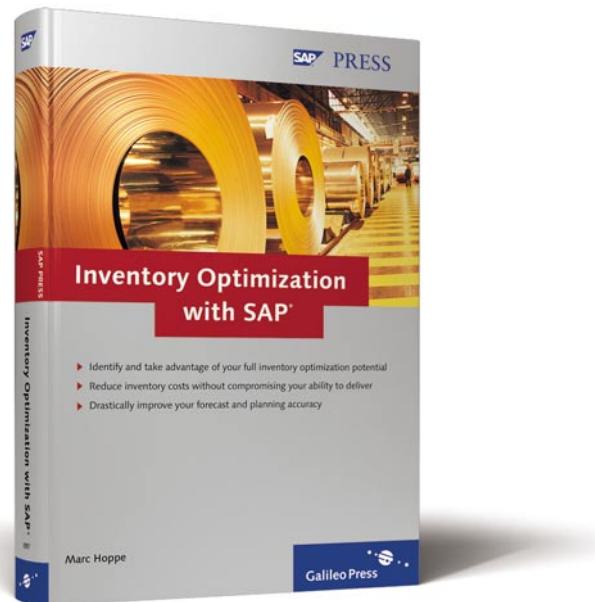


Marc Hoppe

Inventory Optimization with SAP®



SAP PRESS

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You can optimally tune your supply chain and save a lot of money by reducing your inventory without compromising the level of your customer service and the utilization of your internal capacities.

Introduction

An important objective in a company's supply chain management is to ensure an efficient inventory management. If you examine the way in which companies are actually handling inventory management, the methods employed appear to be good; however, the way in which all aspects integral to inventory management interact is often far from ideal, that is, there needs to be a better system of internal controls for inventory to be managed efficiently. So, you frequently hear statements like the following:

"We define the high quality of our services as being our competitive edge, but our service levels are insufficient despite our high stock levels."

"Our machine assignments change five times a day, but we have no idea of the number of sales orders that we are actually putting on hold because of that."

These statements describe only some of the many problems inherent in supply chains today. Despite all the uncertainties and the corresponding countermeasures taken to address these uncertainties, a company's top priority is still to ensure as high a service level as possible to customers. On the other hand, the overall costs must be kept to a minimum.

An important key to success in supply chain management is the optimization of inventories, because stock surplus quantities result in an increase in costs and lower profit margins, while inventory bottlenecks cause problems in production and poor service levels. Warehouse stocks are subject to different influencing factors. This book describes these factors and what you can do to efficiently counteract them.

Decisions made regarding inventory management can have a direct influence on the success of a company. Until a few years ago, it was generally assumed that a high volume of stocks guaranteed a successful future for the company. Today, increasing costs force companies to reduce their inventories and warehouse stocks. Therefore, the optimization of a company's inventory

Introduction

becomes an increasingly important tool for helping companies to save costs. The importance of those inventory costs becomes clearer when you look at the following financial statements:

Table 1 contains the financial statement of EPCOS AG, a manufacturer of passive construction elements. The inventory, which is summarized as "Net stocks," represents an amount of 205,123 Euro in 2003. This corresponds to 14.35% of the entire amount of the company's assets and is the second biggest cost item.

ASSETS (09/30/2003)	in €
Liquid assets	195,797
Receivables from goods and services, net	185,292
Net stocks	205,123
Accruals, deferrals, and other assets	38,884
Deferred income taxes	7,523
Current assets, total	632,619
Fixed assets, net	649,527
Intangible assets, net	39,940
Deferred income taxes 1	83,022
Other long-term assets	23,922
Total assets	1,429,030

Table 1 High Inventory Costs in the Financial Statement of EPCOS AG in 2003

In Table 2, the financial statement of Beiersdorf AG, a producer of consumer goods, shows that the stocks assume an even bigger portion of the total assets (672 m Euro), namely 19.89%.

ASSETS (12/31/03)	in m €
Intangible assets	97
Fixed assets	912
Financial assets	22
Total assets	1,031

Table 2 Financial Statement of Beiersdorf AG in 2003—672 Million Euro of Inventory Costs Represent 19.89% of the Total Assets

ASSETS (12/31/03)	in m €
Stocks	672
Receivables from goods and services	688
Other receivables and assets	94
Current-asset securities and liquid funds	842
Current assets	2,296
Deferred taxes	28
Accruals and deferrals	23
Total	3,378

Table 2 Financial Statement of Beiersdorf AG in 2003—672 Million Euro of Inventory Costs Represent 19.89% of the Total Assets (cont.)

These examples show that a company's inventory represents a considerable percentage of the total assets and the business volume of a company. This inventory-total assets ratio applies to some industries more than to others. For example, in mechanical engineering and plant construction, the long project runtimes and the increasing value of the products over time have a strong impact on a company's financials. In the chemical industry, the values are significantly smaller, which is due to the shorter project runtimes and the cheaper material components used; however, even here, you can save a lot of money by optimizing the inventory.

Inventory Cost Elements and Portions

A prerequisite for a long-term inventory optimization is the availability of precise information on the inventory costs in your company, and an efficient process design and ownership taken for the individual inventories.

Depending on the industry, the stockholding costs can vary considerably. Table 3 contains some general indicators for the different cost portions of stockholding costs including their value ranges (Hartmann 1999).

The entire amount of stockholding costs represents approximately 16–26% of the average valued stock. The interest that accumulates on the working capital (fixed capital) is the biggest portion of the entire stockholding costs.

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Cost Elements	Cost Portions in % (in relation to the average valued stock)
Working capital interest	8–10
Loss, breakage	2–5
Inventory management	1–2
Depreciation	1, 5–2
Plant maintenance	1–2
Disposal	1–2
Taxes	1–2
Insurance	0, 5–1
Total stockholding costs	16–26

Table 3 Stockholding Costs and Their Cost Portions (Source: Hartmann)

Since the list in Table 3 does not contain the stockout costs, the entire amount will be even higher. You can find more information on this topic in Chapter 2, *Factors Influencing Inventory*.

Calculating a Cost Reduction

The key figure diagram from DuPont illustrates how an inventory reduction influences the return on investment (ROI) of a company. DuPont was the first company to implement this calculation method to determine the ROI. That was back in 1919. Since then, it has been improved several times, and today it is an integral part of the performance measurement system in every company.

The performance measurement system displays the relationships between the individual cost elements and the fixed and current assets. The inventories are part of the stocks, which, in turn, are part of the current assets.

In other words, if you can reduce the stock levels, you can also reduce the current assets. A decrease in current assets reduces the amount of total assets. Therefore, if the revenue doesn't change, the asset turnover will increase. The product resulting from the operating margin (profit-sales ratio) and the asset turnover is the ROI. Therefore, in the above example, an inventory reduction of 10% results in an increase of the ROI by 3.6% for your company (see Figure 1, bottom line).

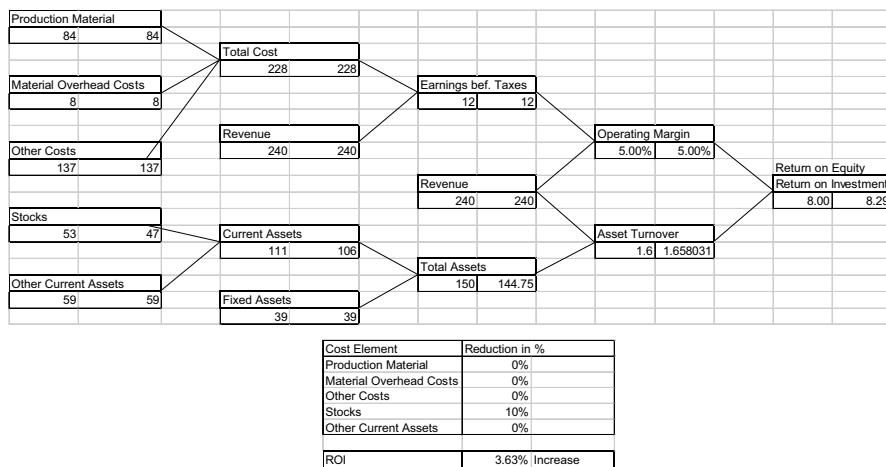


Figure 1 Example of an Inventory Reduction of 10% According to the Performance Measurement System Implemented by DuPont

The entire capital of a company consists of the shareholders' equity and the outside capital. While the shareholders' equity is already a part of the company's property, the outside capital must, for example, be borrowed from a bank. The total ROI consists of the return on equity and the return on investment. It is the goal of every company to maximize its profits. One important aspect here is to invest as little equity and outside capital as possible. Therefore, an inventory reduction will reduce the amount of equity and outside capital you have to invest. Consequently, the return on equity or investment increases, because the return on equity (return on investment) is the ratio between the operating profit and the equity (outside capital). In summary, we can make the following statements: Inventories are a major cost factor in the company. An inventory optimization can essentially help to reduce costs, which results in a considerable improvement of the company's performance indicators.

Inventory Management Using mySAP

Two SAP solutions that enable you to control your inventory management and optimize your inventory are mySAP Enterprise Resource Planning (mySAP ERP) and mySAP Supply Chain Management (mySAP SCM). mySAP ERP is the successor to the R/3 system and it controls all business-relevant accounting, HR, and logistics processes as a backbone system. mySAP SCM is a complementary solution that enables you to equip your company to meet the challenges of the supply chain management area.

Introduction

In this book, you'll learn how to optimize mySAP ERP by modifying existing settings and leveraging the interaction between your specific processes and the SAP system. And you will learn how to do this without incurring any additional costs or investments.

You'll learn how to optimize mySAP SCM by leveraging the inventory management potentials that you can utilize using the SAP APO component.

Structure of this Book

Chapter 1 explains why inventories are necessary in a company, and it describes the different inventory concepts that are currently being used. The end of the chapter describes actual measures that you can implement to counteract uncertainties in the supply chain.

Chapter 2 describes the effect that individual areas—such as lot sizes, production planning, and demand planning—have on the inventory, and provides some optimization potentials. These potentials are described in further detail in the subsequent chapters, which mainly illustrate ways for you to optimize your inventories using mySAP ERP and mySAP SCM.

Chapter 3 focuses on the options available for analyzing inventories and describes the measures that you should undertake based on the analysis results.

Chapter 4 describes the inventory optimization options involved in demand planning processes. It explains how you can improve the exactness of your forecasts in your demand planning process.

Chapter 5 focuses on the material requirements planning strategies and their impact on the inventory, and it describes how you can optimize the material requirements planning (MRP) processes.

Chapter 6 focuses on how inventories impact the service level and security policy. Based on some real-life examples, this chapter explains how you can reduce safety stocks without compromising the service level.

Chapter 7 describes and evaluates the different lot-sizing procedures. In addition, it shows you the options available when working with lot sizes, and tells you what you should consider when selecting lot sizes to reduce inventories.

Chapter 8 describes the difference between the MRP planning logic and the simulation of a material and capacity requirements planning. It also defines

the requirements of a good and feasible production plan, after which it describes the potentials that you can implement by using SAP Advanced Planner and Optimizer (SAP APO) for the production planning.

Chapter 9 describes the options available for implementing a practical inventory and logistics controlling process. In this chapter, you'll find concrete key figures and analysis options for your inventory management using mySAP ERP and mySAP SCM.

Chapter 10 describes a tried-and-tested inventory optimization process. It provides useful advice on what you can do to optimize the inventories and inventory management processes in your own company. The described process is designed in such a way that you can implement the inventory optimization by merely optimizing your processes, or by optimizing the mySAP ERP and mySAP SCM solutions.

Hamburg, Germany, May 2006

Marc Hoppe



There's no doubt about it—inventory is important. But too much of it is counterproductive. Yet, what is the best way to manage inventories? This chapter provides a brief overview of the five instruments that you can use to manage and optimize your inventory—demand planning, material requirements planning (MRP), service level and safety stocks, lot sizes, and production.

2 Factors Influencing Inventory

Today's supply chain networks can cross both organizational and geographical boundaries. This forces companies to control what cannot be controlled. The future of Supply Chain Management (SCM) depends primarily on the ability to quickly react to supply and demand changes and important events in the supply chain on a global basis. The faster a supply chain network can adapt to such events, the higher the added value and the more likely it is to influence the inventory. Inventory optimization is the key to keeping the profitability of a company at a constant level and to increasing the company's competitiveness.

2.1 Five Instruments

Supply chain planning is influenced by a number of factors that cannot be forecast with absolute certainty. For example, when forecasting customer requirements, there is generally an uncertainty regarding the quantity and the exact selling date. In addition, disturbances and fluctuations in production cause deviations in the planned replenishment lead time. For this reason, safety stocks are used to secure the supply chain against uncertain influences and the optimization potentials described in Chapter 1, *Why Inventory is Necessary*.

Colgate Palmolive was able to increase its forecast accuracy up to 98%, to reduce its inventory by 13%, and to improve its cash flow by 13% by using mySAP Supply Chain Management (mySAP SCM). Similarly, a manufacturer of handheld computers, who had implemented a new SCM solution, man-

aged to reduce the planning cycles by 50%, to increase the inventory turnover from six to ten times, and to reduce the delivery stocks by 32%. In that case, however, an entire range of processes had to be improved, namely the demand and requirements forecasts, inventory management, production planning, and order processing. All these changes were based on the goal of increasing the company's competitiveness and on shortening the delivery times. In the highly competitive handheld market, factors such as price, availability, and on-time delivery have a direct influence on a company's growth and profitability.

A research carried out by Gartner Group recently predicted that 90% of today's leading enterprises that have no SCM strategy will lose their preferred vendor status in the future.

In the following sections, we'll take a closer look at the instruments that enable us to optimize our inventories.

2.1.1 Demand Planning

The first instrument we'll consider is demand planning. Demand planning and forecasting are inevitable elements in logistics and the comprehensive planning process for the entire company. They are used to create rough realistic and consistent production plans based on the potential sales volume and the available budget. A good demand planning leads to a reliable characteristics-based forecasting, which, in turn, is the basis for all subsequent processes. The results derived from demand planning determine the production and financial resources. The annual plan and the regular revision of the target plans largely depend on the level of accuracy of sales forecasts and on an efficient production planning.

When planning future sales and production, the planner should not only rely on forecasts. Instead, she must include her knowledge of future market trends, planned advertising campaigns, and changes to specific product groups in the planning.

If the forecast sales volumes are smaller than the customer demand, the previously produced stocks will be completely reduced; furthermore, there will be a need to resort to the safety stock. If the delta between the forecast of sales and the actual customer demand is too big, it can cause stockouts. Customers are lost if they turn permanently to the competition. In addition to a loss of sales, a loss of image for the company and market shares can also result.

If demand planning is higher than the actual customer demand, surplus inventories can result, which may have to be scrapped or written off. This leads to a lower profit margin and a reduced profitability.

Ultimately, it is the accuracy of the forecast that determines the volume of the safety stock. If the forecast deviates substantially from the actual demand values, the safety stock is correspondingly high or low respectively. Finally, the planner determines the primary requirements on the basis of the production quantities and forwards the data to material requirements planning. Chapter 4, *Demand Planning and Forecasting*, provides further detailed information on using demand planning as an instrument for optimizing the inventory.

2.1.2 Material Requirements Planning (MRP)

The second instrument, material requirements planning (MRP), is used to create and manage the production programs for finished as well as unfinished products. For this purpose, customer orders and forecasts are needed. Moreover, all other components of the entire product structure are planned—down to the lowest level. This is done on the basis of the secondary requirements, which must be identified by MRP.

Frequently, specific finished products, sub-assemblies, or raw materials must be produced or procured in advance to ensure short delivery times when customer sales orders come in. This advance planning, which at first is not based on any sales order, is based on the planned independent requirements that are offset against incoming customer sales orders at a later stage. This type of planning triggers the procurement of raw materials and the production of sub-assemblies or final products that will be stored in the warehouse.

MRP monitors inventories and determines the material that will be needed at a specific quantity on a certain date. In addition, MRP automatically generates the procurement proposals necessary for this process. In MRP, a net requirements calculation is automatically carried out in which the available warehouse stock or the planned stock receipts from purchasing or production are compared with the primary requirements. For a material shortage—if the available inventory is smaller than the required quantity—the system automatically generates a procurement proposal. Then, MRP initiates make-or-buy decisions. If dates or quantities change, the planned orders must be automatically adjusted in the MRP process. MRP must be able to quickly adjust procurement and production to meet new requirement situations. Choosing the right lot sizes is another task handled by MRP.

MRP is the interface between demand planning in sales and distribution and production planning in production. If demand planning is too high, MRP has to compensate for the discrepancy by selecting the best safety stock level, the correct range calculations, the best delivery rhythm, and optimal lot sizes so that the optimal quantity can be produced at minimum production costs.

This means that MRP is an important adjustment screw for optimizing inventory, because it must find the optimum between the different inventory goals of sales and distribution (high service level = high inventories) and production (short lead times = low inventories).

MRP's influence on the operational result of a company can be expressed as a direct, an indirect, and a non-quantifiable success potential:

The *directly quantifiable potential* results from the portion of material costs in sales or in the prime costs. This cost pool can be influenced by choosing the optimal lot size, or the level of the optimal safety stock.

An *indirectly quantifiable potential* represents, for example, the creation of supplier relationships, the reduction of overall procurement costs, or the inclusion of inventories in the financial report.

The *non-quantifiable success potential* becomes manifest in the way the company is viewed by its customers on the basis of a high ability to deliver and delivery reliability.

Chapter 5, *Material Requirements Planning*, provides further details on the MRP strategies and parameters you can use to optimize your inventory.

2.1.3 Service Level and Safety Stocks

The decision of a company to provide a comprehensive service level is a strategic one. It must be geared towards other objectives such as cost minimization and capacity utilization. This means that compromises must be found and priorities set. To achieve a high service level, you may have to increase your warehouse stocks so that you can satisfy the demand with finished products from your stocks. Moreover, production must be able to start processing an order when it is first released, while distribution must be able to deliver on time. However, keeping warehouse stocks generates stockholding costs and therefore counteracts the objective of minimizing cost.

The decision to provide a high service level always requires a definition of subgoals that the company wants to pursue. Reliability can be ensured by creating intermediate storage facilities and final product storage facilities. In

addition, buffers that you include in production planning ensure that the capacities can produce the right product at the right time in accordance with the planning. This, however, causes longer wait times and larger storage quantities, which is why you must use the service level value that causes customers to accept higher prices and long-term commitments against the actual costs. Unfortunately, not many companies do that.

If, on the other hand, the company pursues its goal of providing a high delivery flexibility and speed, it must organize its business processes in such a way that the planning lead times are as short as possible, especially regarding order acceptance, planning, and production. In that case, the machine utilization buffers are kept small in to shorten the order-processing timeframe and to guarantee a fast delivery and shorter turnaround times for the customer. Here, the cost risk is rooted in the downtime costs which, for example, occur when required materials are not delivered on time. Moreover, the company must bear additional costs that can hardly be measured when machine failures or disruptions result in delayed productions and deliveries so that confirmed delivery dates cannot be adhered to.

The costs generated by an increase of the service level must be considered on the basis of profitability aspects. When comparing the costs with the revenues, which have been generated by the service level, the services must far outweigh the costs; otherwise, the business objective of profit maximization and the long-term existence of the company would be at risk. Contrary to the objective of cost optimization, however, the service level orientation enables the company to better respond to market requirements, which, after all, is the basis for a complete success. Depending on the focus of a company, the direction towards a service level increase requires a different orientation and processing of the business processes. In this context, striving for speed and flexibility is as important as concentrating on the readiness to deliver, as well as the delivery time and reliability.

An organization can achieve a readiness to deliver of 99% within a maximum of 48 hours only if it permanently maps peak demands in its inventories; however, since those peaks often occur only sporadically, high inventories must be maintained throughout the entire year. Consequently, the company faces increased direct and indirect costs such as high depreciations and accumulated depreciations for short product lifecycles.

So, what is the optimal service level that satisfies your customers and compensates for the costs? How can the service level be measured and which

processes support an optimal service level? These and other questions are addressed in great detail in Chapter 6, *Service Level and Safety Stocks*.

2.1.4 Lot Sizes

One of the primary goals of MRP is the economic supply of external customers and internal customers, that is, production. Here, MRP must optimize the material, order processing, and stockholding costs. Material costs depend on the order quantities and can be determined on the basis of the net landed costs. The order-processing costs depend on the specific operations. They can be described as proportional staff and material costs for procurement, receiving inspection, invoice verification, and data processing. Stockholding costs depend on stockkeeping and can be determined on the basis of the delivered price, the interest rate for stockkeeping, and the inventory cost rate. As a result of the order calculation, you obtain the optimal or cost-effective lot size as a production requirement, which represents the initial value for purchasing and production.

For example, if you want to increase your delivery flexibility, you must produce smaller lots, which, in turn, entails a reduced capacity utilization due to longer machine downtimes that are caused by a higher number of set-up processes. At the same time, the set-up and unit costs go up, as well as the procurement costs in purchasing. Moreover, smaller lots reduce the costs and procurement costs in purchasing. They also reduce the procurement quantities, which results in smaller discounts and rebates; whereas the cost pool for the procurement process remains unchanged and acts as a cost driver due to the shorter replenishment cycles.

Chapter 7, *Lot Sizes*, describes how you can influence your inventories by selecting the right lot-sizing procedures.

2.1.5 Production

The logistics of production is a central functional area within the entire supply chain. The largest portion of the entire added value of a manufacturing company is generated within production logistics. All upstream processes, such as procurement, but also all the downstream processes, like distribution, are linked to production. Products are produced and refined within production. The value creation within production logistics is what makes money. The essential goals of production are therefore short product lead times, low inventories, on-time deliveries, and a high degree of machine utilization and customer satisfaction.

Success factors that lead to a high degree of customer satisfaction and therefore a long-term relationship with a customer are therefore short delivery times and a high delivery reliability. Short delivery times can be achieved by short product lead times, high delivery reliability, low scrap rates, and a high degree of capacity utilization. But, short product lead times and a high degree of capacity utilization are contradictory objectives. The optimization of these goals is the focus of production planning and control. Production planning consists of all the essential planning tasks, such as the creation of master data, work scheduling, and the creation of a production program, as well as capacity leveling. Basically, production planning comprises all work that occurs prior to the actual production start. The production program determines the type and quantity of items to be produced. This applies to final products, semifinished products and subassemblies. The program is also used to define the most favorable production lots and procurement quantities. The production dates (planned dates) and the order sequence are defined in capacity scheduling.

Production control monitors and controls the actual production process. The task of production control is to ensure the supply of production with material components and raw materials, as well as the adherence to production dates. Changes at short notice also entail changes to the short-term production program. The changes to the production program lead to changes on the supply side: Orders must be canceled. Suppliers are asked to deliver later or earlier. Suddenly the lot sizes in procurement are no longer optimal. Rush deliveries must be triggered if a production standstill is imminent, because of an insufficient material supply. Not only does this increase the procurement costs, but the costs in production also increase as inefficient machine setup changes become necessary.

Inventory is supposed to avoid such firefighting and to balance those short-term changes. This means that the inventory level must be appropriate so that, on the one hand, stock surpluses are avoided, and on the other hand, process disturbances can be compensated.

To identify optimization potentials in production, the entire production process must be considered as a whole, both from the standpoint of production and costs. The following section summarizes the potential areas for optimization in production:

► **Shortening of product lead times**

This leads to an increase in machine capacity, a reduction of inventories, shorter delivery times, and a higher customer satisfaction. Liquidity

increases due to the shorter delivery times because customers pay earlier. Because individual orders no longer occupy machines as long as they used to due to the shorter product lead times, a higher number of orders can be processed in production. This leads to increased revenues in a demand-driven market.

► **Improving unit costs**

A reduction of the unit costs can be achieved by a high degree of machine capacity utilization. A set-up optimization and a finite planning lead to a reduction of set-up costs and an optimization of the production lots. This increases the capacity utilization. In general, it also increases the variable unit costs; however, it also increases the marginal revenues as the fixed costs remain unchanged.

Chapter 8 describes the influences of *Production* on the inventory in greater detail and introduces options for using SAP in this context.

2.2 Controlling by Inventory Monitoring

Because the supply chain is very complex, all aspects of the supply chain that we have described so far only become clear by using the right controlling instruments. But many companies will find the "standard key figures" inappropriate. These figures often cannot be used for the organization or the objectives pursued in SCM, or they are simply not the right means of control.

One of the most common serious mistakes is the isolated use of logistics key figures. For example, if a company measures the professionalism of inventory management based only on the inventory turnover or range, the resulting picture will be blurred. Transport costs must also be considered; otherwise, management will see only the low inventories without noticing that the transport costs have risen and this negative effect will outweigh the benefits of the positive inventory effects.

You can only take the right action if various key figures are combined intelligently into key figure systems. Therefore, the key figures must be consistently defined and implemented across the entire company. Today, an appropriate key figure system enables a company to proactively identify and counteract problems. The description of a holistic key figure system would exceed the scope of this book; however, Chapter 9, *Inventory Controlling*, describes the most important key figures and their relevance to real-life production processes.

Before you can optimize your inventories, you must accurately analyze them. This chapter describes how you can implement proven methods to segment your inventories so you can analyze their most important aspects.

3 Inventory Analysis

In the previous chapter, the instruments and potentials available to optimize and reduce inventory were described. Keeping this in mind, you should ensure that you take specific actions to optimize your inventory and that you implement these actions consistently. But, to determine which actions are the right ones for your company, you must first carry out a detailed analysis of your inventories. You can then use the results of the analysis as a basis for defining the appropriate inventory optimization measures. From hereon, a theme that runs throughout this book will be the basic analysis principles described in this chapter.

Note that you should try to avoid making the following mistake, which is unfortunately all too frequently made in many companies: Pressure exerted by top management to reduce the inventory can generally only lead to a short-term success. For medium-term success, the inventories usually return to the previous level that existed before the decreed inventory reduction. To ensure medium and long-term success, you should continuously use these analysis tools, and you should also use them as a basis for controlling your supply-chain processes.

The *ABC analysis* can be used as an inventory analysis instrument. It is a data classification tool. For inventory analyses, these classifications can represent material consumptions, goods movements, and material stocks. The materials are roughly divided into three classes (A, B, and C).

Then a detailed analysis can be carried out using an *XYZ analysis*. The *XYZ analysis* is a classic secondary analysis that is based on the *ABC analysis*. The *XYZ analysis* is used to analyze the weighting of individual units according to their consumption pattern. This means that a consumption fluctuation key figure is determined for each unit. Depending on how regularly a unit is consumed, it is assigned to one of the three classes, X, Y, or Z.

The combination of ABC and XYZ analyses represents the *ABC-XYZ matrix*. In that matrix, you can combine the results of the two analyses and thereby obtain important information on your materials and inventories that enables you to define appropriate measures for optimizing your inventory.

This chapter will describe the basic instruments of the ABC and XYZ analyses in more detail. Chapter 9, *Inventory Controlling*, provides a more detailed description of the available inventory analysis options.

3.1 Inventory Analysis Options

3.1.1 ABC Analysis

The ABC analysis is an organizational procedure that can be used to classify large data quantities. The data can represent material or processes. It is roughly divided into three classes (A, B, and C).

Pros and Cons of the ABC Analysis

The advantages of the ABC analysis are as follows:

- ▶ **Ease of use**

The ABC analysis can be easily used. Usually, the data already exists, and most IT systems provide standard ABC analyses. The separation into three classes can be carried out using the simplest calculating procedures.

- ▶ **Use of methods does not depend on analyzed objects**

You can use the ABC analysis not only for analyzing materials, but also for customer and vendor data. Moreover, you can examine individual process steps and cash flows using the ABC analysis.

- ▶ **Clear graphical presentation of the results**

The graphical presentation of the ABC analysis enables you to obtain a quick and clear overview of the analyzed data. You will be able to identify trends faster using a graphical presentation than you could using a tabular display.

There are also some disadvantages about the ABC analysis, which you shouldn't neglect when using it for inventory analysis purposes:

- ▶ **Very rough classification**

The separation into three classes (A, B, C) is very rough. Therefore, you should go into further detail after the first rough analysis and perhaps extend the separation to four or more classes. This may not always be nec-

essary. But it is advisable for a further subdivision of the C class (the Z class in the XYZ analysis), because that class typically contains particularly large data quantities.

► Provision of consistent data

One of the pitfalls in the ABC analysis is the provision of consistent data. This data is essential to determine the significance of an ABC analysis. If your data is consistent, the ABC analysis can help you obtain a lot of information on your product and customer structures; however, if the data is not consistent, the ABC analysis can be very confusing. You should therefore pay specific attention to the quality of your data. Note that even SAP does not provide some important consistency checks, which means that you have to check the consistency of your data by yourself.

Classification Into A, B, and C

The classification into the A, B, and C classes and their typical value and quantity percentages can be illustrated using the Lorenz curve (see Figure 3.1).

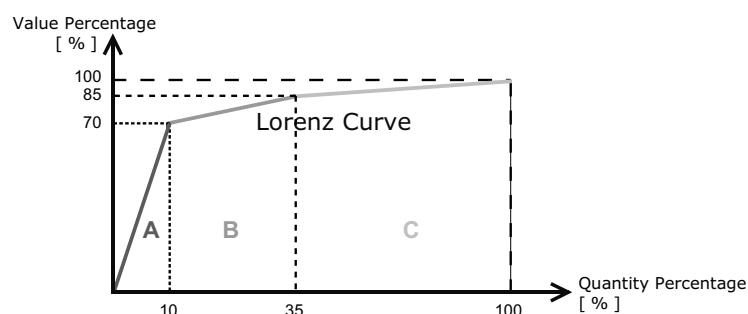


Figure 3.1 Classification into A, B, and C Classes Based on the Lorenz Curve

The quantity portions of materials in *Class A* are usually approximately 10%, while the value portion represents approximately 70%. This means that those materials are the most important ones and have the biggest potential for optimization. The quantity portion of materials in *Class B* is 25%, whereas *Class C* contains 65% of the materials. Thus, C materials occur most often. However, the value of 15% only is the smallest one. They mainly involve automatic processes in order to keep the costs as low as possible.

A general problem that occurs when performing the ABC and XYZ analyses is the definition of the borders between the individual classes. Basically, neither the number of classes (A, B, C) nor the class boundaries (A = 10%, B = 20%, C = 70%) are fixed values. The definition of class boundaries for spe-

cific critical value portions is therefore a subjective decision and can vary depending on the purpose of use. Although SAP does suggest some standard boundaries, you can also use your individual ones (see Figure 3.6 on page 61).

For example, in the retail and wholesale trading industries, the Lorenz curve is relatively flat, whereas for technical products, for instance in the manufacturing industry, it is rather steep.

The stronger the upward bend of the Lorenz curve, the more useful it is to treat its individual parts separately. Still, the separation into three classes has become widely accepted both in theory and daily work.

The ABC analysis is supposed to enable you to focus on the essential processes in the supply chain. Its goal is to separate the essential from the non-essential.

The focus of the activities is to be directed to the most profitable area (A parts), while the costs in the other areas are to be reduced by the simplification of processes (for example, by implementing a usage control).

Although the ABC analysis has been known for a long time and can be easily used, it is still being ignored in many business areas. But the ABC analysis is a universally usable method of classifying objects. Table 3.1 lists some of the possible objects.

Object	Analysis Goal	Classification Criteria
Customer	Analysis of the customer sales distribution	Customer sales in relation to the overall sales within a period
Customer	Analysis of distribution costs per USD of customer sales	Distribution costs per customer in relation to customer sales
Vendor	Analysis of monetary procurement volumes per vendor	Vendor procurement volume in relation to the entire procurement volume within a period
Finished products	Analysis of capital tie-up caused by inventories in relation to the annual revenue	Average value of inventory in relation to the annual revenue per item
Semifinished products	Analysis of the distribution of the usage value per period per semifinished product	Usage value per period of the semifinished product in relation to all usage values per period

Table 3.1 Possible Objects for an ABC Analysis

The selection of the appropriate classification criterion is a significant factor for the ABC analysis. If you choose the right classification criterion for your problem, the analysis result enables you to make the right decisions. If you choose the wrong criterion, the result won't be satisfactory.

The ABC analysis is used predominantly in materials management and in the sales and distribution department of a company. Here it is used to classify material types and products to be procured and used, as well as to classify and prioritize customers.

Typically, a small number of materials tends to represent a large portion of the overall value; however, you should note that the actual relationships between quantities and values can differ, depending on the actual organization.

The following typical classification has been generally established:

► **A materials**

Materials of the most valuable class represent 5–10% of the total number and account for approximately 70–80% of the entire usage value per period. These are high-quality materials, which have a high value, and therefore must be handled with more care by planners than other lower quality materials.

The prioritized handling of A materials is often reflected in the use of exact, program-driven requirements planning procedures, an exact inventory maintenance and control, an intensive market observation, and the closing of master contracts with particularly efficient vendors. The cost structures must be controlled precisely and the determination of procurement proposals should be carried out based on well defined lot-sizing processes.

Due to the high value of A materials, it is critical that you are always automatically informed in realtime about exceptional situations in the process and that you are optimally supported in the search for a solution. The logistics information system in mySAP ERP contains a static monitoring system. In SAP APO, the Alert Monitor (see Figure 3.2) alerts you as soon as an exception message occurs.

► **B materials**

Class B contains all types of materials that represent 15–20% of the total number and 15–20% of the entire usage value per period. For these average materials it makes sense to implement a differentiated procedure. This means that you must decide separately on the planning and analysis meth-

3 | Inventory Analysis

ods that you want to use for each material group and even for each individual material within the B class. For this reason, it can be useful to further subdivide the class of B materials into B1 and B2 materials.

The screenshot shows the SAP APO Alert Monitor interface. At the top, there's a toolbar with buttons for 'Redetermine Alerts', 'Overall Profile', and 'Favorite Management'. Below that is a navigation bar with 'Favorites' and 'ICE (Default Settings)'. The main area has two sections: 'Select Alert Views' and 'Order in Past (22 Alerts)'. The 'Select Alert Views' section lists various alert types and their counts, such as Chocolate Ice Cream (45), Vanilla Ice Cream - Premium Brand (22), and Vanilla Mix (22). The 'Order in Past' section displays a table of 22 alerts with columns for Start Date, Description, Order, Priority, Scheduled, Cat, PP-Firmed, Conv. Inc., Item Number, Schd Ln.No, Product, and Product Description. Most entries are for Vanilla Ice Cream - House Brand.

Start Date	Description	Order	Priority	Scheduled	Cat	PP-Firmed	Conv. Inc.	Item Number	Schd Ln.No	Product	Product Description
Opening date in the past	Planned Order 132510 (In-House)	0	X	A1	X		0001	T-FV200		Vanilla Ice Cream - House Brand	
Opening date in the past	Planned Order 132509 (In-House)	0	X	A1	X		0001	T-FV200		Vanilla Ice Cream - House Brand	
Opening date in the past	Planned Order 128420 (In-House)	0	X	A1	X		0002	T-FV200		Vanilla Ice Cream - House Brand	
Opening date in the past	Planned Order 1232516 (In-House)	0	X	A1			0000	T-FV200		Vanilla Ice Cream - House Brand	
Opening date in the past	Planned Order 1232514 (In-House)	0	X	A1			0000	T-FV200		Vanilla Ice Cream - House Brand	
Start date in the past	Manufacturing Ord. 70000862 (In-House)	0		AB	X		0006	0000109985	T-FV200	Vanilla Ice Cream - House Brand	
Start date in the past	Planned Order 128420 (In-House)	0	X	A1	X		0002	T-FV200		Vanilla Ice Cream - House Brand	
Start date in the past	Planned Order 128421 (In-House)	0	X	A1	X		0002	T-FV200		Vanilla Ice Cream - House Brand	
Start date in the past	Planned Order 128422 (In-House)	0	X	A1	X		0002	T-FV200		Vanilla Ice Cream - House Brand	
Start date in the past	Planned Order 128419 (In-House)	0	X	A1	X		0002	T-FV200		Vanilla Ice Cream - House Brand	
Start date in the past	In-house production 197414	0	X	A1	X	X	0002	T-FV200		Vanilla Ice Cream - House Brand	
Receipt due/datetime in the past	Planned Order 128422 (In-House)	0	X	A1	X		0002	T-FV200		Vanilla Ice Cream - House Brand	
Receipt due/datetime in the past	Planned Order 128420 (In-House)	0	X	A1	X		0002	T-FV200		Vanilla Ice Cream - House Brand	
Receipt due/datetime in the past	In-house production 197414	0	X	A1	X	X	0002	T-FV200		Vanilla Ice Cream - House Brand	
Receipt due/datetime in the past	Manufacturing Ord. 70000862 (In-House)	0		AB	X		0006	0000109985	T-FV200	Vanilla Ice Cream - House Brand	
Receipt due/datetime in the past	Planned Order 128419 (In-House)	0	X	A1	X		0002	T-FV200		Vanilla Ice Cream - House Brand	

Figure 3.2 Alert Monitor in SAP APO

► C materials

C materials contain material types that represent 70–80% of the total number and the remaining 5–10% of the entire usage value per period. C materials are therefore of a low value, and their handling is intended to simplify work processes and reduce costs.

C materials eat up your yield return. The process costs are disproportionately high. They tie up capacities and cause approximately 60% of all procurement processes. Here, you should consider other strategies like single sourcing or even outsourcing.

C materials should be driven in an automated way through the supply chain without any manual effort, because the small value portion should not be inflated by additional manual activities. C materials can generally be planned using fixed or periodic lot sizes. You should avoid doing a

time-consuming inventory analysis if at all possible. However, C materials can have a substantial influence on the production costs, for example, if a C part is missing, which would obstruct the downstream production process. This can lead to production downtimes or delays for the B and A materials.

For C materials it can also make sense to further subdivide the items into C1 and C2 materials.

Table 3.2 provides an overview of the different way in which A and C materials are managed.

	A material	C material
Procurement market research	Global sourcing	E-procurement
Value analysis	Mandatory	Not necessary
Requirements planning	Deterministic	Stochastic
Inventory-taking	Permanently	Once a year
Safety stock	Small	Large
Order cycle	High—JiT	Larger cycles

Table 3.2 A and C Materials Require Different Strategies

The costs involved in a professional *procurement market research* are worthwhile only for high-quality A materials. For C materials, it is preferable to implement automated and lean procurement processes, such as E-procurement.

An exact *value analysis* is mandatory for A materials due to their high value portion, whereas such an analysis is not necessary for C materials.

For A materials, *material requirements planning* (MRP) should be deterministic while you can use stochastic methods for C materials.

Usually, *inventory taking* is carried out permanently for A materials. For C materials, the annual inventory taking at the end of a fiscal year is sufficient.

Safety stocks should be as small as possible for A materials, since those materials have a high value, which means that even small stocks would generate a high inventory value. For C parts also, the safety stocks shouldn't be too high, but they can contain more buffers than the A material stocks because the value of C materials is lower.

A materials should be regularly procured in short *order cycles*. C materials can be procured weekly or monthly in fixed lot sizes.

3.1.2 XYZ Analysis

The ABC analysis is a primary analysis. It can be used as a basis for follow-up or secondary analyses such as the segmentation or the XYZ analysis. The XYZ analysis enables you to perform the next step of the inventory analysis. The following typical classification has been generally established:

► **X materials**

X materials are characterized by a constant, non-changing usage over time. The requirements fluctuate only slightly around a constant level so that the future demand can basically be forecast quite well. Unfortunately, experience has shown that even the forecast for X products can be poor. With X products, it's important to recognize fluctuations straightforwardly so you can respond quickly and appropriately. For this reason, you should install an outlier correction process, for example, in demand planning (see Figure 3.3, top).

► **Y materials**

The usage of these materials is neither constant nor sporadic. With Y materials, you can often observe trends, for example, that the usage increases or decreases for awhile, or that it is characterized by seasonal fluctuations. For these materials, it's harder to obtain an accurate forecast (see Figure 3.3, center).

► **Z materials**

These materials are not used regularly. The usage can strongly fluctuate or occur sporadically. In these cases, you can often observe periods with no consumption at all. The creation of a forecast is extremely demanding and very difficult. It is useful to further subdivide the Z materials into Z1 and Z2 materials, the latter being used even less regularly than the Z1 materials. This enables you to trigger detailed counteractive measures for particularly critical materials (see Figure 3.3, bottom).

The quality of the access fluctuations can also be determined using a fluctuation coefficient. This coefficient represents the deviation of the access pattern in the current period from that in the previous period. If the fluctuation coefficient increases, the forecast accuracy decreases. X materials have a fluctuation coefficient of < 0.1; Y materials are located between 0.1 and 0.25; and Z materials are > 0.25 (see also Figure 3.4).

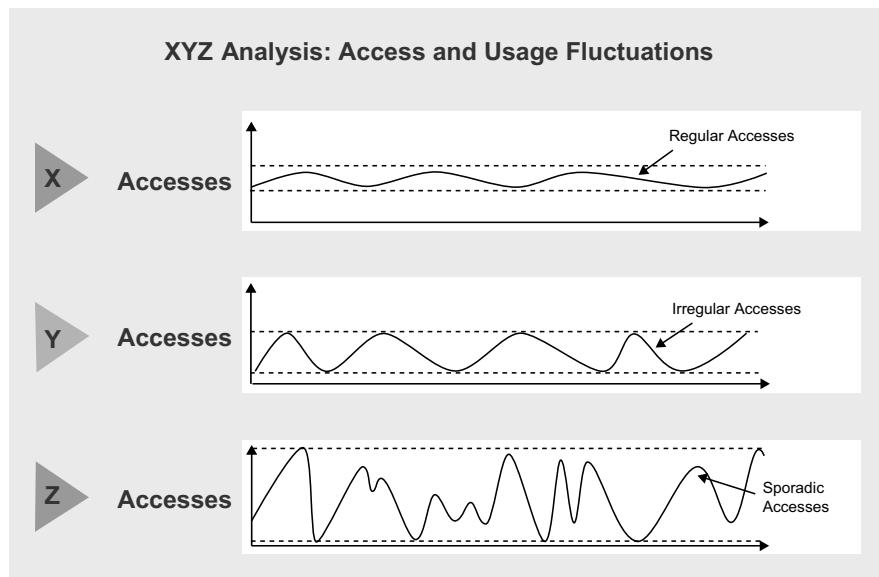


Figure 3.3 XYZ Analysis with Access and Usage Fluctuations for Materials (Source: FIR)

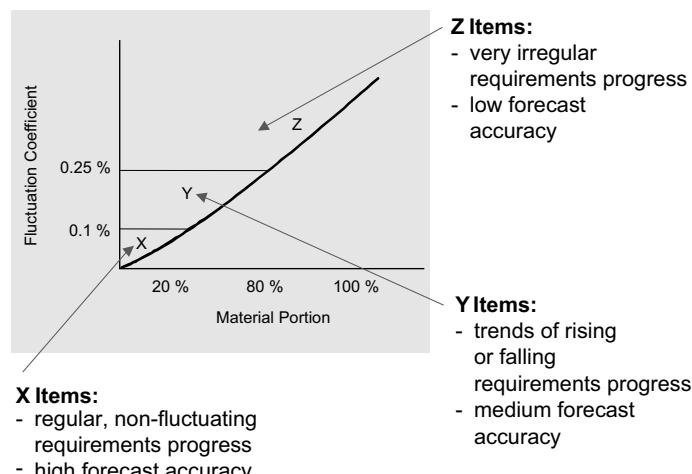


Figure 3.4 Fluctuation Coefficient in Relation to the Material Portion in an XYZ Analysis

3.2 ABC Analysis With SAP

In the SAP environment, you can use the ABC analysis in different departments of your company.

- ▶ You can use the purchasing information system in *purchasing*. Using the ABC analysis, you can classify vendors with regard to the **Invoice amount** key figure.
- ▶ You can use the S&D information system in *sales and distribution*: Using the ABC analysis, you can classify sales organizations regarding the incoming orders key figure, and materials according to the **Revenue** key figure.
- ▶ In *production*, you can use the production information system. Using the ABC analysis, you can classify work centers with regard to the **Scrap quantity** key figure.
- ▶ For your *plant maintenance*, you can use the plant maintenance information system. Using the ABC analysis, you can classify object classes with regard to the **Breakdown duration** key figure.
- ▶ To analyze your inventory you should use the *inventory controlling* module in SAP: Using the ABC analysis, you can classify materials, material groups, storage locations, and even entire plants. For example, you can run comparisons of material movements per storage location or of outgoing quantities at finished goods level per plant. By default, the SAP system provides a wide range of key figures for ABC and XYZ analyses, such as *usage values*, *stock receipts values*, *safety stocks*, *average inventory levels*, and the *number of material movements*. Key figures like the usage or consumption can be measured in terms of quantities (e.g., kg, units, and so on) or value units (e.g., USD).

3.2.1 Outlining the Analysis Process

The following sections will outline an ABC analysis of the inventory controlling component of mySAP ERP. Later in the chapter, we'll do the same with an XYZ analysis. The ABC analysis is performed based on the following steps:

1. Determining the analysis goal
2. Defining the area to be analyzed
3. Calculating the data basis
4. Selecting the analysis basis as a subset of the data basis
5. Defining the ABC strategy and ABC class boundaries
6. Defining the priorities and assignment to the classes

3.2.2 Determining the Analysis Goal

First, we need to define the questions that you want answered and determine in which areas of the supply chain you expect the biggest potential for optimization. In the following example, we'll first conduct an ABC analysis for the consumption quantity and then we'll do a quantity flow analysis for the individual storage locations in plant 1200.

In the mySAP ERP menu, select **Logistics · Logistics Controlling · Inventory Controlling · Standard Analyses · Plant**.

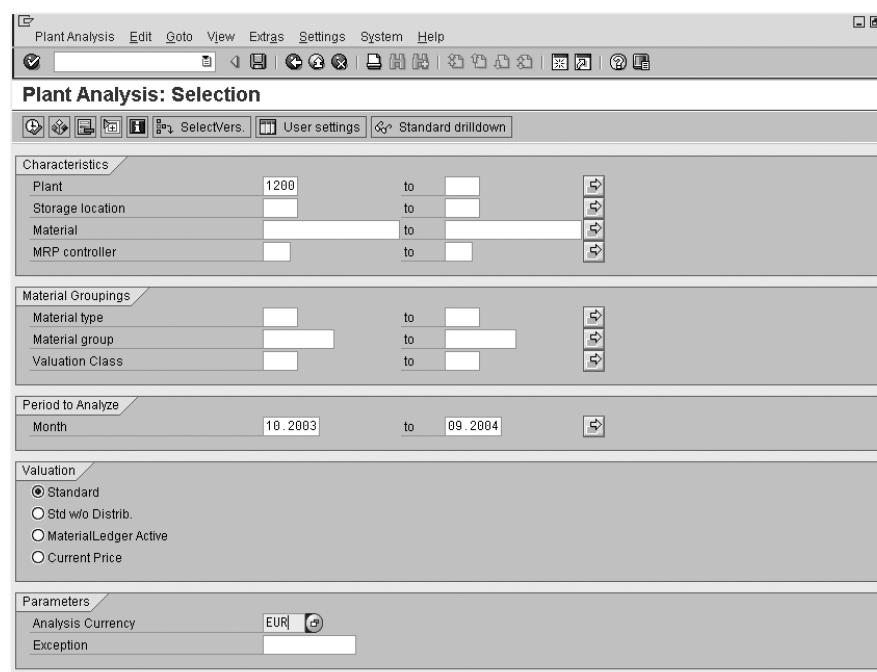


Figure 3.5 Selecting the ABC Analysis in mySAP ERP

3.2.3 Defining the Area to be Analyzed

Then select the objects to be analyzed (materials, customers, ...) and the corresponding timeframe (year, month, ...) that you want to use at the beginning of the analysis. You can extend the analysis at a later stage in iterative steps.

Figure 3.5 illustrates the selection of an ABC plant analysis in the inventory controlling area of mySAP ERP.

In the upper section, you can see the **Characteristics** field group where you can select the objects on which you want to run an ABC analysis. Enter 1200 for the plant. You can also restrict the selection to specific storage locations or exclude specific storage locations from the selection, for example, consignment storage locations.

The **Material Groupings** field group enables you to further restrict the selection, for example, according to material types (e.g., only finished products) or material groups.

The timeframe for the ABC analysis can be entered in the **Period to Analyze** field. For seasonal items, you should enter at least one entire year. If you want to analyze the material consumption only within the season, then you can enter only the period of one season. The longer the period you select, the more significant the trend you identify. For products with a very short product lifecycle (e.g., mobile phones), you should select the product lifecycle period. It is extremely important that you choose the right data basis for the analysis.

Moreover, you can use the **Valuation** field group to determine how the inventory is to be evaluated. Select the **Standard** entry if you want to refer to the standard price that is stored in the material master.

The determination of the inventory value is essential for the ABC analysis, because the value is used as a basis for separating the materials into A, B, and C materials. For this purpose, you should determine a separate value for each item in the data basis, for example: annual requirements in units x cost price per unit.

The next step is carried out automatically in mySAP ERP on the basis of the prices stored in the material master. Figure 3.6 shows that Material T-B1000 is standard-price-controlled. Go to the material master and select **Logistics · Production · Master Data · Material Master · Material · Change · Immediately**. Then go to the **Costing 2** view (**Price control = S**). The current **standard price** is set to 315 Euro and 98 cents.

Figure 3.7 shows the subsequent screen. It shows that Material T-B1000 is specified with a goods receipt value of 31,598.00 Euro. This means that the received quantity of 100 PCs was valued with the standard price of 315.98 Euro from the material master.

The screenshot shows the SAP Change Material dialog for material T-B1000. It includes sections for Standard Cost Estimate, Planned prices, and Valuation Data. The standard price is explicitly mentioned as 315,98.

Standard Cost Estimate	Future	Current	Previous
Planned price		0,00	0,00
Standard price	315,98		

Planned prices	Planned price date 1	Planned price date 2	Planned price date 3
Planned price 1			
Planned price 2			
Planned price 3			

Valuation Data			
Valuation Class	7900	Valuation Category	
VC: Sales order stk		Proj. stk val. class	
Price control	S	Current Period	2 2006
Price unit	1	Currency	EUR
Moving price	310,00	Standard price	315,98

Figure 3.6 Prices Are Automatically Taken from the Material Master in mySAP ERP

The screenshot shows the Plant Analysis: Drilldown report for plant 1200, location Dresden. It displays key figure values for material T-B1000, including Valuated stock and ValStockValue.

Material	Val.stk iss_qty	Val.stk rec_qty	Valuated stock	ValStockValue
T-B1000	0 PC	0 PC	100 PC	31.598,00 EUR

Figure 3.7 Key Figure Values are Calculated on the Basis of Quantities and Prices

The only remaining parameter you can still define is the **Analysis Currency**. If you specify an analysis currency, all key figure values are converted into the specified currency and therefore calculated in a standard format. The specification of an analysis currency can entail longer runtimes. For this reason, you should specify an analysis currency only if you're sure that the system will output different currencies and you want the results to be displayed in only one currency. The currency translation is based on the currency type

for the exchange rate that is valid on the system date. The currency type is either stored in the user settings or can be specified in Customizing.

You can also specify a defined *exception* in the parameters using the early warning system. The exceptional situations defined in the **Exception** parameter are then highlighted in color in the standard analyses. A prerequisite is that the standard analysis and the exception are based on the same information structure and that the exception has been activated for the standard analyses. The use of different colors enables you to easily navigate within the standard analysis. For example, if exceptions occur at the materials level (for instance with a material stock of more than 1m USD), they are displayed at a higher aggregation level (for example at the plant level).

3.2.4 Calculating the Data Basis

Make sure your data basis is consistent. The data basis consists of all characteristics (for example, material numbers) and key figures, such as the consumption quantity and value that you have selected for the ABC analysis. Take your time when carrying out the first ABC analysis and pay attention to quality. The recurring efforts for staging the data basis should be kept at a minimum level so that you can perform the ABC analysis continuously. Another important factor is the cleansing of data. Many ERP systems often contain unused materials that are included in data selections, which actually shouldn't be the case. It also happens that materials are selected because they still have a small stock value but have already been marked for deletion.

You should therefore pay particular attention to the following aspects when selecting and cleansing your data:

- ▶ Scrap materials that show no goods movement
- ▶ Delete materials from the data basis that have been marked for deletion
- ▶ Complement your data with missing prices, units of measure, and so on
- ▶ Scrap materials with negative values

You should first examine your data basis and then decide on the key figures that you want to analyze in the ABC analysis. If you choose a wide data basis, you can narrow it down step by step and evaluate it according to specific values. In our example, the plant analysis result first displays the **value stock receipts** and **value stock issues**, as well as the **total usage** key figures that have been previously set in the standard selection profile, as shown in Figure 3.8.

Plant Analysis: Drilldown				
Switch drilldown... Top N...				
Plant	1200 Dresden	Stor. location	12000001 Materiallage	
No. of Material:	1619			
Material	Val.stk iss. qty	Val.stk rec. qty	Total usage	Valuated stock
L-88Y	0 CAR	0 CAR	0 CAR	268.085.408 CAR
M-01	475 PC	232 PC	475 PC	371 PC
M-02	559 PC	253 PC	559 PC	268 PC
M-03	599 PC	297 PC	599 PC	269 PC
M-04	654 PC	247 PC	654 PC	149 PC
M-05	464 PC	267 PC	464 PC	156 PC
M-06	611 PC	315 PC	611 PC	118 PC
M-07	472 PC	314 PC	472 PC	419 PC
M-08	944 PC	710 PC	944 PC	182 PC
M-09	538 PC	272 PC	538 PC	219 PC
M-10	529 PC	305 PC	529 PC	129 PC
M-11	656 PC	378 PC	656 PC	295 PC
M-12	575 PC	293 PC	575 PC	288 PC
M-13	561 PC	310 PC	561 PC	184 PC
M-14	893 PC	344 PC	893 PC	100 PC
M-15	515 PC	289 PC	515 PC	269 PC
M-16	581 PC	278 PC	581 PC	175 PC
M-17	628 PC	337 PC	628 PC	1.257 PC
M-18	722 PC	383 PC	722 PC	163 PC
M-19	679 PC	399 PC	679 PC	272 PC
M-20	697 PC	347 PC	697 PC	191 PC
PK-089	0 PC	0 PC	0 PC	1.080 PC
PK-090	0 PC	0 PC	0 PC	1.199 PC
PK-095	0 PC	0 PC	0 PC	200 PC
PK-100	0 PC	0 PC	0 PC	1.194 PC
PK-105	0 PC	0 PC	0 PC	200 PC
R-1000	0 PC	0 PC	0 PC	300 PC
R-1001	0 PC	0 PC	0 PC	155 PC
R-1006	15 PC	0 PC	15 PC	929 PC
R-1110	0 PC	0 PC	0 PC	966 PC
R-1111	0 PC	0 PC	0 PC	692 PC
R-1120	0 PC	0 PC	0 PC	1.272 PC
R-1130	0 PC	0 PC	0 PC	2.069 PC
R-1131	0 PC	0 PC	0 PC	60 PC
R-1140	288 PC	300 PC	288 PC	2.000 PC
R-1141	185 PC	287 PC	185 PC	2.147 PC
R-1142	0 PC	0 PC	0 PC	300 PC
R-1150	0 PC	0 PC	0 PC	9.329 PC
R-1169	0 PC	0 PC	0 PC	328 PC
R-1170	0 PC	0 PC	0 PC	1.644 PC
R-1172	0 PC	0 PC	0 PC	60 PC
R-1180	165 PC	165 PC	165 PC	300 PC
R-1210	0 PC	0 PC	0 PC	1.374 PC

Figure 3.8 Basic List for an ABC Analysis with Key Figures: Value Stock Issues, Value Stock Receipts, and Total Usage

Figure 3.9 shows the definition of key figures on which you want to base your ABC analysis in mySAP ERP. Once you have selected the data basis using a set of key figures, you can follow the menu path **Goto • Select key figures** to make your selection.

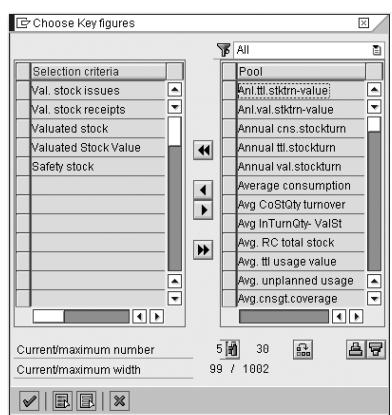


Figure 3.9 Selecting Key Figures for an ABC Analysis

3 | Inventory Analysis

The system displays all available key figures of your data basis (**Pool**), as well as the key figures you actually selected by using the arrow buttons (**Selection criteria**). For our ABC analysis, we'll select the key figures **Valuated stock** and **Valuated Stock Value**.

Next, we'll obtain the analysis based on the selected key figures. Then you can classify the data at the key figures level to examine the data basis prior to the actual ABC classification and to define the ABC boundaries (see Figure 3.10). To do that, you should highlight the **key figure** you want to classify and then click on the **Sort** button.

Plant Analysis: Drilldown						
Switch drilldown... Top N... Sort Filter Print						
Plant	1200 Dresden	Stor. location	12000001 Materiallager			
No. of Material:	1619	ValStockValue				
Material	Val.stk iss qty	Val.stk rec qty	Valuated stock	ValStockValue	Safety Stck	
Total	50.156,270 ***	46.431,000 ***	72317645605,275 ***	7459575.321,30 EUR	93.010,000 ***	
40-200C	0 PC	0 PC	5.887.613.468 PC	601.225.798.92 EUR	0 PC	
L-40C	0 CAR	0 CAR	1.708.389.296 CAR	413.208.686.62 EUR	0 CAR	
80-200C	0 PC	0 PC	3.576.010.875 PC	393.779.825.86 EUR	0 PC	
60-200C	0 PC	0 PC	3.155.304.011 PC	347.452.984.72 EUR	0 PC	
60-200F	0 PC	0 PC	3.154.752.563 PC	347.392.189.93 EUR	0 PC	
80-200F	0 PC	0 PC	2.629.977.981 PC	289.605.429.74 EUR	0 PC	
L-80C	1.430 CAR	1.430 CAR	1.042.006.024 CAR	287.298.631.26 EUR	0 CAR	
40-200F	0 PC	0 PC	2.629.956.965 PC	268.563.702.55 EUR	0 PC	
L-60C	1.840 CAR	1.840 CAR	921.834.990 CAR	229.012.643.12 EUR	0 CAR	
L-60F	0 CAR	0 CAR	915.544.480 CAR	208.016.474.20 EUR	0 CAR	
L-80F	0 CAR	0 CAR	762.441.400 CAR	192.144.608.75 EUR	0 CAR	
L-40F	0 CAR	0 CAR	762.919.400 CAR	188.817.986.44 EUR	0 CAR	
40-210	0 PC	0 PC	5.246.895.413 PC	173.074.985.64 EUR	0 PC	
60-200Y	0 PC	0 PC	1.424.852.276 PC	144.064.277.32 EUR	0 PC	
L-40Y	0 CAR	0 CAR	488.406.656 CAR	129.500.157.38 EUR	0 CAR	
L-40R	0 CAR	0 CAR	469.829.026 CAR	124.598.608.72 EUR	0 CAR	
60-200R	0 PC	0 PC	1.190.748.610 PC	120.234.988.24 EUR	0 PC	
YY-250	0 M	0 M	211903.542.150 M	118.759.812.04 EUR	0 M	
80-200R	0 PC	0 PC	1.139.566.950 PC	115.218.867.90 EUR	0 PC	
L-60R	0 CAR	0 CAR	427.278.824 CAR	108.686.177.88 EUR	0 CAR	
YY-260	0 PC	0 PC	9.627.206.437 PC	105.984.448.14 EUR	0 PC	
80-210	0 PC	0 PC	3.311.797.311 PC	93.344.251.01 EUR	0 PC	
L-60Y	0 CAR	0 CAR	389.138.249 CAR	72.073.803.63 EUR	0 CAR	
L-80R	0 CAR	0 CAR	247.366.992 CAR	69.671.847.26 EUR	0 CAR	
L-80Y	0 CAR	0 CAR	268.085.408 CAR	67.168.479.04 EUR	0 CAR	
YY-240	0 KG	0 KG	7.636.420.586 KG	42.923.423.01 EUR	0 KG	
YY-230	0 PC	0 PC	5.453.252.102 PC	30.559.500.41 EUR	0 PC	
YY-220	0 PC	0 PC	5.453.252.102 PC	30.559.500.41 EUR	0 PC	
YY-270	0 PC	0 PC	4.812.093.227 PC	26.968.997.00 EUR	0 PC	
YY-210	0 KG	0 KG	4.816.223.247 KG	22.158.101.91 EUR	0 KG	
60-210	0 PC	0 PC	3.055.498.226 PC	17.123.731.76 EUR	0 PC	
40-200Y	0 PG	0 PG	1.360.947.622 PG	13.742.093.45 EUR	0 PG	
40-200R	0 PC	0 PC	1.309.800.795 PC	13.225.637.27 EUR	0 PC	
80-200Y	0 PC	0 PC	1.234.536.329 PC	12.482.129.85 EUR	0 PC	
XX-200	0 M	0 M	973466.441.560 M	9.759.389.08 EUR	0 M	
T-ASD30	0 PC	0 PC	10.000 PC	7.772.300.00 EUR	0 PC	
T-ASD29	0 PC	0 PC	10.000 PC	7.772.300.00 EUR	0 PC	

Figure 3.10 The Dataset Can Be Sorted According to Selected Key Figures

3.2.5 Defining the ABC Strategy

Once you have defined the data basis and the key figures for the ABC analysis, you must select a strategy. To do that, you must once again select a key figure and then click on **Edit • ABC Analysis**. The system displays the screen in which you can select the ABC strategy, as shown in Figure 3.11.

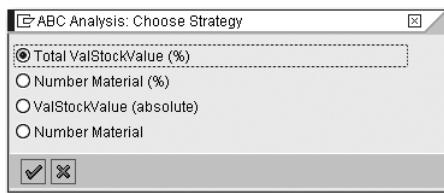


Figure 3.11 Selecting the ABC Strategy

After selecting the strategy, you must select the ABC strategy parameters:

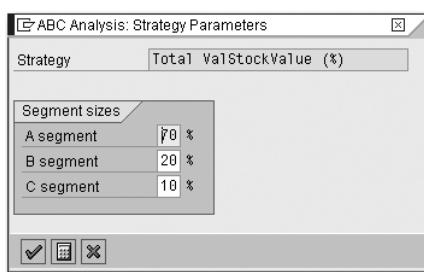


Figure 3.12 Selecting the ABC Strategy Parameters

In Figures 3.11 and 3.12, you can see the analysis strategy and the class boundaries we defined in mySAP ERP for our example. We decided to use the standard strategy, **Total ValStockValue (%)** and the standard class boundaries: **A = 70%**, **B = 20%**, and **C = 10%**.

Prior to the actual analysis in the ABC analysis, you must define the analysis strategy, as described above. To do that, mySAP ERP provides the following four strategies:

Total Key Figure (%)

The total of the characteristic values (materials) assigned to the A, B, or C segment represents a specific percentage of the total value of the key figure (in the above example, that's the **total valued stock value**).

An example: You enter 70% for the A segment, 20% for the B segment, and 10% for the C segment. These values have proven useful in actual practice; however, you can also use slightly modified values if you have already run the ABC analysis on the same data basis several times and concluded that the modified settings are more appropriate for your data basis.

The system creates an internal list that is sorted by the key figure values in descending order. The A segment is assigned all values that represent 70% of the total key figure value. The B segment is assigned the values representing 20%, and the C segment is assigned the values that represent 10% of the total key figure value.

Number of Characteristic Values (%)

The number of characteristic values (the number of materials in the above example) that are assigned to the A, B, and C segments is provided as a percentage of the total number.

An example: You enter 10% for the A segment, 30% for the B segment, and 60% for the C segment. The system creates an internal list that is sorted by the key figure values in descending order. The A segment is assigned 10% of the total number of characteristic values with the highest key figure value, the B segment is assigned the following 30%, while the C segment is assigned 60% of the characteristic values with the lowest key figure value.

Key Figure (absolute)

The boundaries between the A and B and between the B and C segments must be defined.

An example: You enter the value 500,000 to mark the boundary between the A and B segments, while 150,000 represents the boundary between the B and C segments. The A segment is then assigned all characteristic values whose key figure value is higher than 500,000. All characteristic values whose key figure value is between 150,000 and 500,000 are assigned to the B segment. And finally, all characteristic values whose key figure value is lower than 150,000 are assigned to the C segment.

You should opt for this strategy only if you know your data basis very well and if you have previously performed several ABC analyses for the same data basis. This strategy helps you tune up your ABC analysis and perform detailed analyses.

Number of Characteristic Values

The number of characteristic values must be defined for the A and B segments. All other characteristic values are assigned to the C segment.

An example: You enter 20 as the value for the A segment, and 30 for the B segment. As a result of the ABC analysis, the system creates an internal list that is sorted by the key figure values in descending order. The first 20 characteristic values in the list are assigned to the A segment, the next 30 values are assigned to the B segment, and the remaining values are assigned to the C segment.

You should choose this strategy only if you know your data basis very well and if you have previously performed several ABC analyses for the same data basis. This strategy can also be used for fine-tuning your ABC analysis. It is particularly useful when you want to quickly identify the top 20 characteristic values and when you want to accelerate the ABC analysis when dealing with large data quantities.

3.2.6 Defining Class Limits

After selecting the strategy, you must define the class limits. Note that the SAP system provides only one suggestion. You can define the final class limits in accordance with your requirements, and even define more than three of them; however, the three limits have proven useful in actual practice.

Alternatively, Figure 3.13 shows the definition of six individual classes.

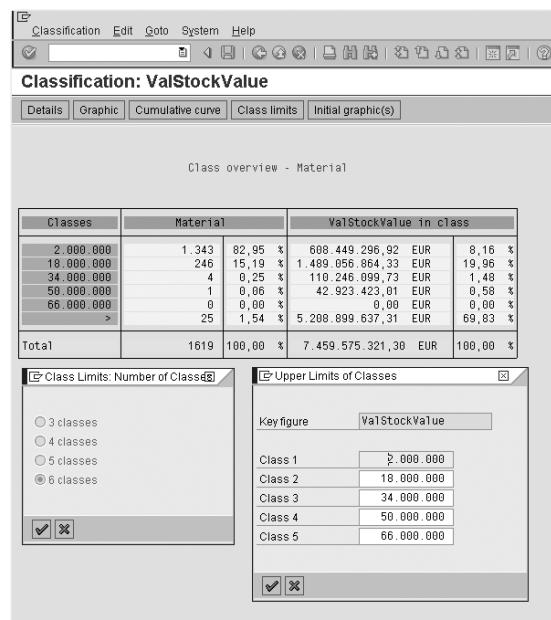


Figure 3.13 ABC Analysis with Six Individual Class Limits

Six class limits are useful only if you want to perform a very detailed ABC analysis and to further subdivide the standard A, B, and C classes. A real-life example would be the more detailed separation of C materials. A large quantity of C materials, for example, can be subdivided into C1 materials (low value) and C2 materials (very low value).

But let us now return to the ABC analysis with the three standard class limits.

3.2.7 Assigning Classes

The SAP system defines the ranking of the values (for example, rank No. 1 is the highest annual requirement in USD) and sorts the materials in the subsequent ABC analysis correspondingly. Here, it is useful to calculate aggregated values with regard to the assignments to ABC limits. The system calculates the rank or the material as a percentage of the total value. Then, it calculates the aggregated percentage of the total value.

The respective materials are automatically assigned by the system to the previously defined classes. The result you obtain is an ABC classification. The identified classification criterion for each material (A, B, or C) can be automatically stored in the material master data. If you don't use this function, you must manually enter the newly determined ABC identifiers in the material master.

Figure 3.14 displays the result of an ABC analysis in mySAP ERP, which you can select via the following path: **Edit • Segmentation**.

ABC Analysis: ValStockValue					
Details Graphic Cumulative curve New Strategy Initial graphic(s)					
Overview of segments - Material					
Segments					
A segment		26	1,61 %	5.251.823.060,32 EUR	70,40 %
B segment		212	13,09 %	1.464.912.964,06 EUR	19,64 %
C segment		1.381	85,30 %	742.839.296,92 EUR	9,96 %
Total		1619	100,00 %	7.459.575.321,30 EUR	100,00 %

Figure 3.14 Overview of an ABC Analysis Result

The figure shows the class limits with their absolute values, the percentages, and aggregated values. In the above example, 0.85% (26 materials) represents 70.40% of the total valued stock value. By double-clicking on the

respective class, you can prompt the system to display the individual materials, including their values in greater detail (see Figure 3.15).

ABC Analysis: ValStockValue			
Graphic Initial graphic(s)			
Total list			
ABC ind.	Material	ValStockValue	
A	40-200C	601.225.798,92	EUR
A	L-40C	413.208.666,62	EUR
A	80-200C	393.779.825,86	EUR
A	60-200C	347.452.984,72	EUR
A	60-200F	347.392.189,93	EUR
A	80-200F	289.605.429,74	EUR
A	L-80C	287.298.631,26	EUR
A	40-200F	268.563.702,55	EUR
A	L-60C	229.012.643,12	EUR
A	L-60F	208.016.474,20	EUR
A	L-80F	192.144.608,75	EUR
A	L-40F	188.817.986,44	EUR
A	40-210	173.074.965,64	EUR
A	60-200Y	144.064.277,32	EUR
A	L-40Y	129.500.157,38	EUR
A	L-40R	124.598.608,72	EUR
A	60-200R	120.234.988,24	EUR
A	YY-250	118.759.812,84	EUR
A	80-200R	115.218.867,90	EUR
A	L-60R	108.686.177,88	EUR
A	YY-260	105.984.448,14	EUR
A	80-210	93.344.251,01	EUR
A	L-60Y	72.073.803,63	EUR
A	L-80R	69.671.847,26	EUR
A	L-80Y	67.168.479,04	EUR
A	YY-240	42.923.423,01	EUR
B	YY-220	30.559.500,41	EUR
B	YY-230	30.559.500,41	EUR
B	YY-270	26.968.997,00	EUR
B	YY-210	22.158.101,91	EUR
B	60-210	17.123.731,76	EUR
B	40-200Y	13.742.083,45	EUR
B	40-200R	13.225.637,27	EUR
B	80-200Y	12.482.129,85	EUR
B	XX-200	9.759.389,08	EUR
B	T-ASD01	7.772.300,00	EUR
B	T-ASD02	7.772.300,00	EUR
B	T-ASD03	7.772.300,00	EUR
B	T-ASD04	7.772.300,00	EUR

Figure 3.15 Detailed View of an ABC Analysis Result

3.2.8 Evaluating an ABC Analysis

You can display the ABC analysis results as a totals curve or as a three-dimensional graphic.

Totals Curve

The totals curve can be displayed for absolute values or percentages. It provides information on the relative concentration of materials. The abscissa represents the number of materials (or the percentage of the number of materials respectively), while the ordinate displays the aggregated consumption values or requirements values (or percentages of those values respectively).

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