



# White Paper

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Inventory Optimization For Better Supply Chain Management



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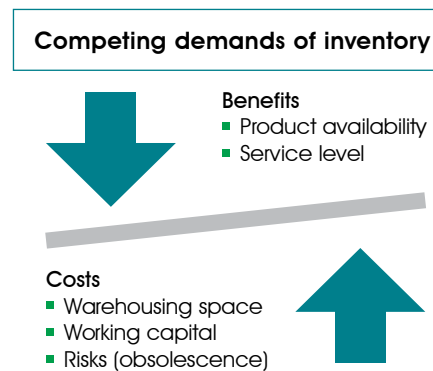
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## Introduction

Inventory takes many forms, ranging from raw materials to finished goods. While holding large amounts of inventory enables a company to be responsive to fluctuations in customer demand, there are associated costs. Inventory can therefore have conflicting priorities for different areas within the organization.

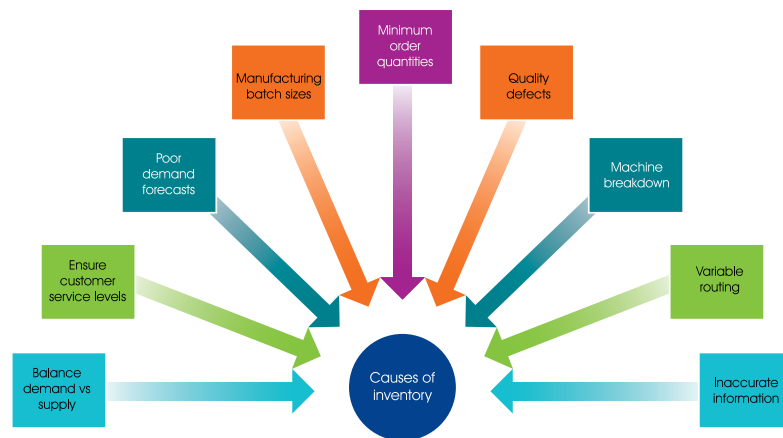
Inventory control is a key aspect of almost every manufacturing and/or distribution operation business. The ultimate success of these businesses is often dependent on their ability to provide customers with the right goods, at the right place, at the right time. The role of inventory management is to coordinate the actions of all business segments so that the appropriate level of stock is maintained to satisfy customer demand. In order to do this, a process of optimization is required to allocate resources in the most effective way to satisfy competing requirements and goals.



Inventory optimization takes inventory management to the next level, providing a more dynamic and holistic approach which allows managers to assess various signals in the supply chain that may be relevant.

## What is inventory?

Inventory exists because a buffer is needed to balance out the uncertainties between demand and supply. On the supply side, constraints such as large manufacturing batch sizes and supplier delivery lead time force organizations to hold some raw materials or components in stock so that products can be delivered to customers. The demand side is affected by inaccurate information and the fact that 100 percent accurate demand forecasts are not possible all the time. This means that some inventory has to be on hand to satisfy service levels.



Different parts of the organization require inventory for different reasons; while inventory can be viewed positively, holding inventory creates problems. Physical space needs to be allocated for stock and this space comes at a cost. The financial view on inventory is that it ties up cash and working capital which could be deployed more effectively elsewhere. Inventory also appears on a company’s balance sheet under assets, so reduced inventory results in a higher return on assets.

Business function	Role of inventory
<b>Sales</b>	Provide the appropriate service for customers so that orders can be filled
<b>After-sales service</b>	Need inventory so that repairs can be made and parts dispatched quickly
<b>Manufacturing</b>	Inventory is needed to allow production to run without unnecessary breaks while waiting for stock
<b>Procurement</b>	Inventory is used as a hedge against supply shortages or expected adverse price changes

Inventory control involves three forms of inventory:

- Basic stock – The exact quantity of an item required to satisfy a demand forecast.
- Seasonal stock – A quantity build-up in anticipation of predictable increases in demand that occur at certain times in the year.
- Safety stock – A quantity in addition to basic inventory that serves as a buffer against uncertainty.

The challenge is to assess the level of basic stock required, keeping as little safety stock as possible and providing ‘just the right amount’ of seasonal stock. The search for optimal inventory levels is therefore a key objective.



## Steps to inventory optimization

How should business leaders approach inventory optimization in the supply chain? The steps to follow are:

1. Analyze stock codes for importance and behavior and then classify them in like groupings
2. Generate the best possible estimate of demand - a forecast for each stock code
3. Model a set of stock policies to determine the optimum balance between customer service and inventory investment to meet the expected demand
4. Replenish stock timeously according to the forecast and the stock policy – keep to the plan

### 1. Analysis of stock

Before doing any forecast, you need to understand the relationship between stock codes and the key issues of profit, revenue and service levels. In addition to any market segmentation, stock codes should be analyzed in two dimensions – profitability, revenue or service frequency – to determine relative importance, and by behavior to identify demand frequency and any historic demand patterns such as seasonality.

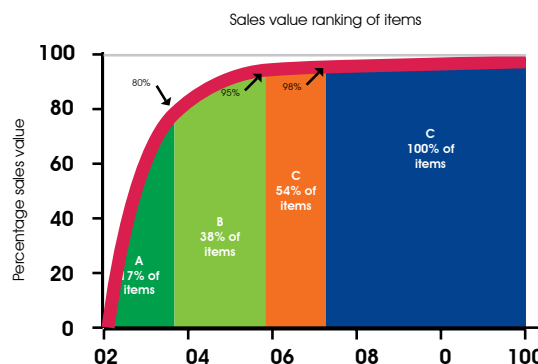
1. Classify stock codes according to some measure of usage. This will also show which stock items should be forecast.

Example of stock classification

Raw Materials	Finished Goods		Obsolete
Import	Forecast Make or Buy to Stock	Make or Buy to Order	Stock
Local	Immediate Service Not Forecast	Delayed Service	No Stock

2. Identify the relative importance of each stock code using a Pareto analysis (also known as the 80:20 rule or an ABC analysis) based on revenue, profitability or service.

Example Pareto analysis of stock



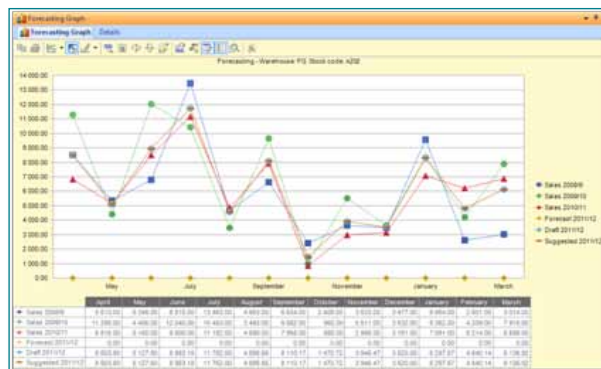


3. Understand the historic demand patterns. There are two parts to this:
  - a. Do a Pareto analysis based on hits (frequency of demand). This indicates how important customer service is for the item, identifies if it has erratic demand patterns, and gives an indication of its forecastability;
  - b. Analyze the time series to identify seasonality or other repeating patterns.

As a consequence of this analysis, all stock codes that have service levels should be classified.

### 2. Forecasting

Having identified which stock items will be forecast, the forecasting process allows the organization to determine the main driver of the inventory planning process – the estimate of customer demand. The importance of this process cannot be understated and its success should be measured through a suitable measure of forecast accuracy. For good reason, high forecast accuracy is often considered the holy grail of supply chain management.

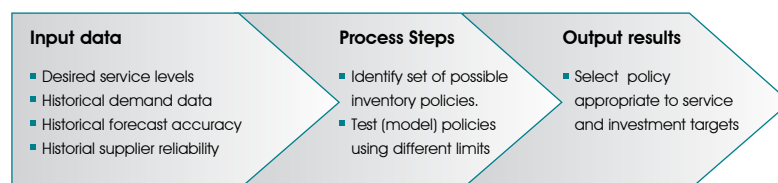


### 3. Modeling and selecting stock policies

A stock policy encapsulates the rules for determining how much stock is held to meet expected demand. Modeling the effect of a policy provides feedback on whether it can meet the competing requirements of pushing up service levels while lowering inventory.

The key outcomes of a policy are safety stock and cycle stock. These two settings establish the minimum and maximum inventory quantities per product targeted to meet expected demand at an appropriate level of service. The groups determined in Step 1 above will have different policies to provide the service and investment targets deemed appropriate for each group.

The process for determining an appropriate inventory optimization policy is summarized below.





#### 4. Replenish to the plan

The plan is defined by the combination of the forecast and the policy. The key discipline of managing to the plan and only deviating by exception is an often overlooked component of optimizing inventory.

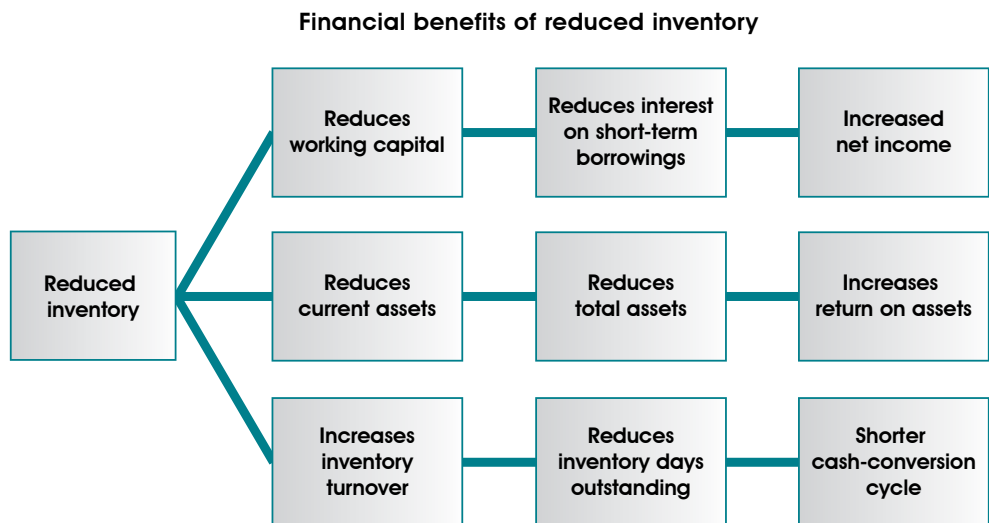
### Ensuring inventory forecasting success

To be useful, forecasting has to be done at the stock code level and needs to be specific. Good forecasts are usually a result of good information, used with appropriate forecasting algorithms, and applying good insight. The targets do not have to use calculated measures but can be based on management judgement. Issues that should not be left out of the decision process include demand and supply constraints, profitability from both item and customer perspective, and inventory carrying costs.

Factors for forecasting success	
Conditions for the Process	Attributes of the Outputs
<ul style="list-style-type: none"> <li>■ A regular forecasting process</li> <li>■ The process is visible and decisions are clear and tracked</li> <li>■ The forecasting quality is measured</li> </ul>	<ul style="list-style-type: none"> <li>■ Measured</li> <li>■ Believable</li> <li>■ Shared by all members of the team</li> </ul>

### Benefits

While a number of studies have shown the benefits of improving the performance of the supply chain<sup>1</sup>, the advantages from a financial perspective can be seen in these metrics.



<sup>1</sup> See <http://vsehgal.wordpress.com/>



Non-financial benefits with definite quantifiable results include improved customer service levels, reduction in lost sales, and of course, reduced inventory. Others areas of the business that can benefit from inventory optimization are:

<b>Sales</b>
Higher order fulfilment and on-time delivery Improved forecast accuracy
<b>Manufacturing</b>
Reduced manufacturing downtime Improved plant efficiency
<b>Management</b>
Better, more-informed decisions Improved communication Clearer view of potential future issues and problems Identification of waste in the supply chain

The benefits are not the same for all businesses; different industries experience the benefits in different areas.<sup>2</sup>

<b>Forecasting benefits (Gartner)</b>				
<b>Industry Value</b>	<b>Fast-moving consumer goods</b>	<b>Speciality</b>	<b>Mass merchandise</b>	<b>Department store</b>
On-shelf availability	X	–	X	–
Inventory	X	–	X	–
Shrink obsolete inventory	–	X	–	X
Sales	X	X	X	X
Gross margin	–	X	–	X
Productivity	–	X	X	X

<sup>2</sup> Gartner: Business Case for Demand Planning, March 2011





## Technology issues

Getting supply management right involves people and process, but without appropriate technology the process can be cumbersome. According to Gartner<sup>3</sup>, key technical issues to address when aiming for supply chain excellence are data accuracy and timeliness. This is not typically found in situations where the technologies used are spreadsheets or stand-alone applications, because data has to be extracted, manipulated and reloaded several times, which can take time and creates opportunities for errors.

Data-related problems are far less likely to occur if the application used for planning and optimizing inventory is integrated with an ERP system. An integrated ERP solution eliminates issues of data accuracy and timeliness as well as the problem of synchronizing master data, all of which have to be addressed when different point solutions are cobbled together.

The capabilities that Gartner identifies as key standard functionality in an integrated system are:

- Integration with business operations
- Data management
- Process and workflow management
- Integration with financial information

## Inventory optimization with SYSPRO

SYSPRO's Inventory Optimization (IO) Suite is a fully integrated set of modules within the SYSPRO product that provides the tools and processes to optimize inventory. The parameters that shape inventory and its causes can be tracked and managed by the IO Suite, which can also determine the impact of changing these parameters on service levels, stockholding, delivery performance, and manufacturing or procurement performance. The four steps for optimizing inventory, detailed above, can be managed fully within SYSPRO.

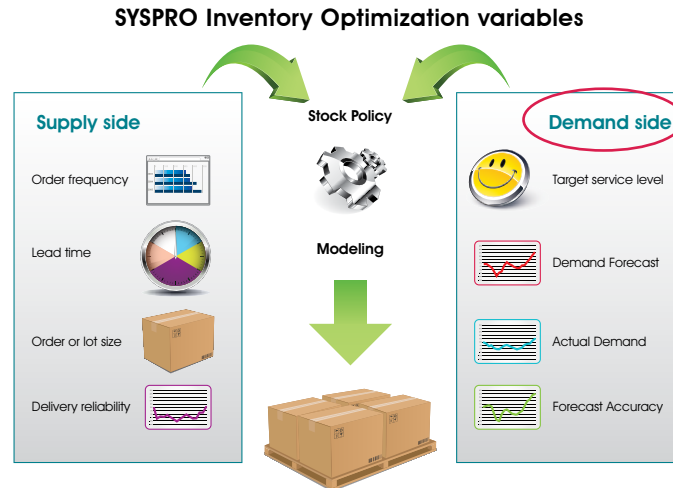
SYSPRO IO enables the following functionality:

- Analysis of stock code importance and behavior;
- Creation of demand forecasts;
- Model inventory and perform what-if scenarios to achieve the optimum balance between service and investment;
- Define target service levels and review achieved service levels, compare these to targets and identify which stock codes offer the best opportunity for improvement;
- Calculate time-phased minimum and maximum levels dynamically with changing demand and service requirements;
- Manage the replenishment process timeously to plan;
- Determine where and why inventory is not in balance (excess or shortage) and steps to balance it;
- Review forecast accuracy and highlight stock codes with the best potential for improvement;
- Report on metrics such as lost sales, days of stock cover, days out of stock.

<sup>3</sup> Gartner: Supply Chain Excellence: Sales & Operations Planning Best Practices, August 2010



The end result of SYSPRO Inventory Optimization is to have dynamic minimum and maximum levels that can be used in Material Requirements Planning to calculate more realistic recommendations for stock holding.



## People and change management

The challenge of instituting improvements in a process as complex as inventory optimization requires getting different parties from across the organization to:

1. Participate;
2. Agree on common objectives;
3. Plan to meet those objectives;
4. Measure themselves collectively against the plan.

It is a cross-functional process, involving many role players, and is therefore not easy. A research study<sup>4</sup> pointed out that two of the main causes of failure to implement supply chain strategies were company culture and lack of leadership by senior management. Consequently, addressing the 'people issue' from the top down should be recognized as a critical element in improving inventory forecasting and optimization.

This kind of project involves organizational change in three complex dimensions.

- The business processes that determine how the organization does its work
- The people who do the work and the way they are functionally organized in departments and business units
- The systems that automate and integrate individual steps and data in the process

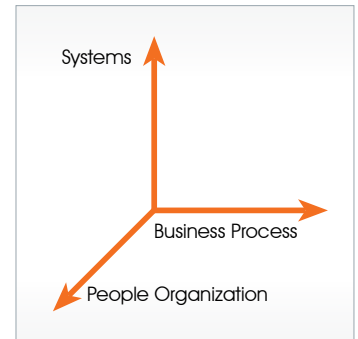
An approach to managing such strategic change is available in the 'Three Dimensions of Change' model<sup>5</sup> which provides executives with a methodology to define what the project is meant to achieve and how the organization can pursue its strategic objectives.

<sup>4</sup> Supply Chain Strategy in the Boardroom: Interim Findings – February 2010, Cranfield University School of Management

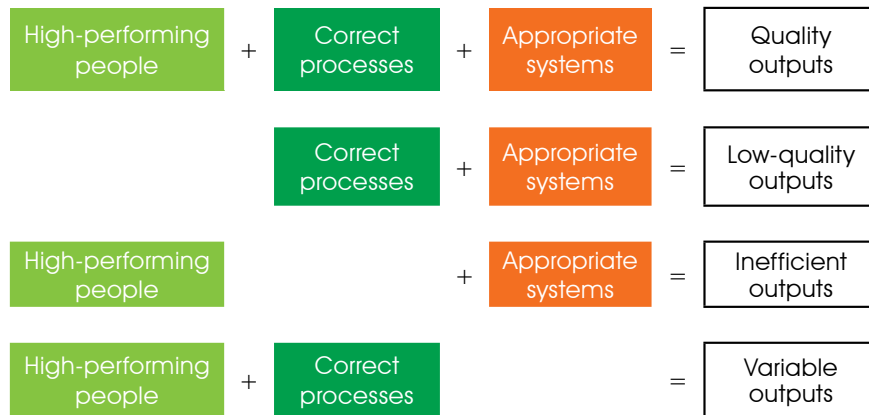


While all three dimensions have to be addressed they don't need to be done all at once. It is often better to start with people and process changes so that the scope of change can be defined properly, and the necessary focus and time is given to important internal changes, before embarking on new systems. The greatest benefit comes, though, when high-performing people, correct processes and appropriate systems are combined.

**The dimensions of change model**



**Interaction of people, process, systems**



Integrating the Three Dimensions of Change seamlessly in any organization is complex. To address this need to integrate business process with the capabilities of the ERP system, SYSPRO also offers SYSPRO Process Modeling (SPM). SPM allows tight integration of business processes to the system, thereby reducing the complexity of supply chain improvement.

## Conclusion

In a business environment where uncertainty, cash and customers are major concerns, an inventory optimization project is a good investment for improving working capital and customer service levels.

Inventory optimization enables companies to address a number of key challenges:

- Improve customer service levels and satisfaction
- Provide visibility across the supply chain
- Enhance a demand-driven approach for the company
- Deliver greater profitability

<sup>3</sup> Thinking About ERP: The Executive's Guide to setting strategy for buying, implementing and operating ERP



As customer focus has become the standard of business, many organizations still face the challenge of traditional attitudes and behaviors in which production and supply issues are seen as more important than demand-related ones. In the trade-off involving inventory and supply chain improvement versus production and cost-related concerns, business decision-makers have to assess whether to stay with the older production-driven approach or adopt newer demand-driven practices. The demand-driven approach, together with new process and organizational structures, will allow the business to become more agile in managing supply and so improve its capability to meet demand and deliver on customer orders.

Demand-driven	Production-driven
Invest in inventory optimization to enable better production scheduling	Maintain a stable production schedule
Improve sales forecasting	Invest in shortening manufacturing lead-times to reduce need for improved forecasting
Costs to serve the customer	Costs to deliver
Understand and address the level and cause of supply chain variability	Invest in building flexibility to deal with variability



## About SYSPRO

SYSPRO is an internationally-recognized, leading provider of enterprise business solutions. Formed in 1978, SYSPRO was one of the first software vendors to develop an Enterprise Resource Planning (ERP) solution. Today, SYSPRO is a global business solution vendor, represented on six continents and by more than 1500 Channel and support partners. Over 14,500 licensed companies across a broad spectrum of industries in more than 60 countries trust SYSPRO as the platform on which to manage their business processes.

Customer focus is the core of SYSPRO's corporate culture and is one of the key reasons why SYSPRO maintains a strong leadership position in the enterprise application market. By focusing on people and building lasting relationships with customer and partners, SYSPRO has ensured high customer retention and satisfaction.

SYSPRO has won awards and earned the reputation for well-structured, effective implementations in all sizes of companies, specializing in demanding environments, across a multitude of Verticals. We have developed a structured approach to reduce the time and cost of implementing SYSPRO that has been the result of over 30 years of experience enabling organizations to personalize and utilize the software successfully and effectively.

We work in partnership with our customers to identify feasible and affordable solutions to transform their business. Team SYSPRO integrates internal and external experts, from the international SYSPRO community, to ensure that our customers are exposed to the best possible resources through all phases of the ERP project: strategic, functional and operational. This consolidated approach ensures that our customers receive holistic and autonomous analysis throughout the project, and optimizes operational efficiencies.

Our single product DNA also means that all SYSPRO upgrades are seamless. With the range of functionality and depth of features built into the product and accessible via a single SYSPRO portal, companies need never go outside of SYSPRO to gain increased operational effectiveness.

The aim is to deliver world-class software that gives customers the control, insight and agility they need for a competitive advantage in a global economy. As such, SYSPRO provides a unique combination of robust, scalable technologies that ensure minimal risk and high return on investment.

Our vision is focused on meeting customer needs today and in the future - SYSPRO, simplifying your success with the most integrated, uncomplicated and effortless business software solution for small and medium enterprises.



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