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**Advance**  
SUPPLY CHAIN SOLUTIONS

Demand  
Driven  
MRP 

**How Demand Driven MRP improves corporate performance  
in terms of Service, Inventory and Lead Time**

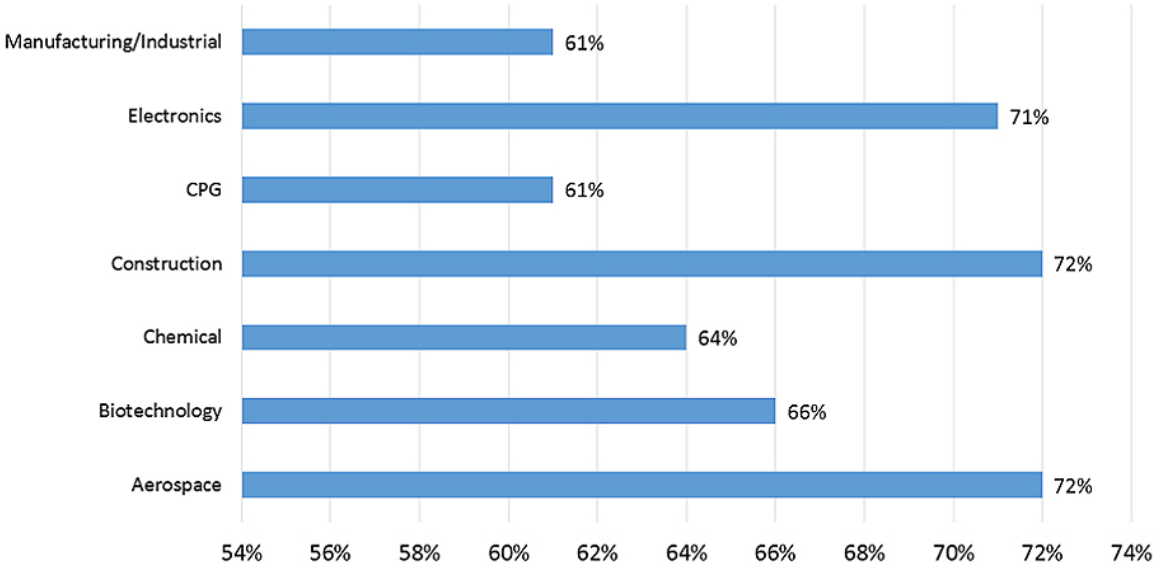
# What is a **SNAPSHOT**?

A Snapshot is the state of an object at a specific point in time. Advance Supply Chain Solutions' snapshots refer to Operations, Supply Chain, Lean Six Sigma or Procurement topics. Generally, the sources of these snapshots are implementations of our Senior Consultants, best practices and the content of our events and webinars. It is an easy and fast way to disseminate knowledge on topics dear to Advance Supply Chain Solutions.

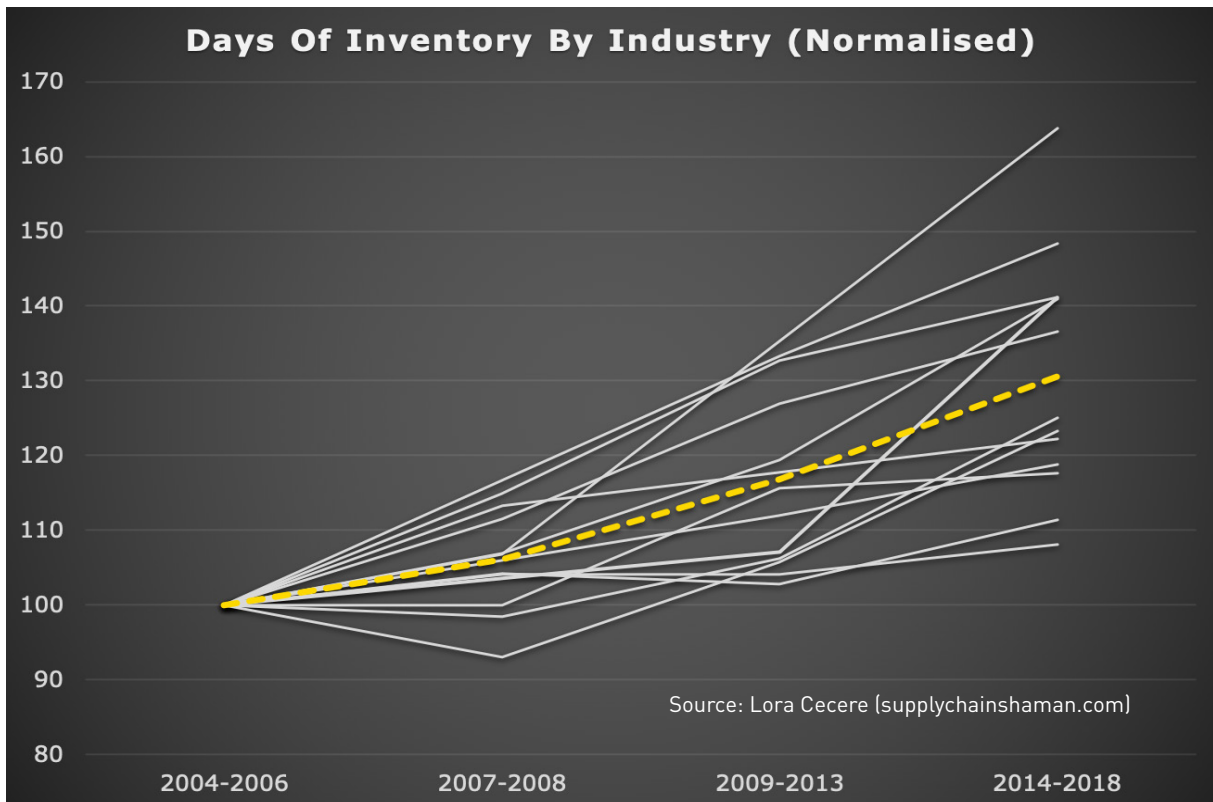
## **How Demand Driven MRP improves corporate performance in terms of Service, Inventory and Lead Time**

Supply Chain performance problems mainly depend on the fact that we use forecasts, which are not always accurate, as inputs to plan orders. Sectors or companies having a forecast accuracy of around 60% have difficulties in planning the Supply Chain.

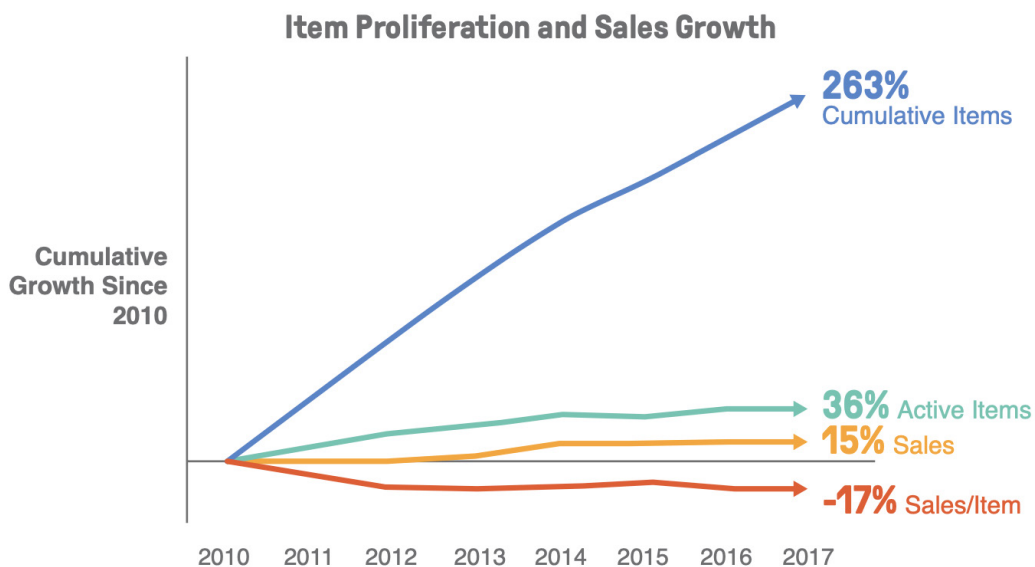
### The forecast accuracy of some sectors



According to world renowned Supply Chain Analyst Lora Cecere, many companies are experiencing a decline in cost performance, service level, stock and return on invested capital (ROIC). Moreover, only 30% of the leaders interviewed believe that their Supply Chain is efficient.



Many companies have invested heavily to improve forecasts but with poor results. One of the reasons for this forecast inaccuracy is shown in the chart below.

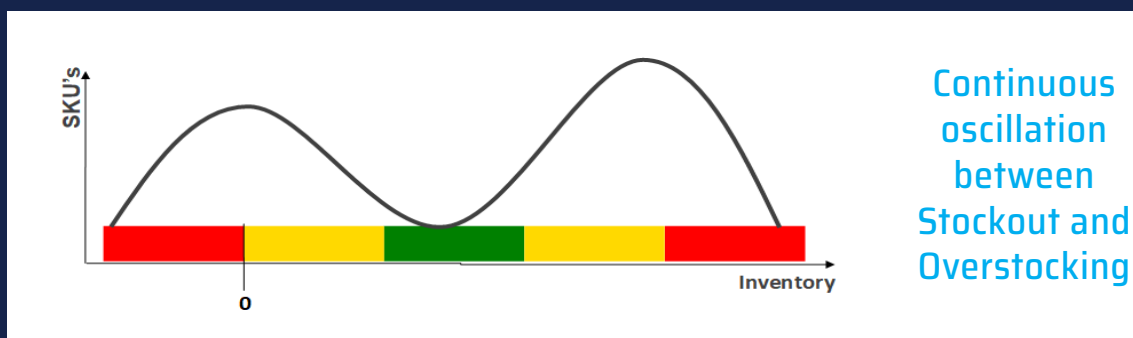


The companies covered in this study were forced to increase their product portfolio by 35% (on average) to improve their turnover by 15%. We are dealing with massive product proliferation and diversification, which make forecasting complicated.

To make things worse, the product life-cycle is getting shorter. This means that while a large number of new products enter the market, others abandon it very quickly. Moreover, another significant aspect to consider when planning the Supply Chain via forecasts is the Bullwhip effect. After creating a Master Production Schedule (MPS) and planning orders based on the subsequent BOM levels, it is essential to revise the order balance.

Sales data change and forecasts get updated, requiring a new MPS and MRP. As a result, decreased, increased, postponed, and anticipated orders generate further variations that affect the entire supply chain.

This situation leads to what we call Bimodal Inventory Distribution. It means that a company has too much inventory for its needs and too little to support sales or production. In this case, the company cannot be positioned in the ideal green zone indicated in the figure. The vast majority of companies using forecasts to plan the supply chain rely on this distribution. The financial cost in terms of missed sales, poor use of working capital and acceleration and stress costs is enormous.



## Demand Driven MRP

How can we change planning rules to prevent forecast inaccuracy from affecting the Supply Chain performance, causing the problems above?

**Demand Driven MRP was introduced in 2012 to answer this question.**

**This method is based on several best practices from the Lean, TOC, Six Sigma and APICS world. Today, many companies from different sectors operating in various MTS, MTO, AT0/ETO environments successfully apply it.**

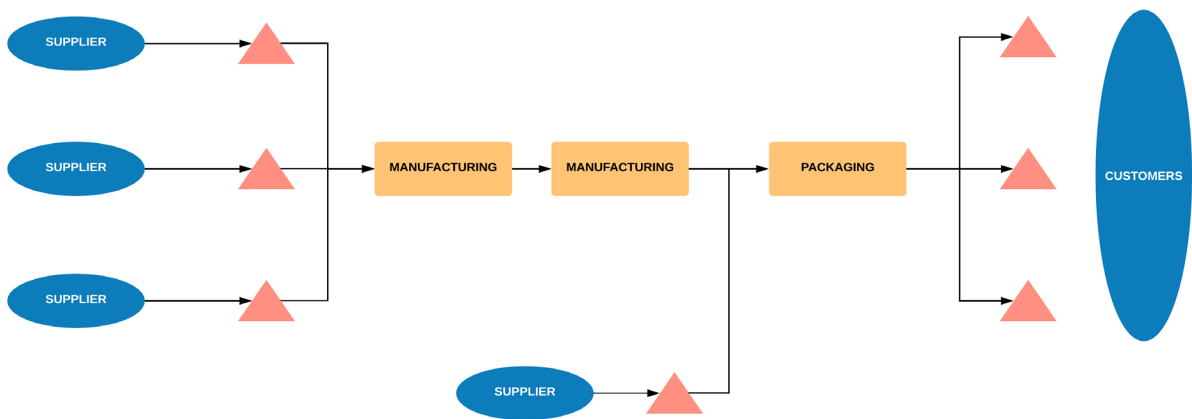
DDMRP is based on 3 essential principles:

- 1) Position -** Use of decoupling points to create independence between planning horizons and lead time

**2) Protect** - Buffer sizing to absorb demand and supply variability, allowing the propagation of a clear and definitive signal from the demand. The combination between decoupling and buffering is the only way to prevent the Bullwhip effect.

**3) Pull** - Propagation of a demand signal aligned with the market demand, therefore with orders on hand.

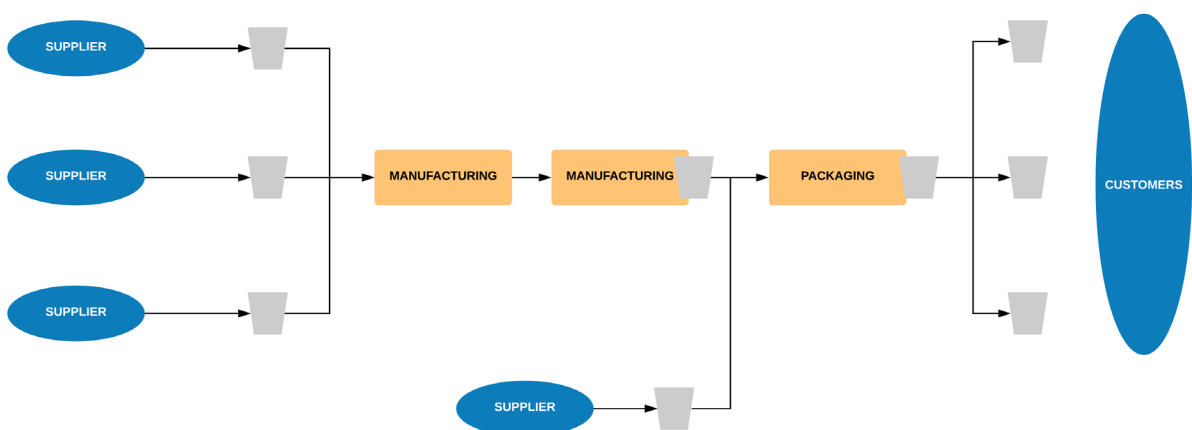
The example below refers to an MTS Supply Chain. These universal concepts also apply to the MTO, ETO or mixed-mode Supply Chains.



As you can see below, this Supply Chain evolves gradually, applying the 5 DDMRP components that implement the Position, Protect and Pull principles.

### Component 1 – Strategic Inventory Positioning (Decoupling)

Decoupling points are identified and created in the supply chain, decoupling the lead time and creating independent planning horizons. Decoupling points can be located at an RM, WIP and FG level. This strategic decision must be made at this point.

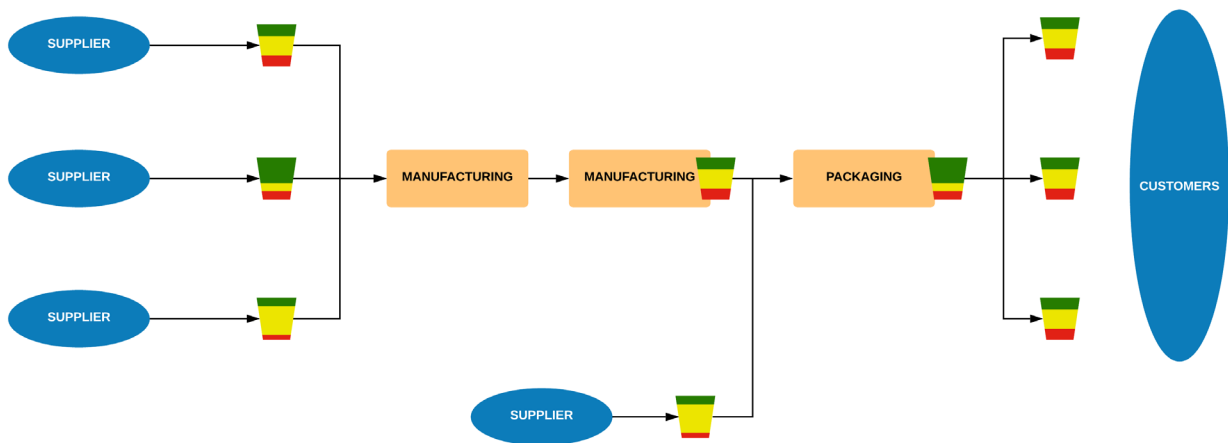


## Component 2- Buffer Profiles and Levels (Buffering)

Decoupling points are buffered through stocks. Stock buffers (buffers DDMRP) implement the decoupling points, absorb variability and stop the bullwhip effect. Stock buffers must not be mistaken with safety stocks, as they differ from a functional perspective.

The main difference is that the entire stock in the buffer must be consumed. Buffers are sized based on the average demand, lead time and variability.

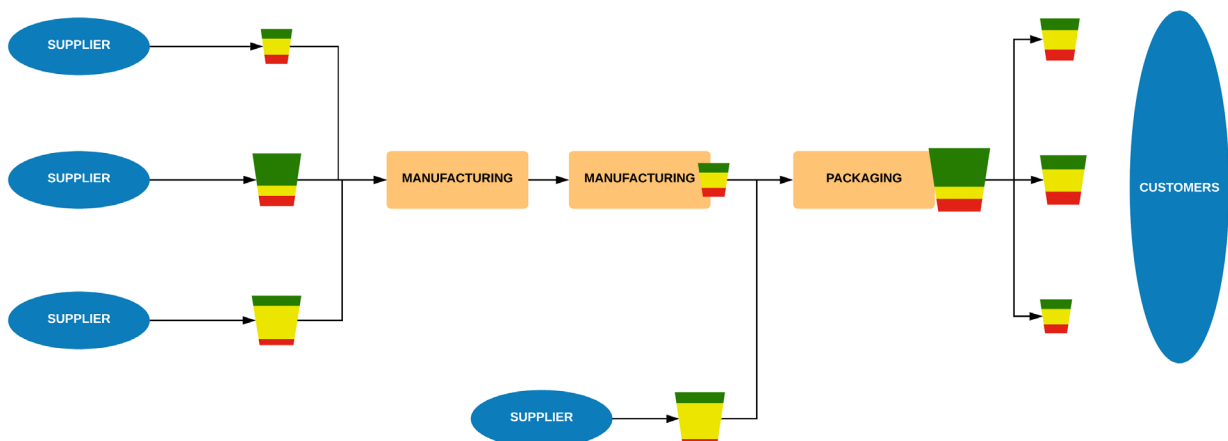
Buffers are divided into 3 zones: red, yellow and green. Each colour has different functions. These zones are calculated based on specific methods. The yellow zone refers to the average product consumption (RM, WIP or FG) during the Decoupled Lead Time.



## Component 3- Dynamic Adjustments

Buffers adapt to the market's evolution.

Increasing or decreasing sales, seasonal effects, promotional campaigns, launches of new products, replacements are all variations coming from DDMRP to adapt the buffers.

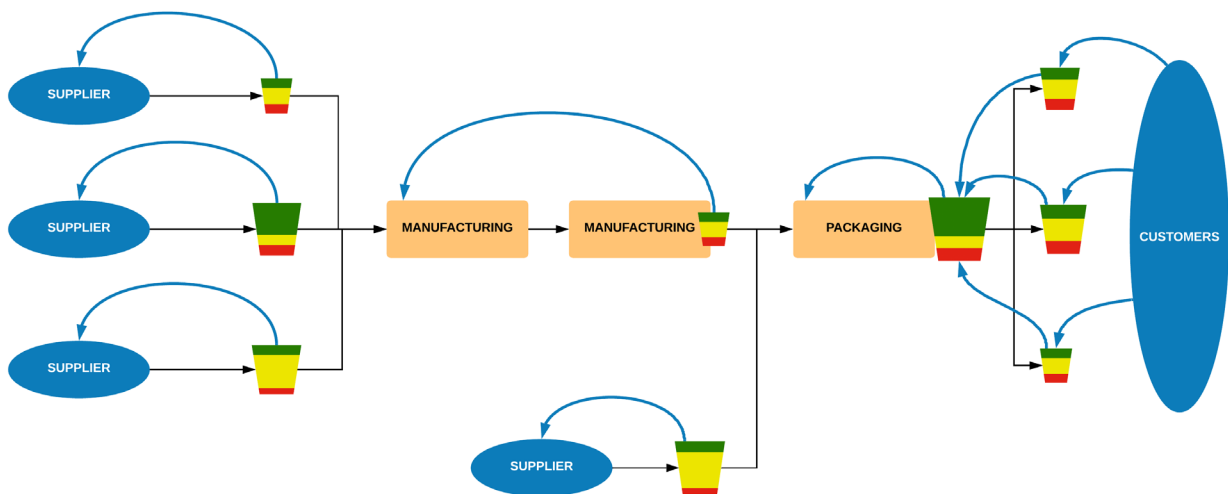


## Component 4 – Pull

Orders from customers can come from the large-scale distribution sector, shops (e.g. MTS), warehouses or bespoke production (E.g. MTO). Buffers will be consumed based on the orders placed, generating replenishment orders based on the Net Flow Equation formula (not to be mistaken with Reorder Point). This calculation has been introduced by the DDMRP.

Remember that buffers can exist at an FG, WIP and RM level. Therefore, the Net Flow Equation will be calculated for each buffer, replenishing RM, WIP and FG.

Thanks to the buffer decoupling effect and the pull mechanism, the entire Supply Chain aligns with the market demand. This also works when components have extremely long lead times because buffers consider them in their zone (yellow).

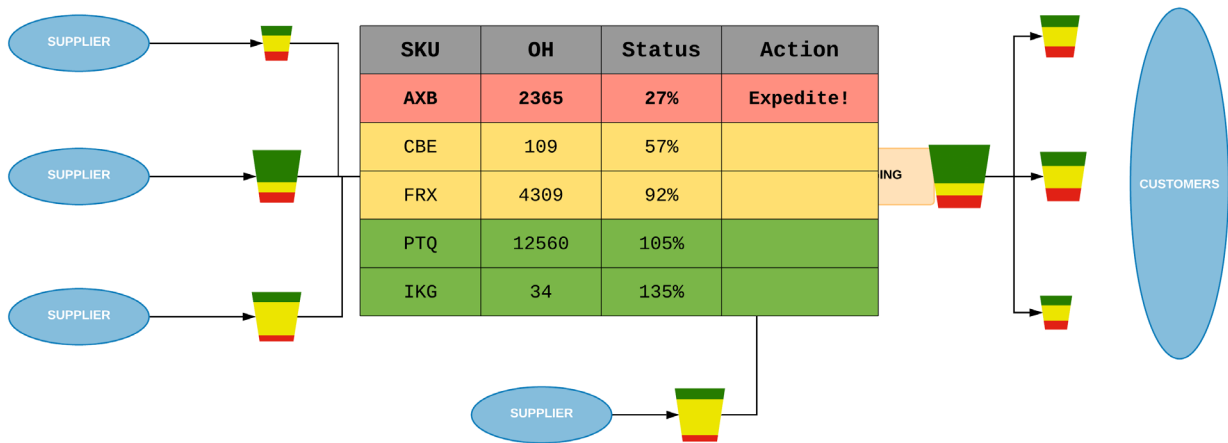


## Component 5 – Visible and Collaborative Execution

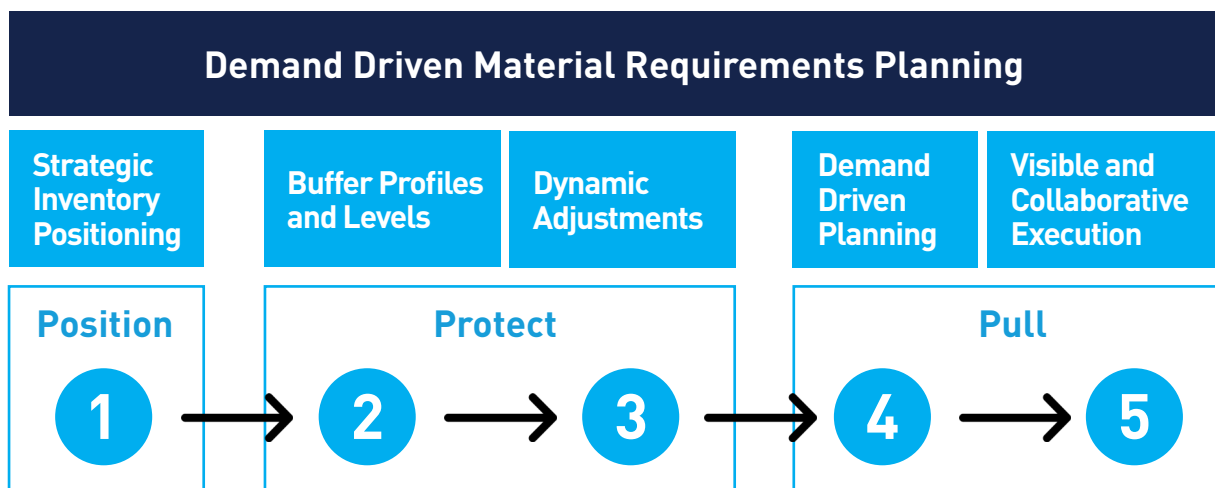
This buffer-oriented analytics creates a simple, visual and transparent system to understand and communicate which orders need to be prioritised.

Priorities are classified based on the colour and buffer penetration percentage, which give an idea of how much buffer has been consumed. This way, the planner knows on which items to focus.

This system is highly effective and functional. Suppose there are 5 orders of 5 different products to manufacture. In that case, the planner can understand that the priority is AXB and then CBE by consulting a dashboard (see figure below).



The figure below summarises DDMRP principles and components.



### ADU (Average Daily Usage)

What is the role of forecast in Demand Driven? This is a question that has often led to confusion.

We have already mentioned that buffers are sized according to the average demand that is expected. How is this average demand calculated? Through a number called ADU. This number represents our best guess of what customer demand will average over the next cycle.

**How you determine the Average Daily Usage (ADU) is up to you. You can calculate it as average of sales in the past few weeks or as average of forecasts or mix of these data (e.g. 70/30).**

## ADU



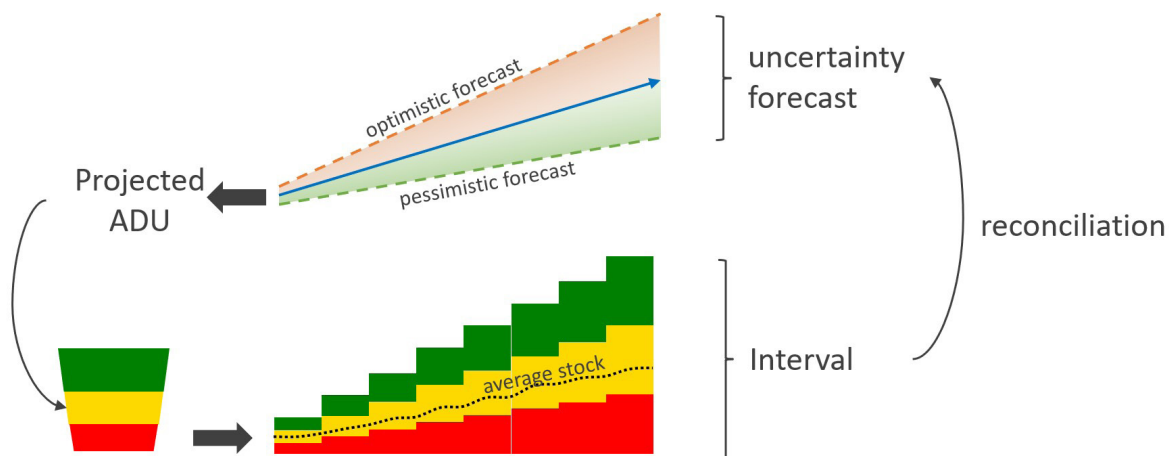
Average of historical sales

Average of forecasted sales

...or a mix of both

The ADU will be as incorrect as a forecast can be. However, the DDMRP operating system can work effectively even when the actual demand differs, in excess or defect, from the ADU. Moreover, DDMRP has introduced a mechanism for which the ADU is recalculated and corrected regularly to reduce the gap compared to the actual demand. The Demand-ADU variation analysis is included in the DDS&OP (Demand Driven S&OP). This process output is used to make corrections and maintain corporate results, meaning service and stock levels within the desired targets.

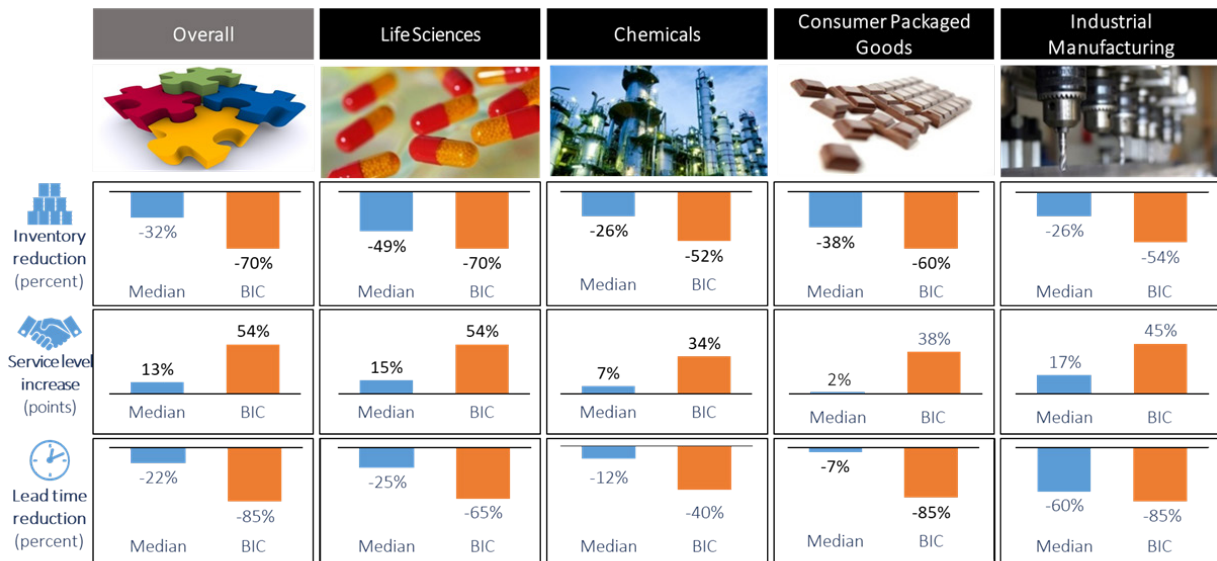
DDS&OP has other purposes that hint at the Sales & Operations Planning process. DDS&OP helps plan future resources, such as machines, stocks, personnel based on the expected demand and future ADU, calculated based on forecasts.



## DDMRP results

The results ensured by DDMRP has convinced companies worldwide to implement this method. The figure below shows the results of a survey conducted among several companies that have implemented the DDMRP.

## The Demand Driven and Customer-Centric Operating Model delivers transformational performance improvements



BIC – Best in Class Source: CAMELOT project experience, Demand Driven Institute, FAPICS

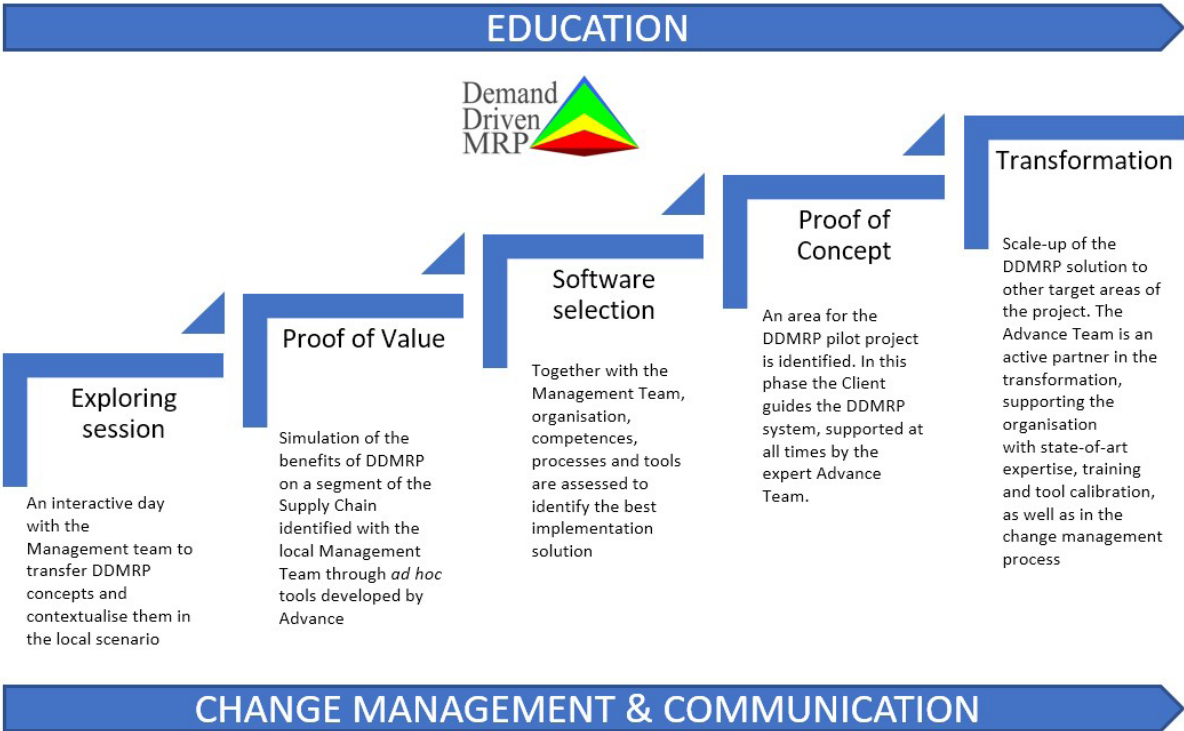
### Some companies that have implemented the DDMRP are:

Nome Azienda	Prodotto	Ambiente produttivo	Risultati
9 Wood	Wooden ceilings	ETO/MTO	<ul style="list-style-type: none"> <li>Service level 97%</li> <li>Stock – 27%</li> <li>Increase in available capacity: + 30%</li> </ul>
Allergan	Filler (cosmetic surgery)	MTS	<ul style="list-style-type: none"> <li>Average stock – USD 20 mill. with same service level at 98%</li> </ul>
Shell	Lubricants	MTS	<ul style="list-style-type: none"> <li>Stock reduction</li> <li>Better allocation of distribution network stock to customers in the event of lack of availability</li> </ul>
Sames Kremlin	Pumps and Guns for Spray Painting	MTS/ATO/MTO/ETO	Stains Site (18,000 SKUs): <ul style="list-style-type: none"> <li>Service level: from 65% to 80%</li> <li>-25% Stock</li> </ul>
BT	Telecommunication cables	MTO	<ul style="list-style-type: none"> <li>Stock -30%</li> <li>Increase in available capacity</li> </ul>
MIC	Children's t-shirts and clothes	MTS	<ul style="list-style-type: none"> <li>Lead time from 45 days to 7 days</li> <li>Increase in sales of fast movers: + 800%</li> <li>Stock – 40%</li> </ul>
Coca Cola Africa	Beverages	MTS	<ul style="list-style-type: none"> <li>Stock outs reduced from 18% to 5%</li> <li>OTIF: from 73% to 85%</li> </ul>
MOOG	Aircraft actuation systems	MTO	<ul style="list-style-type: none"> <li>Lead Times reduced from months to weeks</li> <li>Stock -30%</li> </ul>

Based on Deman Driven Institute's database

# How to implement a DDMRP system

The Advance team has developed a proprietary method for implementing the DDMRP. This method is based on the extensive experience of its consultants who have operated successfully in various companies of any size and from many sectors. The method consists of the progress of the DDMRP through key steps and milestones. It is an effective Change Management methodology that enables customers to successfully implement the system while containing the change management risks within all projects.



Every implementation is an independent project requiring a different approach and lead times based on the scope, organisation and complexity of the Supply Chain.

## Conclusions

Today, DDMRP is applied successfully to various industrial and distribution sectors, as well as in retail shops. This method aims at reducing signal variations of demand and supply through the strategic positioning of buffers in the supply chain key points.

Moreover, the DDMRP operating system is based on the actual demand rather than forecasts to issue supply and production orders. DDMRP has no application limits.

New implementations are made every month in different production environments, MTS, MTO, ETO, ATO and mixed-mode. This method was introduced in 2012. Since then, it has been successful at an international level because it is based on universal principles of Supply Chain Management, which are adjusted and applied accordingly.

The list below shows the benefits DDMRP can provide, based on the DDI database.

Benefits	Improvements
Improvement in Customer Service	On time fill rate performance between 97% and 100%
Reduction in Lead Times	Up to 80% reduction in Lead Times in various companies
Stock reduction	On a like-for-like basis, stock was reduced by 30% to 45%
Reduction of Supply Chain and TCO costs	Elimination of expediting costs (typically urgent and partial deliveries, transfers between warehouses and sudden changes to production lines)
Stable planning	Planners follow priorities with a simple and intuitive Dashboard, rather than following the often contrasting messages of the traditional MRP

Email the Advance Team For further information concerning DDMRP:  
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# Advance Supply Chain Solutions

Advance Supply Chain Solutions is the consulting division of Advance, ASCM/APICS Premier ELITE Partner. It provides consulting services in the Procurement, Supply Chain Management, Lean Six Sigma and DDMRP areas. Advance Solutions' assessment and implementation method has allowed companies of various sizes and from different sectors to quickly improve performance and reduce Supply Chain costs.

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What they say about us:

*"We are delighted with how Advance supports us in the Procurement and S&OP areas. We're obtaining excellent results, thanks to their expertise and effective approach, which allowed us to involve the whole organisation."*

*Michele Storci, COO and CFO Atlantic Fluid Tech.*

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