WHITE PAPER

Best practice rules for efficient planning

Scheduling and production control are the heart of the company: they pump the entire value and material flow through the company and the supply chain. A series of basic principles and best practice modules should help you get your cycle going again.

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Contents

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Best Practice Rules for Efficient Scheduling

Scheduling and production control are the heart of the company: they pump the entire value and material flow through the company and the supply chain. But in many companies there is so little understanding of this central task that they constantly suffer from cardiovascular problems - without even knowing it. A series of basic principles and best practice modules should help you get your circulation going again.

When do I need to order which material so that it is available in the required quantity at the required time? In short, this is the task of scheduling. Something that can be summed up so briefly cannot be complicated, can it? Scheduling is not complicated either if you understand the relationships and design the scheduling mechanisms correctly.

However, a look at practice shows a completely different picture: Scheduling is often the cause of annoyance in the company - annoyance that seems to be part of everyday working life. Regular attempts to improve scheduling processes show only temporary success at best. But that doesn't have to be the case if you take the following basic principles and best practice building blocks of scheduling into account, which can help to turn a nuisance into a competitive advantage.

Basic principle 1: Scheduling is the heart of the company

Scheduling represents the heart of the company, but top management likes to see it as work in the coal bunker.

If top management is interpreted as the head of the company, then the planning department represents the heart. The planning department pumps the entire flow of goods through the company and the supply chain. In the planning department, decisions are sometimes made with a far greater financial impact than some management or board decisions, for which approval must be obtained from advisory or supervisory boards. Every manager knows that he has to take care of the performance of his heart if he does not want to fall by the wayside at some point. In the same way, the top management in a company must understand at least some of the basic principles of planning so that the economic health of the company does not suffer. This leads to a first best practice building block, which may be formulated harshly but is clearly understandable:

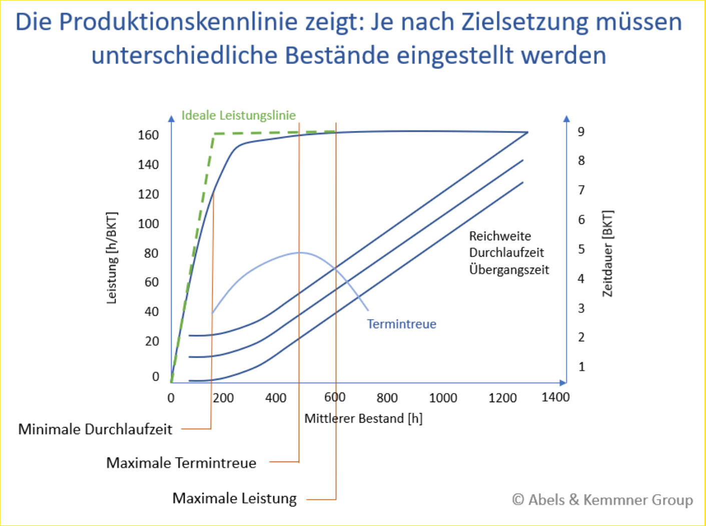
Best Practice Module 1: Top management should either familiarize themselves with the basic principles and laws of scheduling or stay out of operational business.

Why this requirement is so important becomes clearer when we consider Basic Principle 2.

Basic principle 2: Without clear logistical objectives there is no reasonable planning

Don't you also have the feeling that logistics in general and planning in particular are constantly "dumping around"? We have just discovered that our stocks are too high and everyone has to worry about reducing them, but then customers complain about poor delivery reliability and all attention shifts to delivering the products on time. The happy deadline-chasing has not even really begun when the production manager notices that capacity utilization in production is at rock bottom and warns everyone to make sure that plant utilization increases again. In the meantime, purchasing has found a new, much cheaper source of procurement, but this can only deliver in larger quantities - and stocks are already rising again...

Too many cooks spoil the broth - or so you might think. In our experience, however, it is not so much the many cooks that are to blame as the lack of a recipe for how to "mix" logistics together. Improving delivery readiness, increasing adherence to deadlines, reducing inventories, making better use of capacities and reducing lead times - unfortunately, all of these things do not go together. Given the architecture of the value chain and the order situation, there is a clear statistical connection between inventories, capacity utilization, lead times and adherence to deadlines, which can be determined in the form of a production or operating characteristic curve.



Depending on your business and competitive constraints, you must position yourself on this curve. Logistical positioning inevitably means that you cannot please everyone in the company and in the market, and that you have to step on the toes of both the stakeholders in the company and in the market. You don't want to leave the decision of how much to step on whose toes to your dispatchers alone, do you? Positioning the value chain correctly in logistical terms and encouraging the dispatchers to adhere to this positioning; this is where the experience and quality of top management come into play! Either you position yourself logistically or you continue to "dally around" - there is no middle ground. Best practice component 2 is therefore simple and clear:

Best Practice Module 2: Proper planning starts with clear logistical positioning.

First, we need to take a closer look at a very important logistical target: delivery readiness.

This refers to the ability to deliver a required quantity of products, items or components to an internal or external customer on the requested or agreed date.

Almost all companies have an idea of how high the delivery readiness should be, without there having to be a consensus between different departments, such as sales, logistics and production. The extent to which the desired delivery readiness affects the inventory required for this remains hidden in the fog of logistical uncertainty, as does the actual delivery readiness ultimately achieved, which only surprisingly few companies can measure at all inventory levels. However, logistical fog stands in the way of efficient planning. That is why we are devoting ourselves to basic principle 3.

Basic principle 3: Willingness to deliver is not a size

Delivery readiness is not a value that arises randomly at the end of a scheduling process, but a target value that the entire scheduling process must be geared towards achieving.

The required delivery readiness on the market is an essential strategic parameter for the planning and control of the entire supply chain.

The various company divisions often like to define the key figures in such a way that they can best present themselves. We do not want to argue about the "correct" definition at this point; depending on the boundary conditions of a company and its market situation, there may well be different truths. However, it is indisputable that a company needs a generally valid definition of delivery readiness for all areas and that management must set a clear, item-specific (!) specification of the delivery readiness to be aimed for.

If the relationships between the desired delivery readiness and the required inventory could be determined using the on-board resources normally available in the company, the struggle for the “right” delivery readiness would be more intense.

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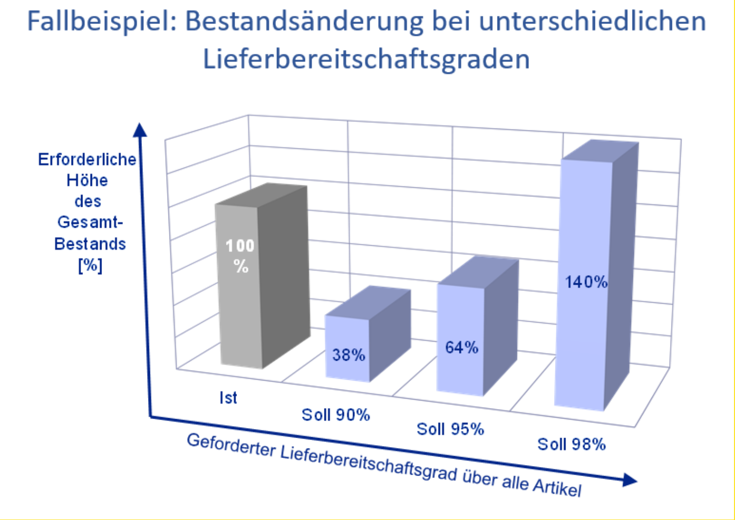


Especially for items with irregular demand, stocks explode the higher the willingness to deliver to the buyer. Items with regular demand, on the other hand, react less sensitively to high levels of readiness to deliver.

Experience shows that you often do not need the same level of delivery readiness at every storage level and not for every material and every item. Today, with the help of planning simulation systems, it is possible to calculate precisely which delivery readiness for which items leads to which inventory levels. In this way, you can determine exactly what your delivery readiness will cost you and whether you can and want to afford it, or how much inventory and therefore money you need to invest in order to remain competitive.

Best Practice Module 3: In an efficient planning system, the required delivery readiness is determined on an article-specific basis and is checked regularly.

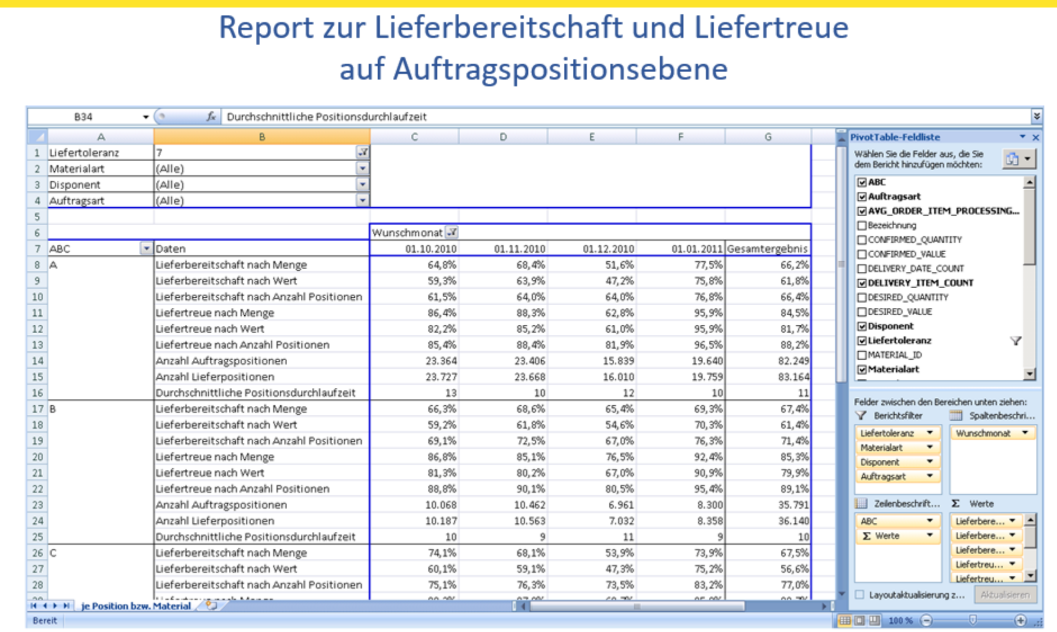
Specifying the target delivery readiness without measuring the actual delivery readiness achieved later is a pure “shoot-and-forget strategy”.

You can only achieve a control mechanism if you create instruments with which you can determine and track the actual delivery readiness achieved on an article-by-article basis at all warehouse levels. Unfortunately, basic principle 4 applies in most companies.

Basic principle 4: correctly assess delivery readiness

Most companies do not know their delivery readiness and systematically overestimate it.

All problems and uncertainties in the entire procurement, production and distribution chain are ultimately expressed in two key figures: the inventory in the entire supply chain and the achieved delivery readiness. The required delivery readiness is the decisive strategic factor determined by the market and competition. The inventory, on the other hand, is a consequence of the efficiency of the entire supply chain and the profitability of the value chain. Even if every company likes toInventories decrease: The inventory remains consequence the supply chain and not a requirement for the supply chain.


Report zur Lieferbereitschaft und Liefertreue auf Auftragspositionsebene

B34 | Durchschnittliche Positionsdurchlaufzeit

	A	B	C	D	E	F	G
1	Liefertoleranz	7					
2	Materialart	(Alle)					
3	Disponent	(Alle)					
4	Auftragsart	(Alle)					
5							
6			Wunschmonat				
7	ABC	Daten	01.10.2010	01.11.2010	01.12.2010	01.01.2011	Gesamtergebnis
8	A	Lieferbereitschaft nach Menge	64,8%	68,4%	51,6%	77,5%	66,2%
9		Lieferbereitschaft nach Wert	59,3%	63,9%	47,2%	75,8%	61,8%
10		Lieferbereitschaft nach Anzahl Positionen	61,5%	64,0%	64,0%	76,8%	66,4%
11		Liefertreue nach Menge	86,4%	88,3%	62,8%	95,9%	84,5%
12		Liefertreue nach Wert	82,2%	85,2%	61,0%	95,9%	81,7%
13		Liefertreue nach Anzahl Positionen	85,4%	88,4%	81,9%	96,5%	88,2%
14		Anzahl Auftragspositionen	23.364	23.406	15.839	19.640	82.249
15		Anzahl Lieferpositionen	23.727	23.668	16.010	19.759	83.164
16		Durchschnittliche Positionsdurchlaufzeit	13	10	12	10	11
17	B	Lieferbereitschaft nach Menge	66,3%	68,6%	65,4%	69,3%	67,4%
18		Lieferbereitschaft nach Wert	59,2%	61,8%	54,6%	70,3%	61,4%
19		Lieferbereitschaft nach Anzahl Positionen	69,1%	72,5%	67,0%	76,3%	71,4%
20		Liefertreue nach Menge	86,8%	85,1%	76,5%	92,4%	85,3%
21		Liefertreue nach Wert	81,3%	80,2%	67,0%	90,9%	79,9%
22		Liefertreue nach Anzahl Positionen	88,8%	90,1%	80,5%	95,4%	89,1%
23		Anzahl Auftragspositionen	10.068	10.462	6.961	8.300	35.791
24		Anzahl Lieferpositionen	10.187	10.563	7.032	8.358	36.140
25		Durchschnittliche Positionsdurchlaufzeit	10	9	11	9	10
26	C	Lieferbereitschaft nach Menge	74,1%	68,1%	53,9%	73,9%	67,5%
27		Lieferbereitschaft nach Wert	60,1%	59,1%	47,3%	75,2%	56,6%
28		Lieferbereitschaft nach Anzahl Positionen	75,1%	76,3%	73,5%	83,2%	77,0%

je Position bzw. Material

Bereit

The decisive competitive strategic parameter for the supply chain is the readiness to deliver. And only the comparison of the required readiness to deliver with the achieved readiness to deliver opens up the possibility of intervening in a regulatory manner.

Responding first to the internal or external customer who is best known to the management board or who shouts the loudest is not a rule, but it is the day-to-day business and management philosophy in many companies.

Let us therefore state:

Best Practice Module 4: Only the systematic measurement of delivery readiness and delivery reliability can turn a second-class “shoot-and-forget-Control" is a first-class supply chain control.

The reason why the required delivery readiness has such a serious impact on the inventory of some items is due to the required safety stocks for items with uncertain demand, which brings us to Basic Principle 5.

Basic Principle 5: Uncertain demand requires inventory or…

Uncertain demand requires inventory or costs delivery readiness.

If you do not know what demand you will have, but still want to be able to deliver, you must prepare for the unexpected by creating sufficient safety stocks. The more the internal or external demand for an item fluctuates, without
that there is a systematic mechanism behind it, such as seasonality, the higher the safety stocks must be for the same required readiness to deliver. This is a key reason why sales forecasts are so important in companies (see: Best practice rules for sales forecasts). Uncertainties that you cannot eliminate with a sales forecast must be offset by safety stocks. There is no way around this, even if many companies are constantly trying to do this by demanding high levels of readiness to deliver and lower stocks at the same time:

Best Practice Module 5: Try to eliminate forecast uncertainty. The only way to cushion the remaining uncertainty on the demand side is to hold safety stocks, whether you like it or not.

You must not overlook an important starting point for achieving low safety stocks despite fluctuating demand:

How high the required safety stocks must be depends on the replenishment time, i.e. the time you need to replenish your stocks. The shorter the replenishment times, the lower the required safety stocks can be. At least when it comes to your own production, a short lead time can only be achieved with a lower average capacity utilization. Which brings us back to logistical positioning. Alternatively, you can change the architecture of the value chain, for example by combining work steps and thus reducing transition times. As promising as shortening replenishment times may be, reliable replenishment times are even more important than short ones, as basic principle 6 points out.

Basic Principle 6: Unreliable replenishment times

Unreliable replenishment times make scheduling difficult to control

How do you generally react to unreliable replenishment times from suppliers or fluctuating production lead times in your production? If you want to be sure that the required material is actually available at the end of the replenishment time, you have to assume the worst case scenario of the longest replenishment time in your ERP system - or statistically cushion the fluctuation in the replenishment times - in accordance with the required procurement security. The second option is the more efficient one, but is probably not supported by your ERP system. Both options mean that you build up safety times and thus safety stocks - now on the warehouse entry side. Because every early delivery leads to additional stocks.

For the reasons explained above, you should avoid uncertainty in delivery times as much as possible. On the procurement side, this can be done by analyzing disturbance variables and cleverly integrating suppliers into the scheduling mechanisms. In your own production, the first thing to do is to make the delay measurable at the component level and then proceed according to the system "deadlines are fixed, capacities are variable".

Best Practice Module 6: Try to improve your suppliers' adherence to delivery dates. You can only compensate for a lack of delivery reliability on the warehouse receipt side by using safety times or stocks. In professional planning, this is done by determining safety times based on procurement security.

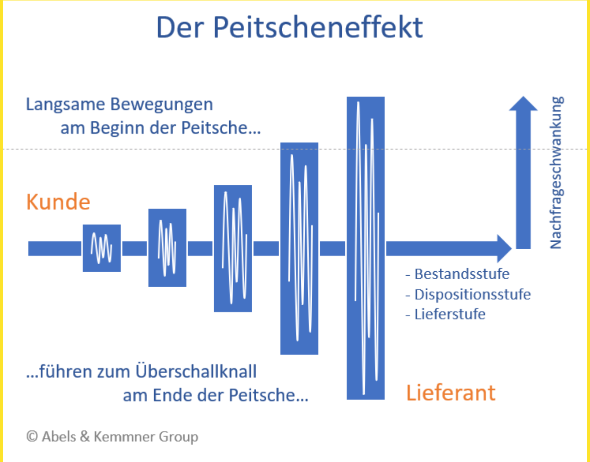
Unfortunately, short and stable replenishment times are still not enough for planning at a best practice level. You must also observe the 7th basic principle.

Basic Principle 7: Sudden Changes in Replenishment Times

Sudden changes in replenishment times lead to sudden changes in demand.

Do you know the easiest way to get your customers to bring forward their requirements and send you more orders at short notice? Tell them that your delivery times are temporarily being extended by two weeks (for whatever reason). If your customers' organization works, their planners will enter the extended replenishment time in the ERP system (unless they switch to an alternative supplier - this is where the concept has a "small" flaw).

During the next planning run of the ERP system, two more weeks' requirements suddenly become due and one day later you have two weeks' worth of additional customer orders or call-offs on the table. If you are like most companies, you are not at all prepared on the procurement side for this wave of demand, whereupon your ERP system quickly reorders raw materials and purchased parts. You can imagine how it continues:
A surge of demand sweeps through the supply chain and drains the warehouses from one planning stage to the next.



If you later remove the two-week extension in replenishment time in one fell swoop, the reverse mechanism happens and the backlog of demand leads to a wave of excess inventory that pushes its way through the supply chain.

But that's not all: the consumption or order history of the affected items will show greater fluctuations in the future, which may lead to the safety stocks in the supply chain being increased.

You see, even the sudden change in replenishment or delivery times can lead to a logistical earthquake!

Instead of making sudden changes to replenishment or delivery times at longer intervals, it is important to regularly communicate even small changes to your customers. You should demand the same from your own suppliers and at the same time continuously measure the suppliers' changes in delivery times.

However, the reality is often different: In supplier integration projects, we often find that replenishment times have not been maintained for months and sometimes years. For us, the easiest way to shorten delivery times is therefore often to simply ask the supplier whether they can deliver more quickly. So let's summarize:

Best Practice Module 7: Changes in replenishment times must be checked and updated regularly and at short notice, and delivery times must be communicated to customers regularly and at short notice. This avoids the whiplash effects in the supply chain described above. A tool that allows you to continuously monitor changes in replenishment and delivery times is essential for best practice planning.

Once you have replenishment times under control, you need to turn your attention to another basic logistics factor: batch size. Here, basic principle 8 applies.

Basic principle 8: Isolated batch sizes endanger adherence to delivery dates

Batch sizes set in isolation for individual materials endanger punctuality, delivery readiness and low inventories.

Why do you work with batch sizes in planning? Typically because batch size "1" sounds chic and trendy, but is often not feasible for various reasons. You will only be able to order or produce a few products in batch size "1" because it is too expensive. Larger batch sizes in procurement often enable purchasing to negotiate cheaper unit prices and reduce freight costs. Larger batches in production reduce the frequency of annoying and sometimes expensive setups.

If you question fixed minimum and rounding batch sizes, you often find that, especially in production, most batch sizes are determined based on gut feeling rather than objective criteria. However, determining batch sizes has a profound impact on the sensitive planning mechanism between parts and storage levels. Correctly set batch sizes can save a lot of money, while incorrectly set batch sizes can destroy a lot of money. Five factors play a decisive role in batch size optimization:

1. economic efficiency,
2. the technology,
3. the capacity,
4. the spread of order times and
5. the quantity synchronization of the production stages.

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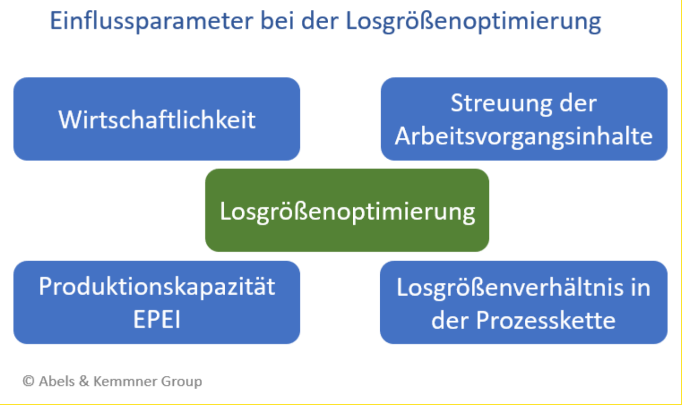
How many of these criteria do you take into account when determining your batch size?



Batch sizes or batch size increments are sometimes technically determined. If eight parts are manufactured in an injection mold at the same time, it is sometimes technically difficult to use only four of these cavities in the production process. A process such as barrel plating is more problematic because it is usually associated with larger batches. If your process is set for a batch size of 3000 parts, you cannot run this process with a significantly different number of parts without compromising on quality.

If you manufacture several parts using a production capacity and reduce the batch size for each of these parts, you may find that the number of setup processes increases so much that the available system capacity is not sufficient for setup and production. You can solve the problem to a certain extent by optimizing setup. At some point, however, setup optimization becomes so expensive that it no longer makes sense. The limited capacity, the required setup effort and the required production time result in precisely calculable production batch sizes that cannot be undercut. A smaller batch size might be desirable, but is not feasible for capacity reasons. In almost every production, there are such cases of capacity-related batch sizes.

If your product is structured in several BOM levels, then you usually produce in several consecutive production stages. The batch sizes at the individual production stages should be in an integer ratio to each other, unless they vary from order to order in sync with requirements. This further restricts you in determining batch sizes.

After these actual batch size requirements and restrictions, at least in production, there is little scope for one of the supposedly most important batch size criteria: profitability. When determining economical batch sizes, the inventory costs incurred are compared with the ordering or setup costs. By combining larger required quantities, some from the distant future, into one production or procurement batch, you spread the necessary procurement or setup costs across many parts, so that the costs per part are lower.

On the other hand, you have to keep the parts in stock for a long time, which increases storage costs. The usual methods for calculating economic batch sizes that are used in companies struggle with numerous shortcomings. The cost factors included in the analysis are often inaccurate, the profitability calculation does not take capacity limits into account and ignores the interaction of batch sizes at the various planning levels. It is therefore almost irrelevant that all popular methods for calculating economic batch sizes are purely approximate methods that are sometimes far from the true economic batch sizes.

Last but not least, the working hour content of different production orders that are processed using the same production capacity should be as similar as possible so that you can achieve high capacity utilization with low inventory levels and thus short lead times. This requirement also translates into batch sizes.

These considerations should make it clear:

Best Practice Module 8: Efficient scheduling cannot do without batch size optimization, but requires systematic batch size management and not isolated command actions.

When it comes to batch sizes, it becomes clear how uncritically and without a sufficiently deep understanding of the interrelationships many companies and users mess around not only with batch size determination, but with the entire planning process. Your interest in these explanations already shows that this statement does not apply to you.

This is especially true if you handle safety stocks correctly, because:

Basic principle 9: Manually set safety stocks are usually wrong

Statistics are often involved in planning and also play a major role in determining safety stocks. Unfortunately, humans have no sense organ for statistical correlations. This is clearly shown by an example outside of logistics: every year, an average of five people die worldwide from shark attacks, while 150 people are killed by coconuts on beaches. Despite this, the beaches in the tropics are full of sunbathing tourists. However, if there is a report of a shark being seen within a few tens of nautical miles of a beach, no one goes into the water again.

Since one cannot rely on a reliable sense organ for statistical correlations, it is extremely unwise to determine safety stocks manually. Even a supposedly keen look at past inventory trends, bottom line analyses or the actual experience of a stock-out are poor guides for determining the size of safety stocks.

Unfortunately, most ERP systems only help you to a limited extent when it comes to statistically determining safety stocks: If safety stocks can be determined automatically at all, they are usually based on inadequate statistical concepts and only refer to delivery and not procurement safety stocks. The fact that the ERP system cannot do something is no excuse when it comes to achieving best practice levels; there are enough tools and mechanisms to correctly determine safety stocks. Therefore:

Best Practice Module 9: Safety stocks on the warehouse input and output side as well as in production must be automatically calculated, set and built up based on reliable statistical mechanisms in order to achieve best practice disposition.

Determining the correct amount of safety stock is critical. But creating it in the first place can be even more problematic. The reason for this is the next basic principle 10.

Basic Principle 10: It is too late for safety stocks

When safety stocks are needed, it is too late to build them up.

Safety stocks are unpopular because they are thought to cost money but bring nothing. Many companies are therefore hesitant to actually build up safety stocks. Instead, they use every short period of time during which they have not had to touch the safety stocks as an opportunity to reduce the stocks again. When things really get tough - and they really will get tough! - it will be too late to build up the stocks.

In the best case, the build-up takes time and the market is patient. Often, however, the supplier or the company's own production is no longer able to deliver the required quantities. Safety stocks can usually only be built up at times when they are not yet needed. Therefore, we should note:

Best Practice Module 10: Determine the required safety stocks regularly and build them up in good time, i.e. before they are needed.

Inventories represent an organizational lubricant in the logistics gears. Consequently, inventories are also very well suited to evaluating logistics performance. Basic principle 11.

Basic Principle 11: Basic Stocks versus Safety Stocks

Basic stocks result from the architecture of the value chain, safety stocks from its process stability.

Let us imagine that the entire value chain would function without disruptions: no irregular replenishment times, 100% adherence to production deadlines, no quality problems, customers who collect their ordered goods on time, etc. Would such a process chain be inventory-free?

If it is to operate as cost-effectively as possible, then of course not, as we know! It would hardly make economic sense, for example, to procure each screw individually from China and deliver it as needed. Stocks that are required to operate such an ideal value chain are referred to as basic stocks.

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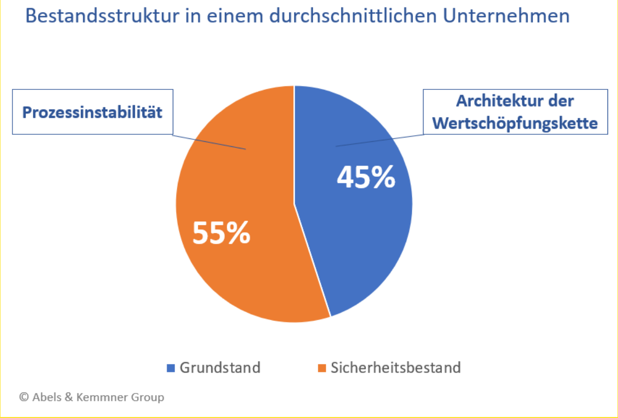
Lagerlos, i.e. working without basic stocks in the value chain, is a theoretically conceivable solution, but not one that makes economic sense. In every supply chain, you eventually reach a point where further reducing stocks at other points in the value chain causes more costs than the inventory savings reduce. We refer to this total cost minimum as the "optimal operating point" below.

Clever changes to the architecture of the value chain make it possible to work with lower basic inventories at the same cost, thus shifting the optimal operating point to lower inventories: By creating variants late, as close to the customer or market as possible, you will be able to get by with lower basic inventories.

The same applies to a smaller number of inventory levels, a very early logistical decoupling point or highly flexible production. Not every measure is technically feasible and almost every one also incurs costs. The optimal operating point will therefore probably never be at zero basic inventory.

Even if we were able to create an economic value chain with a basic inventory of "zero", we would not necessarily be able to do without inventory in the real world. In the real world, an infinite number of disruptive factors affect the value chain, most notably fluctuating demand, unreliable delivery times in procurement and production, and quality problems.

In order to cushion all these disruptions, the safety stocks already discussed in detail are necessary. Safety stocks are no small matter! In an average company, safety stocks make up 55% of total stocks compared to 45% of basic stocks!



Basic and safety stocks therefore represent a good indicator of where in the value chain further improvement measures need to be considered. Required basic stocks show starting points for improving the architecture of the value chain, while necessary safety stocks indicate places where process instabilities need to be reduced. While everyone is happy to deal with logistical measures to reduce basic stocks, often without being aware of the difference between basic stocks and total stocks, logistical process reliability is often forgotten. Another best practice building block is therefore:

Best Practice Module 11: Unreliability in the logistics chain that cannot, should not or must not be eliminated must be offset by safety stocks.

If the central logistical variables discussed above are set correctly, the task is to plan and control them sensibly and efficiently:

Basic Principle 12: You have to understand disposition mechanisms very precisely

One must understand disposition mechanisms very precisely in order to be able to judge under which conditions which procedure is suitable and how its parameters must be set so that it works.

Classic push controls, such as plan-controlled scheduling or MRP II, are no longer "cool" today, but rather "out". Everything is striving for lean production and "pull control": reorder point control and especially Kanban (pendulum cards) are "in". Both are very old methods that were in use before the age of computers, and pendulum cards at least in the Middle Ages. There are many reasons for the renaissance of pull control, andHowever, it is often overlooked that push control was originally developed to overcome certain disadvantages of reorder point control and that pure pull control practically does not exist.

Pull control in its classic form is primarily suitable for uniform average requirements of recurring items with a fluctuation variance of up to 1. Pull mechanisms can be deformed so that they also work for individual and small series production, but then they no longer offer any advantage over push control.

Reorder point control 100 years ago meant that a mark was placed in the warehouse at the level of inventory at which new material had to be reordered. Reorder point control today means that the inventory level in the warehouse is tracked using the book inventory and that reordering is triggered when the book inventory falls below the level. In order to save on booking effort, retrograde bookings are often used today. Material is only debited from a warehouse when the production order requiring the material has been processed and reported back. The old material is only debited when the new material is added to the warehouse. As a result, book inventory is always a little behind the physical inventory: not a happy starting point for electronic reorder point control. Retrograde booking and reorder point control do not go well together.

Kanban control is nothing more than reorder point control, but one that is based on the physical inventory. In contrast to reorder point control, in the Kanban system the increasing number of empty containers is monitored and not the decreasing inventory in the warehouse in order to trigger replenishment. A manual Kanban system, for example, has no problems with retrograde debiting of book inventories. Many companies experience problems in the Kanban system when it comes to calculating or recalculating the required number of cards or containers in the control loop.

While reorder levels are regularly adjusted, Kanban levels are often left constant for as long as possible. While at least qualified planners know that a reorder level is made up of basic requirements and safety stock, the safety stock in the Kanban control loop is often forgotten or set "by feel". The fact that the required level of delivery readiness must be included in the calculation when designing a Kanban control loop is no longer even part of the specialist knowledge of many consultants.

Classic multi-level reorder point and Kanban control cannot cope with seasonal demand and trends. In such cases, it is not enough to regularly to re-dimension. Rather, you need special mechanisms, such as parabellum control or reorder point control with MRP, in order to be able to adjust to the increasing or decreasing requirements at lower planning levels in good time and thus to be able to serve the increase or decrease in requirements at the higher planning level. If you do not know how to deal with this because you lack the knowledge or the functionality in the ERP system, then it is better to use plan-controlled planning in such cases.

Multiple items that are ordered from the same supplier or procured using the same transport carrier must be planned together in order to, for example, achieve full containers, exceed minimum order values or adhere to order budgets.

The examples could be continued indefinitely, but it should already be clear:

Best Practice Module 12: An efficient planning system uses a broad repertoire of planning procedures depending on different boundary conditions and article properties and never treats all articles in the same way.

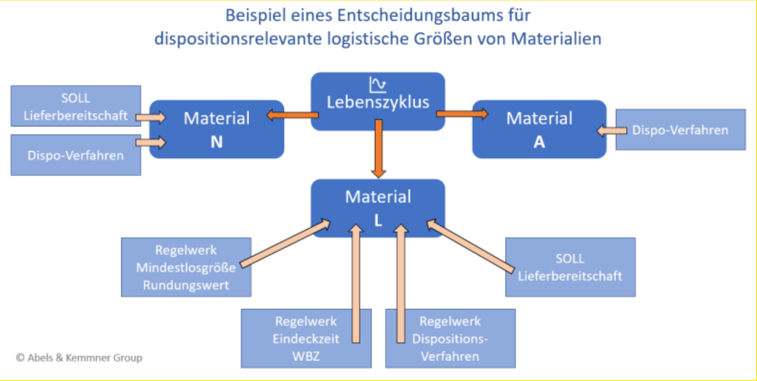
However, the differentiated application of different disposition procedures for different articles only shows the tip of the iceberg of efficient and process-stable disposition, because there is no static, one-time-set connection between articles and all their master data and parameters. Rather, the following applies:

Basic principle 13: Continuous adaptation of master data and parameters

The planning, forecasting and scheduling procedures and master data of an article must be continuously adapted to changing requirements.

Even if it rarely happens in practice, there is a consensus that central logistical master data, such as batch sizes or replenishment times, must be regularly adjusted to changing situations. It is far less well known that ongoing adjustments also apply to the other logistical parameters of each item. An item that previously had to contend with strong fluctuations in demand may now sell quite evenly. Whereas in the past few customers requested this item or the end product in which this item is incorporated, it may now be ordered by a large number of customers. Such changes may require a different scheduling procedure to be set up for the item. The ongoing updating of scheduling procedures, parameters and master data is not an exception; rather, it is a regular requirement that is often ignored in practice.

Which rules should be applied to which items and how does not depend on the logistically relevant properties of the items. Necessary criteria that must be taken into account in any case, but are by no means sufficient, are the importance of an item for sales (ABC), the fluctuations in demand for an item (XYZ), the number of demand drivers behind an item (STU) or the life cycle of an item (ELA).



In many companies, the realization that items need to be maintained leads to corresponding activities only surprisingly slowly. The instruction to the dispatchers is often to check and adjust the master data of their items more regularly. So everyone does what they think is right - one does this, another does that! A strange generosity that the same companies do not allow their production. For the manufacturing processes, it is clearly defined which technical procedures, which process parameters and in which work steps the parts are to be processed. Anything else would hardly lead to reproducible, reliable manufacturing processes. In order to achieve efficient best practice disposition, the following obviously applies:

Best Practice Module 13: Under which conditions which parameters, planning, forecasting and scheduling procedures are set and how, must be defined uniformly in clear business rules and not left to the individual opinions of the individual dispatchers. The parameter settings are defined depending on logistically relevant article properties.

How do you arrive at uniform business rules? Please don't do it by getting the entire scheduling department together and discussing the right hiring rules together! Another 14th basic principle needs to be taken into account here.

Basic Principle 14: Inventory Driver Gut Feeling

The gut feeling of the dispatchers is one of the biggest inventory drivers in the company.

The technical term"Behavioral Economics"There are numerous treatises in economics on the influence of gut feeling and supposed experience on business decisions. It would take too long to discuss the details here. The conclusion of the studies can be summed up in a simple way: Neither professional norprivate investors beat the market. Successes through "good" or, to put it better, "lucky" decisions in one area are undone in another. The reasons for this are the same in disposition as in shares and other securities and lead to dispositioners overestimating their own experience and gut feeling. Dispositional decisions and thus dispositional rules also have a greater impact on events along the entire value chain than a person can oversee, no matter how experienced and intelligent they are.

Rules set manually or based solely on the supposed experience of dispatchers or consultants may lead to reproducible dispatch results, but they also cement the “underperformance“ of the entire value chain. Poor planning, cast in clear rules, is still poor planning. For top companies, the following applies:

Best Practice Module 14: The right scheduling business rules for high-end scheduling are optimized for maximum logistical performance and minimum costs in the value chain using simulation and are not set based on experience and gut feeling.

If you have defined clear rules and, using a differentiated simulation, have set the rules so that you can achieve the required logistical positioning at the lowest possible cost, then you have taken a big step forward. Don't make the mistake of trying to regularly update the item settings manually in accordance with the rules, because:

Basic Principle 15: Do not perform data maintenance manually

Data maintenance is too time-consuming to be done manually.

In order to maintain high data quality, the parameter settings must be maintained monthly in accordance with the rules. This cannot be done manually for two reasons:

Firstly, simply entering changed master data on an article-specific basis every month in accordance with the regulations would be too labor-intensive and time-consuming and therefore cannot be done manually.

The second reason is the classification of articles: Rules are largely based on the classification properties of articles. For example, if an article belongs to the class of new articles, it is handled differently than an article that belongs to the class of discontinued articles. The classification of an article is sometimes based on extensive calculations. This is already clear from the standard classifications "ABC" and "XYZ". These calculations must be updated with each maintenance run, which cannot be done manually.

Software systems that can process such rules suggest the necessary setting changes for each article to the user. The suggestions can still be revised by the user and must be approved for upload to the ERP system. Only this semi-automatic method can ensure that the required "mass" data maintenance is actually carried out regularly. Therefore, the following applies:

Best Practice Module 15: Rules must be applied semi-automatically to the entire range of items on a monthly basis. To do this, the items must be reclassified or reclassified according to their logistical properties.

You have slowly fought your way through the undergrowth and have restored the forest of planning. Reliable planning parameters were an important step in this, but the following still applies:

Basic Principle 16: Does ERP system help with decisions?

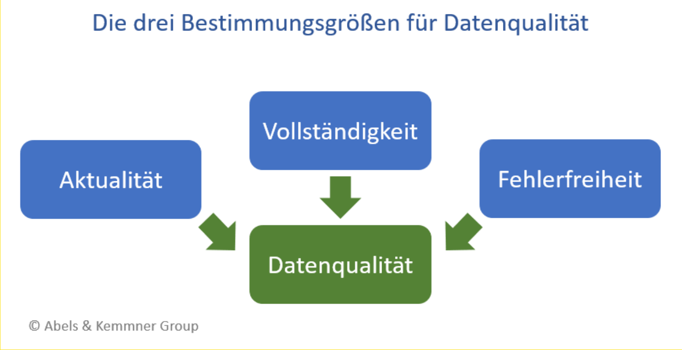
An ERP system with yesterday's information cannot make decisions for tomorrow.

Unfortunately, it is not enough to have defined the correct logistics sizes for each item and to have coordinated the scheduling procedures. If the ERP system lacks information about the current status of production, procurement and delivery, it will be of little help to you.

How is the ERP system supposed to make correct inventory decisions if the inventory information in the system is incorrect or is available far too late? How is it supposed to schedule production orders correctly if the required input material is not delivered by the supplier on time? If procurement does not regularly check this important and critical date and at least enter date changes in the ERP system when they become known to it?

For production orders with longer lead times through production, the completion of individual work processes may need to be reported back so that the ERP system has a sufficiently up-to-date overview of the capacity loads on the individual production facilities. We have already discussed elsewhere how serious the impact of incorrect delivery times on the support efficiency of the ERP system can be.

These few examples already prove that maintaining the planning parameters alone is not enough to set up a usable ERP system. Just as a car is useless without petrol, an ERP system is useless without data fuel in the form of current transaction data. The transaction data includes not only inventory values, but also delivery, replenishment and lead times, production progress and delivery status.



A company whose ERP system keeps all data up to date and accurate is on the verge of bankruptcy - it is too time-consuming and expensive to keep all values up to date. Even in residents' registration offices that operate "citizen data management" with large departments, the data quality is less than 100%! The art of data quality management in the ERP system consists in knowing under which conditions at which point in the planning steps what level of accuracy is required and how much deviations in the timeliness, quality and completeness of the data affect the planning quality of the ERP system.

We must therefore note the following as an essential best practice component:

Best Practice Module 16: Status information on procurement, production processes and capacity loads must be reported back to the ERP system promptly, completely and error-free so that the system can make reliable decisions. Regular audits must check whether feedback is sufficiently up-to-date, complete and error-free.

A well-maintained and correctly configured ERP system lays the foundation for continuing to move forward along the best practice path and working to eliminate another shortcoming in many companies:

Basic Principle 17: ERP system just an expensive typewriter

In many companies, ERP systems are used only as expensive typewriters

Just imagine that in production, everyone does what they want. There are work plans, but you don't necessarily have to stick to them if you know better. Instead of working according to clear guidelines and quality criteria, everyone does what they think is right and of sufficient quality. You think that doesn't happen in modern companies? Certainly not in production, but it does happen when it comes to handling planning and scheduling processes. Worse still, the proportion of companies that work in this way is actually increasing!

Paradoxically, this is largely due to the improved user-friendliness and transparency of many ERP systems and the development of so-called cockpits, which present all the information required for a user decision in a clear and often graphical manner. The supposed transparency of information often reinforces the user's gut feeling and the false feeling of security leads to the wrong decision being made.

This regularly noticeable effect does not speak against the improved user-friendliness of such aids. It does, however, show that discipline is required in their use, even if this is often not demanded because people are not aware of its necessity.

You can only achieve planning and scheduling processes that are stable, reproducible and independent of fluctuating experience and overestimation of people if you automate your planning and scheduling processes to a greater extent and people only intervene for two reasons: Firstly, to correct incorrect decisions made by the system because the system could not have known certain decision-relevant information. Secondly, to readjust the "tuning" of the system (the rules) if the system has made a "wrong" decision that it could have made correctly had the parameters been set correctly.

Of course, these principles cannot achieve the precision and reproducibility of a machine tool's CNC program. However, the goal must be to "wave through" 80% of system suggestions. This can be achieved by consistently taking the best practice rules discussed above into account. For the remaining 20% of system suggestions that need to be corrected - and only there - the "cockpit effect" has a positive effect. However, there is always the danger of replacing incorrect suggestions with incorrect gut feeling.

A best of-Class disposition must therefore also offer system-side support for special disposition cases, such as discontinuation and infeed planning, spare parts management or joint disposition of several items.

Best Practice Module 17: Planning and scheduling processes must be as stable as possible and therefore highly rule-based and automated, and system-technical support must also be available for special scheduling cases.

The ERP system is set up correctly, data is reported back cleanly, scheduling processes are as automated as possible - what is still standing in the way of success? In many companies, first and foremost, it is the poor forecast data on which scheduling must be based. A key prerequisite for the success of scheduling is the sales and demand forecast, because the following applies:

Basic Principle 18: Vague assumptions are poison for every disposition

Vague assumptions about future needs are deadly poison for any planning.

It is rare that planning can afford to be based on specific customer requirements. For the majority of items, you will have to rely on assumptions about future demand trends.

Steering effectively when demand forecasts are poor is like trying to successfully sail a powerful ship without knowing which way the wind is blowing.

We have already discussed the best practice rules required for effective sales and demand forecasting elsewhere (see Best practice rules for sales forecasting). Here we just want to note:

Best Practice Module 18: A best practice planning is based on a best practice forecast and an efficient planned distribution calculation.

If you meet the best practice criteria described, then your scheduling is truly working at a world-class level. However, there are still a few lights to be lit in terms of production control in order to regulate production according to best-in-class criteria.

A new world of planning

Companies that have implemented the best practice building blocks described live in a new scheduling world:

Scheduling decisions are made faster and more reliably and are significantly less dependent on the experience and gut feeling of the individual user. Staff turnover in scheduling is less critical.

The ERP system is now finally doing what it is supposed to: It handles the majority of routine tasks and gives the dispatchers time to deal with the really tricky issues. The planning and control process becomes more transparent and efficient, and stress, hecticness and friction between the company departments are reduced.

However, the new world not only offers a quieter working environment, but also hard-hitting business advantages: a more stable delivery readiness on the market leads to more satisfied customers and lays the foundation for increased sales and higher market shares. It also means that fewer changes have to be made in production, which has a positive effect on production costs and reduces the overall costs of the value chain.

Experience from numerous projects shows us that an inventory reduction of 15% to 25%, combined with a more stable and better delivery readiness, can be achieved if the rules have been optimized in a sufficiently differentiated manner.

In addition, further automation of scheduling processes reduces the required personnel expenditure by 25% to 45%.

A new world that can be reached without risks and that offers benefits to everyone who consistently sets out on the path!

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