozen horizon. They are linked to your supply chain lead times.

The frozen period is the one where orders are in production. At this point it's basically impossible to change, without a significant impact on cost. However, in many companies, we see the frozen period is not as frozen as the planners would like. There's a lot of pressure from sales to be reactive to last minute changes.
The flexible period is the one where raw materials have been ordered, but they have not yet been assigned to specific production orders. In this horizon the orders for the raw materials are fixed, meaning the volume available is fixed. However, we remain flexible in the mix. As long as they share the same raw materials or components, we may still decide to produce some more of product A and a bit less of product B. In practice again, the orders for the raw materials are often changed. We try to push them out or bring them forward, as production is pushed out or brought forward.

In many companies, keeping the 2 in sync is a manual process. The number of changes makes it very challenging. When under time pressure, we typically see the bring forward is done, not to miss production, but the pushing out is forgotten, leading to excess raw material inventory.

The free period, is the one where no raw materials have been ordered. The upward and downward flexibility will remain limited. In case of outsourcing contracts, we commonly see that it is even regulated by mentioning specific percentages for the allowed upward and downward change for each month ahead. In the free period, we're probably in the flexible zone of the supplier. This means we can order some more or less of raw material A versus B, as long as they share the same resources and base materials. Mapping the flexibility of key suppliers is advised. It reveals the true flexibility you have in the free period.

As we explain further, the free period is the domain of the RCCP process, the flexible period is controlled by the Master Plan, and the frozen period is controlled by the detailed scheduling.



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Master Planning

In APICS terms, the master plan is the so-called Master Production Schedule or MPS. Where the rough-cut capacity plan is getting the volumes right, on an aggregated level, in the free period, the master plan will get the mix right, in the flexible period. In a Make-To-Stock environment, the master plan will be on the finished product SKU.

In an Assemble-To-Order environment, the master plan will be on the intermediates or subassemblies. The master plan controls the so-called 'push' part of the supply chain. It is driven by the forecast and controls the inventory in the so-called Customer Order Decoupling Point (CODP), cfr. our outline on the production strategies and the CODP below.

The 'pull' parts of the supply chain will be scheduled based on orders, and starts from the inventory of intermediates or subassemblies.

Where the RCCP is typically in months, the master plan is typically in weeks. A typical horizon is 8-12 weeks out, but as explained in the outline on the planning horizons, it really depends on the cumulative production and supplier lead times.

The key decision in the master plan is getting the mix right, within the allocated volumes decided by the RCCP. The RCCP has decided which aggregated volumes will be sourced from where and whether to build up inventory.

The master plan has to translate that monthly plan into a weekly production plan, and on an SKU level. In planning the mix, it will account for variances in run times, try to group products in campaigns as to minimize change-overs and specify in which SKUs to build the required inventory. It will also manage and prioritize different demand streams consisting of customer orders, forecast or safety stock replenishments. Depending on the flexibility it may fine-tune capacities like the amount of overtime and temporary labour.

The master plan will define planned production orders, showing the quantities and the week. These planned production orders will trigger the MRP, so that the necessary raw materials are ordered. The planned production orders within the frozen period will be confirmed and fixed in the detailed scheduling.

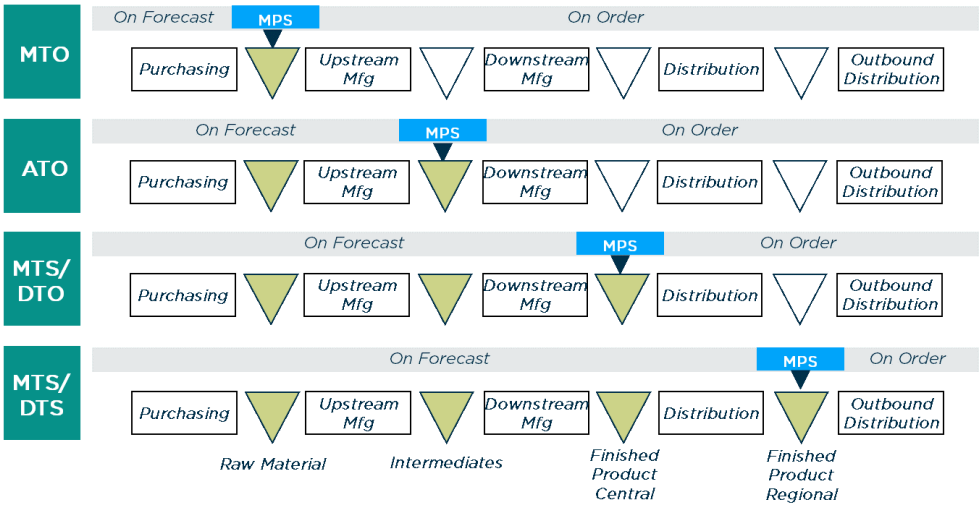
So in summary, the master plan is all about detailing the monthly aggregated volumes, to a weekly mix on an SKU level. In making the plan, we account for extra inputs, such as customer orders, and we account for extra detail like variances in run-time. With this extra detail, we do a further optimization of maximizing service, while minimizing cost and inventory. Needless to say that this process is typically driven by production.

OUTLINE – The Customer Order Decoupling Point (CODP)

The Customer Order Decoupling Point or CODP defines which parts of the supply chain are driven by the forecast, and which are driven by orders. The Master Plan or Master Production Schedule typically plans and controls the 'decoupling point', which is the inventory point that buffers the forecast driven from the order driven part. The following figure shows the corresponding production strategies.

In a Make-To-Order or MTO environment, the raw materials and components are purchased based on the forecast but the rest of the production is order driven. An intermediate solution is the Assemble-To-Order or ATO environment where intermediates or subassemblies are produced based on the forecast but the downstream operations (typically blending, packaging or final assembly) are based on orders. In a Make-To-Stock or MTS situation, the finished product is planned based on the forecast. The Distribution can be to order (DTO) or to stock (DTS).

MTO, ATO, MTS with DTO or DTS are also called 'production strategies' or 'supply chain strategies'. As is apparent from the figure below, they have an impact on the Master Plan and on the scheduling. The Master Plan will control a different step in the supply chain. The scheduling may be order driven or driven by the planned production orders from the Master Plan, as we will explain further in the explanation of the detailed scheduling.



In accordance with the lean terminology, the 'forecast' driven part of the supply chain is typically labelled 'push' and the order driven part is called 'pull'. In the lean philosophy push leads to waste, as the forecast is never perfect. Instead of MRP to derive and plan the upstream dependent requirements, lean advocates the use of Kanbans to create an upstream pull as well. The principle then becomes that upstream production is only triggered by an actual downstream consumption rather than a predicted downstream consumption. Debates about this difference can become quite religious. In our mind it is simple. A key assumption of pull is that demand can be stabilized so there are no sudden peaks. In many environments that remains a dream rather than a reality. Promos, tenders and seasonality all make that demand has important swings instead of being stable. In our experience a push system remains the only way to tackle that effectively.

Detailed Scheduling

At the lowest level we have the detailed scheduling. This will plan the actual manufacturing in the so-called frozen period.

In many companies it has a 3 to 12-day horizon, but again, this now depends on the production lead times. In a Make-To-Stock environment, it will typically start from the planned production orders of the Master Plan, which it will confirm into firm production orders. For the pull part of the supply chain it will be order driven, and it will combine customer orders into firm production orders. In principle the existing firm production orders are frozen and will not be changed. Depending on the scheduling frequency, each day or twice a week, new orders are confirmed into firm production orders at the end of the schedule horizon.

Scheduling is typically done in continuous time, provide start and stop dates for each of the orders. Big differences with the master plan are the sequencing and the scheduling. Sequencing means orders are put in a specific order one after the other. Optimizing the sequence will again optimize the cost and inventory, as long as it allows to realize the expected service. Scheduling means that orders are placed on specific workcenters, not only for the last step, but for all steps required in the production of an intermediate or a finished product, depending on the scope of the scheduling process.

Though scheduling looks easy, it has to confront many practical constraints like the unavailability of raw materials or packaging, limited manpower to execute specific activities like change-overs, unexpected orders pushed by the sales, which disrupt the normal flow of operations. Due to the continuous and short-term nature, a schedulers' job is never finished. It takes a special kind to withstand this type of continuous stress and pressure. The schedule will generate shop floor orders, which trigger the MES or ERP execution systems. They directly steer the operations on the production floor.

The vertical dimension in summary

The following table summarizes the key characteristics of the different planning levels. Companies are tempted to skip a level, as they are overwhelmed by the complexity of the different layers. You can try to skip a level, but you cannot skip the related questions. Skipping the Master Plan typically drags the RCCP into more detail. As we will discuss further, getting both the volumes and the complexity right in 1 single process, requires a high maturity of the planning people. It also requires more advanced tooling. We will lay that out in the section on complexity and maturity.

	Strategic	Budget	RCCP	Master	Scheduling
Horizon	3-10 yr	1 yr	12-18 mth	8-12 wk	3-12 days
Buckets	Yearly, Quarterly	Monthly	Monthly	Weekly	Continuous time
Updates	1-5 yrs, minor/major	Quarterly, Half-year, None	Monthly	Weekly	Daily
Owner	CEO, BU President	Finance	Supply Chain	Production	Production
Level of Aggregation	Highest, e.g. region/application	Intermediate, e.g. subregion/product group	Intermediate, e.g. subregion/product group	Detailed, e.g. FP SKU, depending on MTS/ATO/MTO	Most Detailed, FP SKU, intermediate SKU, …
Inputs	Long-term forecast, evolutions, scenarios, PESTEL, …	Long-term ambition, next year ambition & outlook	S&OP forecast (most realistic expectation next 12-18 mth)	Allocation, capacity, inventory + forecast + orders	Planned production orders & customer orders
Key outcome	Long term plan & focus: growth, profitability, consolidation, markets, …	Financially viable (stretched) plan for next fiscal year	Realistic, cost-efficient and viable tactical (volume) plan	Realistic, cost-efficient and viable operational (mix) plan	Realistic, cost-efficient and viable daily plan for all steps
Key Decisions	Major capital investments, acquisitions/divestments, partnerships, markets, … SC network	Target setting for volumes, pricing, cost, margin, … Allocation of (financial) resources	Identification of bottlenecks and appropriate solutions (capacity, inventory, …)	Account and plan for mix variances Prioritize orders vs forecast vs inventory	Scheduling (synchronized start/stop for all steps) & Sequencing (optimal sequence)

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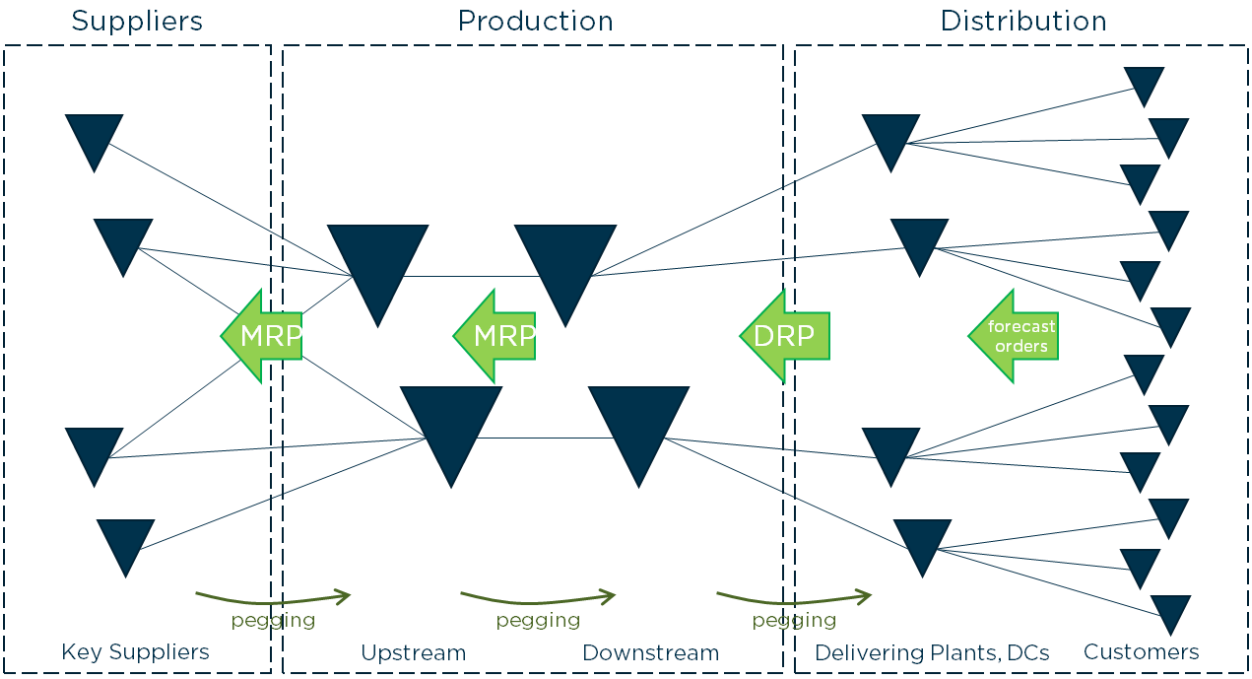
Dimension 2 – Supply Chain Planning

The second dimension of planning is the 'horizontal' or 'supply chain' dimension. As shown in the figure below, many companies have to plan a distribution network that is keeping stock and is delivering to the end customer. They have production assets, which may be split in upstream and downstream activities spread across different sites or even different regions. And we must not forget to plan key suppliers. Our upward and downward flexibility may be bound by that of key suppliers.

In a 'Distribute-to-Stock' strategy (cfr. outline above on CODP), the forecast and orders are made available on the DC level. A DRP calculation is used to calculate the net requirements on the level of the downstream production. An MRP calculation is done to translate that into net requirements of intermediates and raw materials. DRP and MRP are connecting the different steps in the supply chain.

They perform stock netting and lead time offsetting. MRP accounts for the consumption and the yield. This information is typically captured from the Bill of Distribution and Bill of Material stored in the ERP system. The routings define the default and possible alternative paths throughout the network. Calculating the dependent requirements is really the first step in your supply chain planning.

In the other direction, we sometimes want to know which distribution orders are linked to a specific production order. And whether the distribution orders are linked to any customer orders or just meant for forecast or replenishing safety stocks. This concept is called order pegging. We peg the upstream orders to the downstream consuming orders. This can be important information in case we need to prioritize upstream orders.



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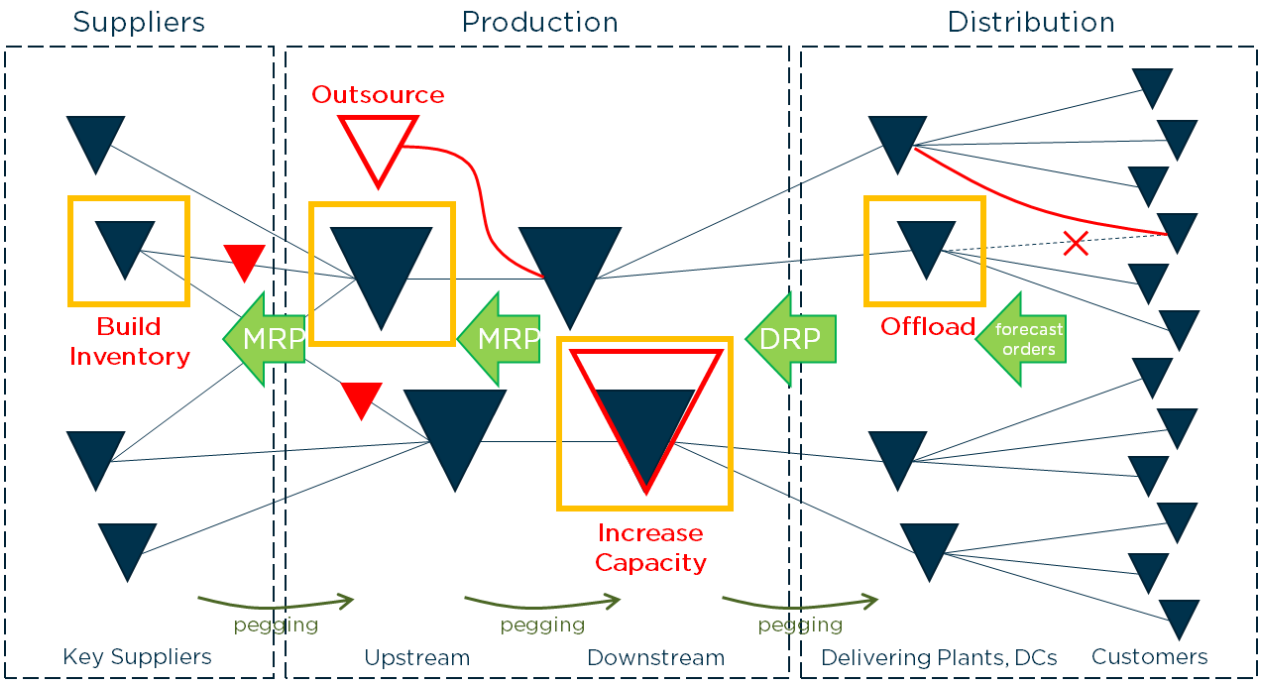
A second step in the supply chain planning is defining your critical assets. A critical asset may be a bottleneck, an asset which has a primary impact on the overall cost or quality or an asset which is unique and costly to reproduce like a mould. They are shown as the orange boxes in the next figure. Critical resources can be at the supplier, in the upstream or downstream production. If you're making fresh or frozen food, or have heavy seasonality, there may also be a constraint in the distribution center or even in the transport.

Every critical resource needs a rough-cut plan. The horizon of that plan depends on the frozen, flexible and free periods as discussed in our outline above.

Distribution environments are typically more scaleable than production operations. Their horizons are typically shorter. The figure also shows the basic options you have when a critical resource is overloaded. You can either increase capacity, offload demand to another internal resource or outsource to an external resource, or in case of a temporary peak, you can cover with building extra inventory.

As we'll show in the next paragraph, we need to apply the different hierarchical levels of planning to our supply chain.



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Combining Vertical and Horizontal into "Hierarchical Supply Chain Planning"

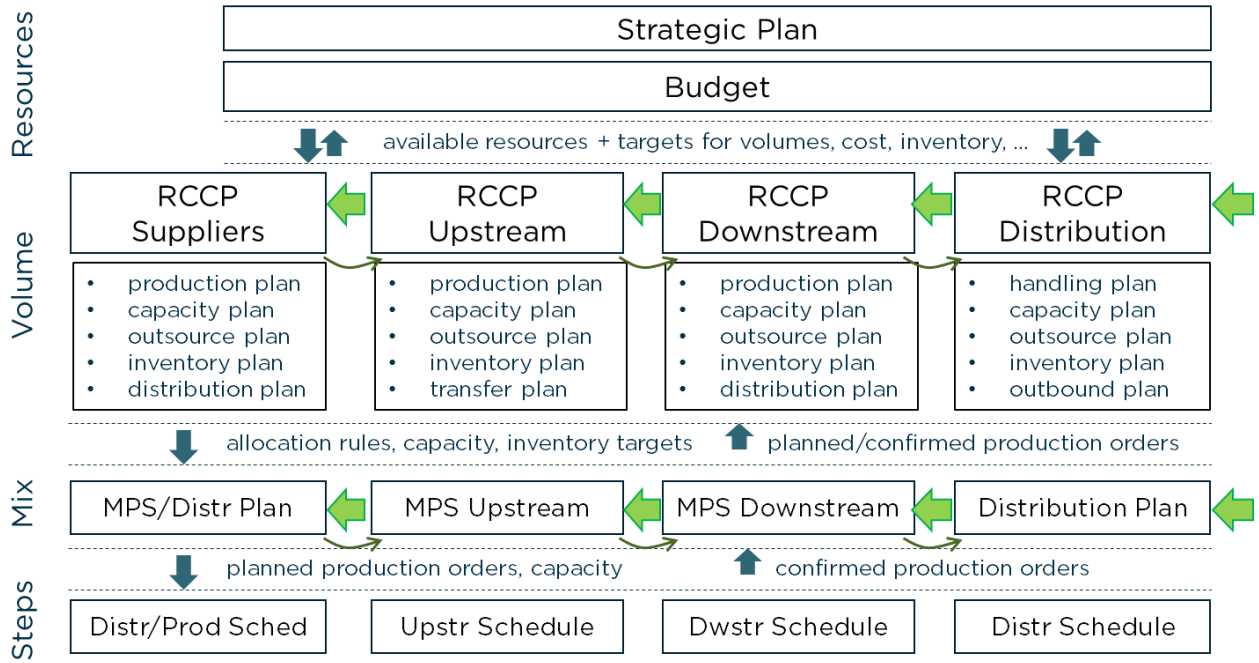
The next figure maps the hierarchical planning to the supply chain. The strategic plan and the budget are typically holistic. They take a look at the integrated supply chain. As explained in the previous paragraph, depending on where the critical resources are, we may need one or more RCCP processes. The more critical resources, the more complex the planning. In a next section, we will show how more advanced techniques like optimization modelling allow a more holistic approach, instead of the more sequential approach suggested below.

Each of the steps in the supply chain needs a 'volume' type of plan, defining the required capacity and/or inventory build-ups to accommodate constraints. Each of the steps need to refine that using a 'mix' type of plan, where specific SKUs can be grouped based on shape, size, weight, finishing or any other relevant characteristic. Finally, to steer the operations, we need to come to a schedule, which tells people what to do in the coming hours and days.

Separating into different plans keeps the pieces manageable. However, it raises the crucial question of how to connect them. As explained in the previous paragraph, the connection from customer to supplier is done via DRP and MRP.

The figure below also summarizes the typical connections between the hierarchical levels. The strategic plan and the budget define the available resources and assets like plants, machines and distribution capacity. As elaborated in the beginning of this paper, the budget is not neutral, it typical shows and ambition, and people's compensation is linked to the targets it contains. This heavily influences the decision making on a tactical horizon. The RCCP tries to get the volumes right and basically decides on capacity levels, inventory levels and allocations. These are the constraints within which the master plan will try to further detail the plan. The master plan will generate planned production orders which are triggering the MRP for the raw materials.

The planned production orders within the manufacturing lead time are firmed in the detailed scheduling. The confirmed production orders are passed back to the master plan as these cannot be changed. The planned and confirmed production orders are passed back to the RCCP as these cannot be changed by the RCCP. The RCCP gives critical input to budget updates. The planned utilization rates may be significantly lower or higher than the budgeted ones. This will impact cost and profitability. As we will argument in the next section, the more mature the RCCP process and tooling, the more integrated the RCCP and the budgeting process can be.


Resources
Strategic Plan
Budget
available resources + targets for volumes, cost, inventory, ...
Volume
RCCP Suppliers
RCCP Upstream
RCCP Downstream
RCCP Distribution
• production plan
• capacity plan
• outsource plan
• inventory plan
• distribution plan
• production plan
• capacity plan
• outsource plan
• inventory plan
• transfer plan
• production plan
• capacity plan
• outsource plan
• inventory plan
• distribution plan
• handling plan
• capacity plan
• outsource plan
• inventory plan
• outbound plan
allocation rules, capacity, inventory targets
planned/confirmed production orders
Mix
MPS/Distr Plan
MPS Upstream
MPS Downstream
Distribution Plan
planned production orders, capacity
confirmed production orders
Steps
Distr/Prod Sched
Upstr Schedule
Dwstr Schedule
Distr Schedule

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Dimension 3 – Complexity and Maturity

Though every company will think they have the most complex supply chain, there are significant differences across them. Some elements we regularly encounter are:

- Shifting Bottlenecks
- Multiple BOMs/Recipes for the same finished product
- Complex change-overs & production wheels
- The need to keep upstream assets running to keep costs reasonable
- …

As we will argument below, different complexities require a different approach. The more complex the supply chain, the bigger the need for 'integrated' and 'optimized' solutions.

A second challenge we see in companies is a big difference in planning maturity. Some characteristics that define maturity are listed below:

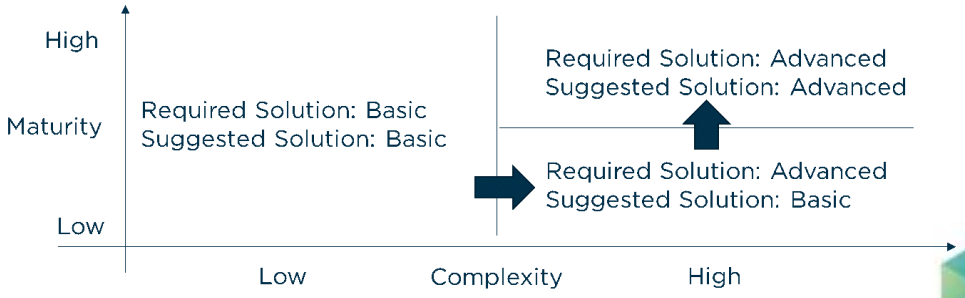
- Quality master data
- Quality cost data
- Excel-driven vs experience with advanced planning tools
- Average years of experience in the planning team
- Experience with other recent improvement projects
- …

As shown in the following figure, even if you have a high complexity, we advise to start with a basic solution. Basic solutions will help increase the confidence and the maturity of the team.

Don't jump to advanced solutions with a basic team. You may not have the data to feed (garbage in garbage out), you may not have the people to manage them. In general, we see if complexity is increasing, we all carry more products, are exposed to longer lead times from global selling and sourcing and have less buffers because of pressure on cost and inventory.

As complexity increases, we all have to adopt more advanced planning solutions.

To manage change effectively, see it as a journey with multiple steps, as opposed to just 1 single project, where maturity and technology go hand-in-hand.



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Below we have tried to summarize our view on the potential journey. If you have a low maturity or a low complexity, we advise a so-called 'planner-driven' approach. This approach follows the basic sequential and hierarchical process lined out in the section on hierarchical supply chain planning. We advise to put the planner in control of decisions to increase capacity, build inventory or offload demand to alternative internal or external assets. This planning is manual, and from that perspective may seem suboptimal.

However, it is key that planners control the basics, before they move to more advanced solutions. You learn to drive a basic car before you step into a Ferrari. Moreover, if maturity is low, chances are big a lot of your planning is currently Excel driven. If that's the case, you will already see a huge performance in both time spent and planning parameters. We do advise to use a professional planning tool instead of Excel. Excel will support basic planning decisions but it's not integrated. The time lost is in the manual downloads of information from ERP or BI systems and the VLOOKUP's that need to connect it.

A next step is automating some of the recurring decisions using a rule-based engine. A rule-based engine may define that on specific work centers pre-building stock is the default option, or offloading demand from a primary to a secondary source. By defining rules, the planner stays in control but his efficiency is further improved. As the number of rules grows, the complexity increases and both the process and the planner seem ready for an optimization-driven approach.

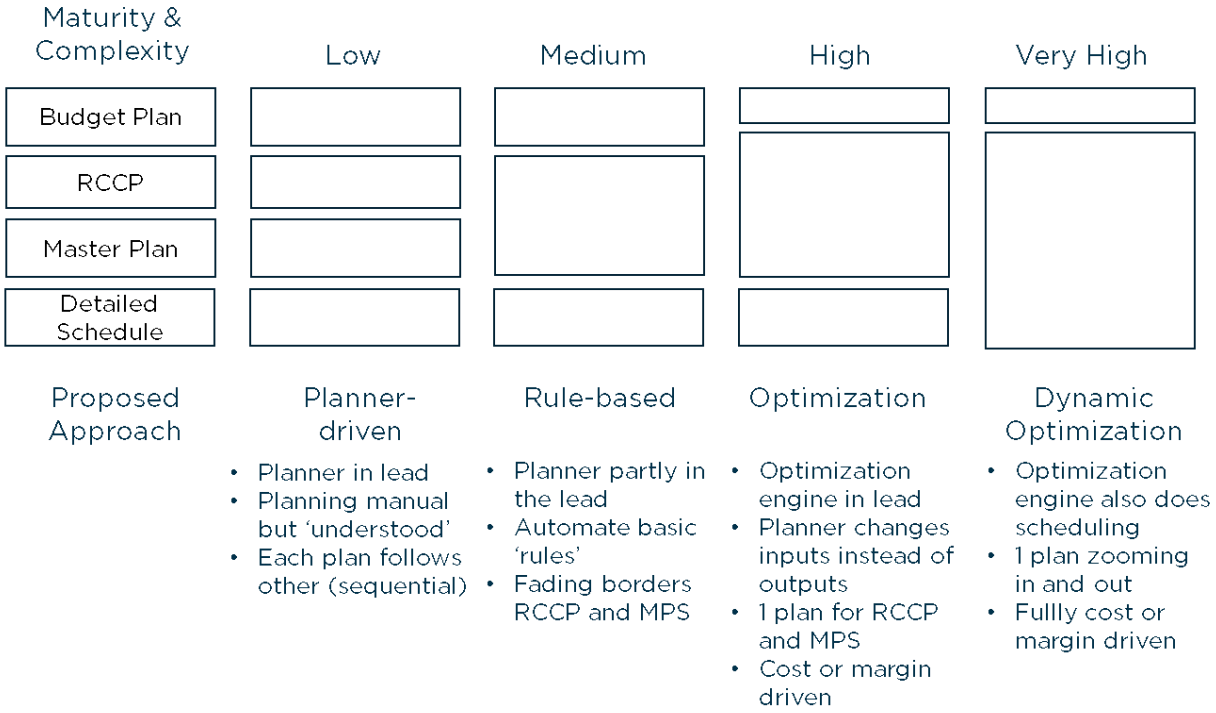
In an optimization driven approach, the planning decision is not an input, but it is an output. The optimization engine will decide on the optimal plan. It will do so by trying to optimize a so-called objective function. The objective may be to minimize cost, where cost may include production, change-over, transport and inventory cost. The objective may be to maximize margin.

The objective we choose may depend on the company, but also on the quality and the availability of cost and revenue data. The optimization engine will find the optimal solution within specific constraints. Constraints may be availability of raw materials, the need to meet the demand, the capacity available. Capacity may be a constraint, it can also be an output, like the amount of overtime or the need for extra shifts. The planner can influence the 'result' by changing the inputs. If he believes the proposed plan is not realistic, he will probably need to modify the model and add some constraints. If he believes the proposed plan is not optimal, he will probably need to refine the cost data. The job of the planner becomes drastically different. Instead of managing the plan, he becomes the manager of the inputs of the plan.

As already mentioned, a planner-driven approach is typically sequential. We work from a higher level of aggregation down to a lower level of aggregation, we work from right to left, from the customer to the supplier. The rule-based approach does the same, but in a more automated fashion. Optimization takes a holistic approach, looking at all of the constraints at the same time. Optimization can tackle aggregated constraints like capacity planning at the same time as more operational constraints like grouping in campaigns. If we look at the examples shown earlier, with simultaneous constraints in distribution, downstream operations, upstream operations and suppliers. Optimization will be the only way to ensure a feasible and cost-effective solution.

In general optimization is also more finance driven rather than volume driven. As maturity increases, companies have better cost data. Optimization will put this data at optimal use by looking at cost or margin optimization.

As more financial data is in the planning engine, it becomes a robust platform to run budget scenarios. As illustrated below, optimization from that perspective spans from the budgeting up to the master planning process.



A next step is what we call 'dynamic optimization'. Two challenges remain in an optimization based approach. A first is that it remains quite static. It may be updated only weekly. A second is that it remains 1 level higher than the actual scheduling. If for your company, the actual sequencing and scheduling of orders is essential to the cost of the product, and you are faced with highly variable demand meaning you can't effectively plan ahead for more than a week. Then a dynamic optimization which integrates the scheduling into the optimization is essential.

If the optimization is run multiple times throughout the day as new orders are coming in and need to be scheduled, we call this 'dynamic optimization'. Prior experience with both scheduling and optimization is required to make this a success. As markets become more complex and demanding. We expect more companies to gradually shift in this direction.

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Combining process, tooling, analytics and people

At Solventure we strongly believe in a combination of process, tooling, analytics and people. A first step remains to get the processes right. Which levels of planning do we need, how will they interact. These are key questions for which we have given a reference framework. This can be the starting point for a discussion in your company.

As explained in detail, more complex processes require more advanced tools. Running a complex supply chain on Excel will be suboptimal. Ensure that the planning system allows you to evolve as a company. As your business complexity grows, your systems will need to adapt. Different parts of your business may have different complexities. Ensure that your system supports the different complexities, from planner-driven to dynamic optimization.

Ensure that your implementation partner masters advanced analytics such as optimization. Mastering means he knows how to configure complex models and how to trade-off complexity versus added value.

It also means he knows when to use it, and when not to use it. Avoid single minded people. There is no single truth in planning.

And don't forget the people. As your complexity grows, and your systems become more advanced, so need your people and your data. If planners have followed a specific approach in Excel for over 10 years, jumping to an optimization solution is guaranteed to work as a black box. And a black box works as long as its first surprise. If people don't understand they will start changing parameters as to have the system do what they think is right. They will ultimately give up and revert to their Excel solutions as the trusted environment. Make sure that your implementation partner acknowledges the change aspect. Yes, we can move steps forward, but ensure the people go first. Even with a high-level of automation, they remain the key resources in the planning process.

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In conclusion,

we believe supply planning is by far the most complex step in the S&OP process. We have outlined how traditionally supply planning has been split into different hierarchical levels, each solving a part of the planning puzzle. We have also explained how we link the planning of the different steps in the supply chain from the customer up to the suppliers through DRP and MRP. When prioritizing upstream orders, we need to know the impacted downstream orders. This is called pegging.

We have indicated that complexity and maturity are important in defining the desired and the recommended planning approach.

If maturity is low, we recommend starting with a basic planner-driven approach, even for complex supply chains. Before you drive a Ferrari, you need to learn how to drive an ordinary car. In planning terms that means getting basic planning data right and ensuring different planning levels exist and are connected. If you're not there yet, making this as a first step will always pay off. As the planner gets increasingly comfortable, he can start configuring basic rules in a rules-based approach. As the number of rules and the complexity increases, he's ready for an optimization driven approach.

As we move towards optimization we will plan based on cost or margin optimization. We will also start integrating constraints from different hierarchical levels into the same plan. The strong financial planning capabilities will automatically integrate into the budgeting process. The ultimate goal is to come to dynamic optimization, where the costs from scheduling and sequencing are also included in the model, and where running the optimization multiple times a day further increases the responsiveness while keeping costs and inventories at an absolute minimum.

We'd like to hear from you!

Let us know your thoughts. We're curious on which aspects you'd agree or disagree. Where are you in your supply planning journey? Which challenges are you facing? Together we can make it even more exciting and rewarding!

Watch out for more!

Check out www.slideshare.net/solventure for our more in depth position papers on "Balancing service, cost and cash in the supply chain triangle", "Segmenting customer in B2B environments", "Effective Demand Planning", "Including Product Management in your S&OP cycle", "Multi-Echelon Inventory Optimization" and many more.

About Solventure

Solventure takes pride in being experts in designing and implementing S&OP. We do that through a unique combination of people, processes, tools and analytics. Solventure is the European channel partner of Arkieva, an award winning S&OP software. Together with Arkieva we provide global support to our growing customer base. Check us out at www.solventure.eu or contact us at contact@solventure.eu for more info.

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