

# THE REIGN OF THE FLOW: A NEW PATH

## Demand Driven Supply Chain Management

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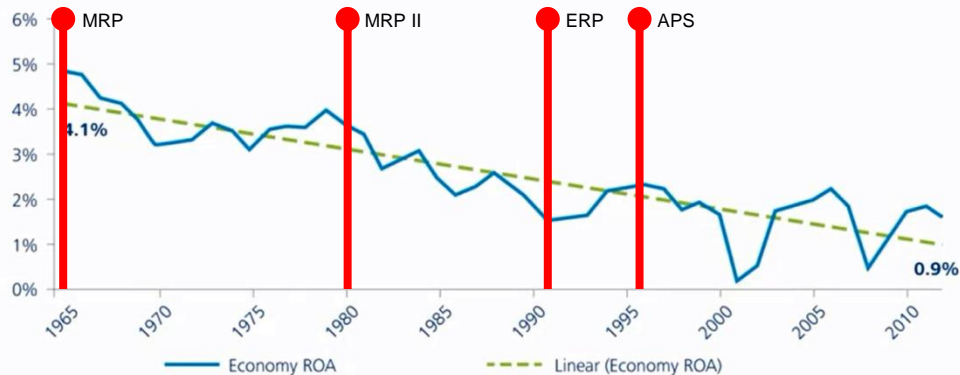
Significant investments in infrastructure and technology in recent decades have contributed in achieving supply chains that are more efficient in cost every time. Nevertheless, despite the improvement in the available tools, the return over investment indicators are not improving, some clients continue dissatisfied and inventories continue to be high. The following graph portrays a study published by Deloitte University Press that evidences this:

### S&OP

Many of the best practitioners of S&OP produce a demand plan or forecasting at an SKU-week-region level. What is its accurateness? Very good when we see the plan in an aggregated manner, meaning at a quarterly level, for a whole country and the whole portfolio. This information becomes then very relevant for decision making in the strategic range (like defining entering a new market, expanding the installed

## Business Reality – Return on Asset Decrease

Figure 1. Return on assets for the US economy (1965–2012)



US firms' ROA fell to a quarter of its 1965 levels in 2012. To increase, or even maintain, asset profitability, firms must find new ways to create value from their assets.

The challenge to change this tendency becomes even more difficult since demand is more unpredictable every day, forecasts are more inaccurate in guiding tactical decisions, product lifecycles are shorter and portfolios are broader as a consequence of innovation and product development aimed at specific market niches. How should we face this growing complexity in supply chains and still provide the profitability, return over investment and return over used capital, service level and inventory rotation results demanded by the stakeholders? This is a crucial dilemma for many chairmen, directors and managers.

Let us see how today's conventional models deal with this situation:

infrastructure or another decision that entails important impact on the CAPEX).

But how relevant is this information for decision making in the tactical range or even to make decisions during the current operation cycle for this week? The truth is that even a good single digit MAPE, at portfolio-month-country level, becomes a MAPE greater than 20% at SKU-week-region level; which is the way the operational cycle requires it since in a manufacturing, procurement or distribution process, the detail product by product, node by node and week by week is required in order to design and execute the plan. Hence, what gave us relevant information (as an aggregated whole) for strategic decision making has become irrelevant information for decision making at a tactical and operations level because with such degree of deviation it will invariably lead us to making the wrong decisions.

So we launch initiatives trying to improve the MAPE and after several years of effort and discipline, the best in class find

that there is a threshold over which any further improvement in the MAPE no longer generates any increase in the service level if not eroding the return over the capital employed when increasing inventory. Still, the pressure to improve on the return is still increasing (remember the graph after the opening paragraph) and customers want their reliability and speed to continue improving. This conflict appears to have no solution.

## MPS - MRP

A short while ago we discussed this issue in Chicago with Dick Ling, considered one of the fathers of S&OP and who developed the MPS (Master Production Schedule). This living legend from the SCM and manufacturing world developed MPS as a pivot to stabilize the interior scheduling of a plant and prevent such distortions from permeating the system and to produce a bill of materials explosion that presented greater stability through the MRP engine.

This requires that the planning horizon be at least equal to half the accumulated lead time that each scenario entails and since the visibility horizon of each real sales order tends to be shorter to such margin, then the difference between these two horizons must be compensated by generating planned orders (or so called provisional/temporary orders under some ERPs) based on the sales plan or forecast generated. For example, if customers only place orders one week before the delivery date, but their lead times are 2 weeks, and the material lead times are 8 additional weeks, then you must have a planning horizon of 10 weeks but where you will only have certainty or visibility of 1 week concerning real orders. For this reason, you must fill in the remaining 9 weeks with planned orders that come from a forecast for the purpose of anticipating and completing the remaining accumulated production and procurement lead time and fill out the entire planning horizon. This is a great idea as long as the assumptions it is based on are applicable. The assumptions are basically the following:

1. Demand signals are known and stable.
2. The lead times for release, receiving and order synchronization are realistic.
3. The materials and capacity are available on the required dates.

It is worth noting that the decisions we are discussing here are of tactical/operational nature, for which we know that the forecast does not produce exact and trustworthy information about the behavior at an SKU-weekly level and therefore the first assumption becomes not very realistic these days. This assumption was good enough, perhaps, to deal with the complexity and volatility of supply chains from several decades ago, but not anymore when we possess broader

portfolios that by definition are trying to tend to smaller and smaller market segments every time (previously we had few products for large market segments and now each SKU is associated to a much smaller target market) making accurateness and precision in our predictions worse every time. This view gets worse when we consider that planning horizons are greater every time because manufacturing lead times are longer on account of products with higher added value, more complex manufacturing processes and because global procurement makes it more common to import raw materials with longer lead times than under the previous model with local vendors. All of us know the consequences of elongating such planning horizon in any prediction: the

longer the horizon to foresee, the more inaccurate the prediction or forecast being made. Anyone that does not see this problem would benefit from visiting a friend that works in weather forecasting or macroeconomics, and ask him about the difficulties of predicting the weather or the exchange rate a great deal ahead of time.

The previous also bears consequence on reliability concerning the lead times used for the MRP explosion. After all, where is there greater probability for an unforeseen event to affect an order; in a short or long lead time? The greater the lead time, the less reliable it is because "Murphy" exists. And if procurement and production lead times tend to get longer, then we can deduce how valid the second assumption presented becomes. Combining these two situations in forecasting and lead times, it is not a surprise to see that some materials are not there when needed and/or the capacity is not available at such time when it is required.





The final consequence of all this is that when a discrete number is defined in the MPS finally, and the MRP is exploded, we commit to this figure during a long time horizon and variability simply does its work; this number is not complied with and despite the reprocesses in planning and execution, it will never be met (because we will be working under the same assumptions!). Thus, some items will

be produced in excess because real demand is lower than anticipated with a forecast, and the planned purchase or production of other items will be lower than the real demand, generating product over-costs due to urgency and expediting, all of this giving us the so called bi-modal distribution where: "I have a warehouse full of what I don't need and I don't have or barely have some products that I do need for the real actual sale".

### Safety Stock

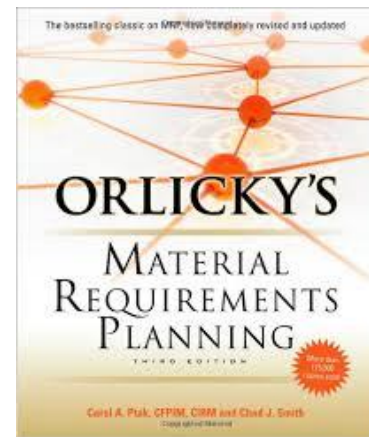
Then to compensate these errors we add safety stocks, but we also assumed that we only needed to add one supplementary position to provide some protection and that the demand did not change frequently and therefore these could be static positions in the short term, and that the variability with which they should be assumed came from the demand side. Nothing was farther from the truth: when the short term variability of the demand is analyzed at an item level, high variation coefficients can be observed (most times mathematical calculations are not necessary to deduce this that we experience every day), the variability that these inventory positions must face not only comes from the demand but from external or internal supply sources, and being a supplementary position it's simply a "new zero" for the net sum of requirements which in reality generates reprocessing and expedition efforts every time a new calculation is run. However, it does not generate the effect of isolating or absorbing the impact from the variability of the demand and supply like a firewall in a fire or a dike when the

waves come in from the ocean. This has not been the solution although it has contributed in the increase of inventories and has deteriorated the return over employed capital indicators even more.

### APO / APS

Ergo, to salvage this situation we generated the advanced planning models in the 90s with the promise that we would obtain the relevant information for adequate decision making, if we used the calculation capacity and speed of the mighty ERPs to reprogram more frequently and be able to adapt. However not changing the assumptions and using them more often and with greater processing speed instead, we quickly ended up in the wrong place. It is not surprising that the effervescence period of these models is coming to an end.

### UN NUEVO CAMINO



Following several decades with little changes in MRP, a new path was described in the third edition of Orlicky's MRP book. What would happen if our supply chain and operations model were designed to react to the actual demand with a greater velocity than the order visibility horizon? The first idea that springs to mind is that we would not depend on the accurateness of forecasts and we could work with the better known and most reliable demand signal: actual demand. This would validate assumption #1 proposed under the MPS-MRP portion. Furthermore, with greater speeds, lead times would be reduced and thus the probability of an unexpected occurrence taking place, which would validate assumption #2. Finally, with a faster model there will be greater reaction capacity to adapt to changes, resulting in a greater probability of finding the right material at the planned time, therefore having higher possibilities of having greater capacities available according to the defined program/schedule. This would validate assumption #3.

How to create this fast model of operations? The flow is the key to rethink

Our way of designing, planning and managing processes throughout our supply chains, where the most feared enemy of the flow is variability. Without variability, all the problems described will fade away. Hence, we must find a way to promote the flow as the center of our models and protect it from variability as its main enemy. For this, it is necessary to implement the three P's:



suffering constant reprocessing and variability from entering the system.

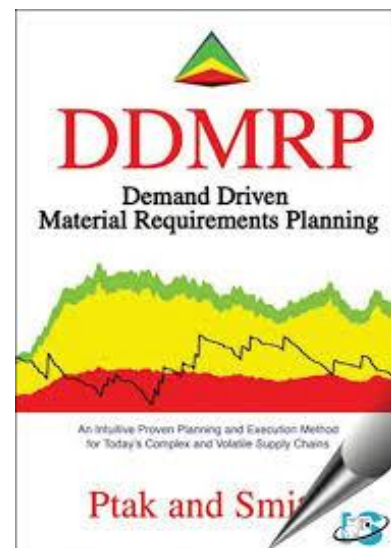
Position, Protect and Pull are the fundamental 3 Ps of the Demand Driven Operating Model (DDOM) that have started to generate outstanding results around the world. Demand Driven MRP is a novel and powerful multi-tier model focussed on inventory management and materials

planning with aligned execution for any company. Next year we will be in several cities around Latin America teaching through an innovative 2 day program called Certified Demand Driven Planner (CDDP), starting with Lima and Bogotá, next February.

This program is internationally accredited by the renown ISCEA and is aimed at managers, planners and planning and execution chiefs for the processes of supply, production and distribution for manufacturing companies, distributors and retailers with chain stores of all types of products. If you wish to learn more about these topics, give a quantum leap to your professional career and take your company to the next level in competitiveness and profitability, we suggest you don't miss this event.

**NOTE: If you wish more info about Demand Driven MRP or Demand Driven S&OP, please contact to Alfonso Navarro Bustamante as Demand Driven Institute Representative: [alfonso\\_navarro@hotmail.com](mailto:alfonso_navarro@hotmail.com) +57-3008151499**

1. **Position** inventory in those strategic places where it is effective to fight off variability. These places are called decoupling points.
2. **Protect** the defined decoupling points, calculating an inventory firewall for each point, that generates independence between the consumption of such material and its supply (creating a so called "decoupling" effect) and adapting it dynamically to actual or planned changes in the demand, supply and associated variability, so that its calculation never becomes obsolete facing the conditions to be endured in the short term. This shall require that the parameters with which these "firewalls" are calculated come not only from the behaviors of such parameters in present time, but from a process that connects these parameters with the strategic steering and business plan set forth by the High Management in the strategic range of decision making. So far such bridge has not existed because what we have done is use relevant information in the strategic range (such as the demand plan) as a direct entry for decisions in the tactical and operational range where this information is completely inaccurate and irrelevant. This "missing link" of supply chain management will be the evolution of MPS so that the flow is protected from variability and it shall connect the strategic range with the tactical range by using the relevant information through these firewalls. This new element is called "Demand Driven S&OP" and is currently being developed by our Demand Driven Institute and Dick Ling, father of MPS and S&OP.
3. **Pull** based on the actual demand and relevant information in the short term, generating the orders necessary to defend these firewalls called Buffers as primary planning positions and not supplementary ones. The latter, with the purpose of preventing planning from



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Consultant and International Speaker in Strategy and Operations with more than 15 years of experience in implementations with large companies in Latin America and Asia in sectors such as consumer goods, assembly plants, clothing, fashion, footwear, pharmaceutical and healthcare labs, manufacturing, food, metalworking, cardboard and plastic, for their purchasing, production, distribution and retail processes. He is a well-known Strategy and Operational Excellence Expert recognized for their significant results refocusing strategy of his clients, building Sustainable Competitive Advantages, redesigning their Supply Chains, building and improving their S&OP processes, and achieving superior performance in service levels, inventory turnover, sales, thereby increasing their profitability and reducing the pressure of more investment because of the growth or financial situations of these organizations. As international speaker and post-degree professor, he has trained thousands of executives and professionals in these areas. Currently, he is the Executive Head of K2 Solutions, K2 Asia Logistics and MIDAS Consulting Group, which are dedicated to improve companies' performance through investment solutions, logistics integrated solutions and consulting solutions.



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Co-creator of Demand Driven MRP, author of best-selling books in operations including co-authoring with Dr. Eli Goldratt, former president of American Production and Inventory Control Society (APICS) and a global authority in this field, recognized by *CFO Magazine* and *The New York Times*. She is Co-founder and Partner at the Demand Driven Institute (DDI), and recently co-authored the ground-breaking third edition of Orlicky's *Material Requirements Planning* (McGraw-Hill, 2011). Carol has served as the vice president and global industry executive for manufacturing and distribution industries at PeopleSoft, and there she developed the concept of Demand Driven Manufacturing (DDM). She has authored several books on a variety of topics including MRP, ERP, Lean and Theory of Constraints.