# Between flexibility and focus on costs

## Planning procedures lead to higher costs and lower product freshness

**According to a recent study by Bausch Food Consulting, 99% of the companies surveyed attach a high degree of importance to error-free planning processes. However, only 40% are satisfied with the planning results. Operative production planning is caught in the dilemma between flexibility and a focus on costs. This article sets out the main reasons for this and explains the nuts and bolts available for improving operative planning.**

**By Josef Bausch and Jörg Priese**

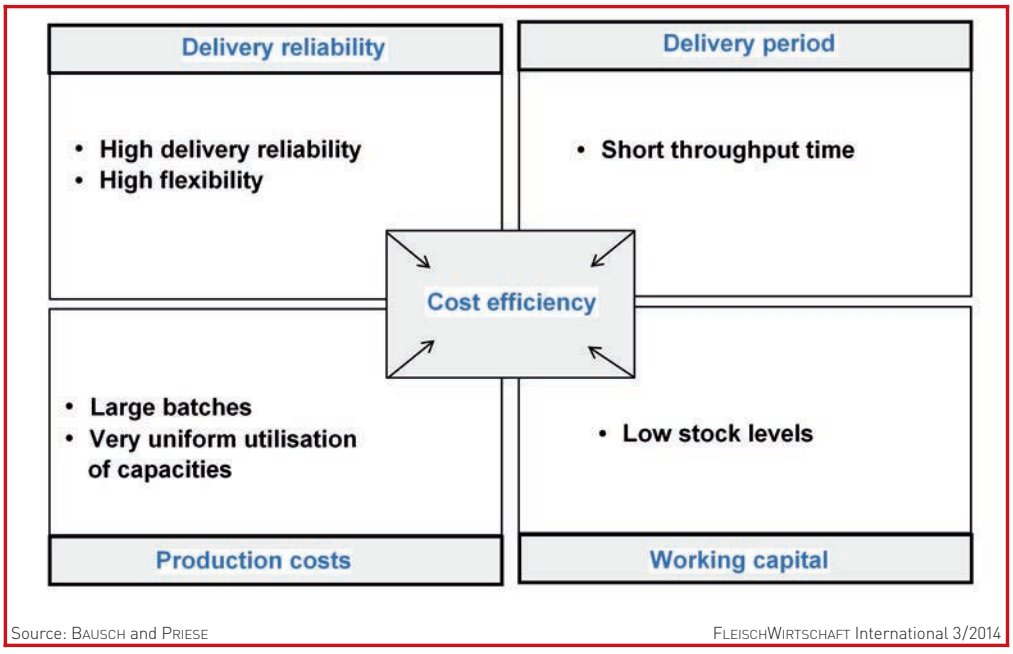


Fig. 1: Goals of production planning and control

The situation in the food and beverage industry has been characterised for years now by a growing diversity of variants and shorter delivery periods. End consumers expect a large selection of products with different flavours, ingredients and package sizes. For most producers this means that batch sizes decline from year to year. Furthermore, the retail trade as largest customer of the food industry expects ever shorter delivery periods and – especially in the case of fresh products – fights for every additional day of shelf life. Depending on their negotiating clout, suppliers are required to comply with short-term changes in customer wishes directly with 100% delivery reliability. This frequently leads to short-term changes in planning that make efficient production and warehousing distinctly more difficult.

## Goals and dilemma of production planning

The study shows that a possible response by producers in the form of continuously optimising planning and the linked production and supply chain processes is only possible to a certain extent. The goal of operative production planning and control is to plan production with optimal cost efficiency and organise the materials required. This includes high delivery reliability, short delivery times, low stock levels and consistently high capacity utilisation rates of the individual production stages (Fig. 1). As some of the individual goals work in opposite directions, conflicts of interest between them naturally arise.

For example, if a company concentrates on delivery reliability and realises short-term changes in orders from its key customers, this means that it must keep sufficient packaging and raw materials as well as finished goods in stock, which substantially increases the costs of working capital. In addition to frequent changes in planning and the associated disruptions, this also leads to considerable increases in the average throughput time due to rising downtimes (new set-ups, cleaning, ...) and rescheduling of other production orders.

On the other hand, if a company tries to achieve uniformly high capacity utilisation rates for staff and equipment, this is done at the expense of flexibility and leads to poorer delivery reliability. Moreover high levels of semi-finished product stocks are needed and the business

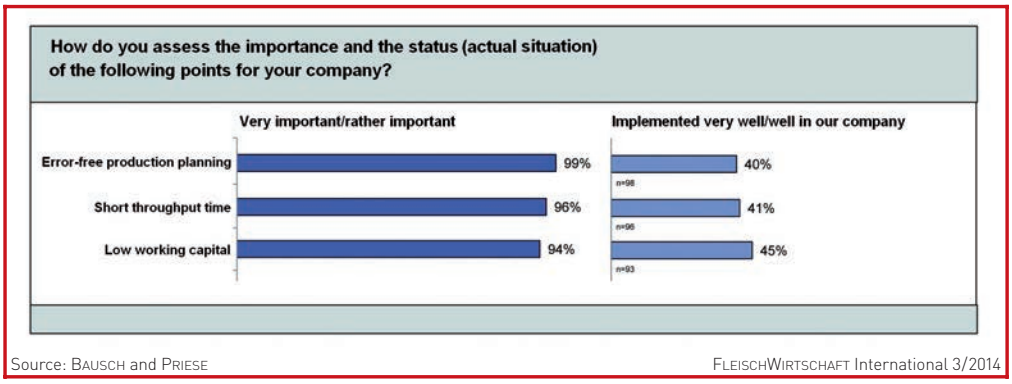


Fig. 2: Importance and actual situation of production planning, throughput time and working capital

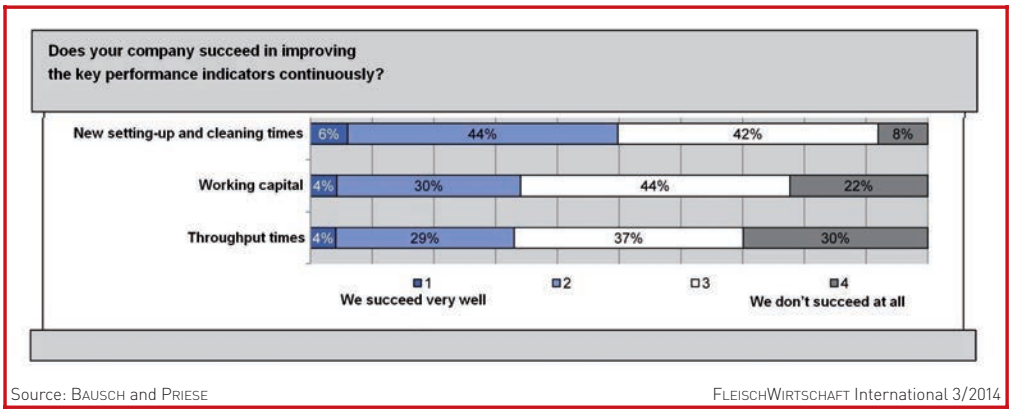


Fig. 3: Continuous improvement of the key performance indicators

runs the risk of high finished goods inventories. Furthermore, if it produces partly "for stock", the average shelf life available to customers is also shortened. This can cause major problems, especially in the case of fresh products.

Altogether 94% of the companies rate the importance of stocks in store or working capital as high. Just 45% of the firms interviewed are satisfied with the actual situation (Fig. 2).

## Software is not the solution

Generally speaking, the use of software solutions has not contributed to defusing the conflicts of interest that emerge. Deviations from plans are due to the fact that the future cannot be predicted in detail. The product quantities and variants required can be altered at short notice, machinery may sustain unscheduled outages, staff may become ill unplanned and suppliers may not deliver – also unplanned. Extremely precise and detailed production plans make the situation worse, as the probability of divergences from plans increases, the more detailed the plans are, and the impacts of a tiny deviation acts directly on all other resources like a snowball system.

## Optimising production planning

What do the champions do differently on their way to operative excellence? In this section the authors provide answers to these questions on the basis of the results of the study and their experience, showing possible ways of improving the planning results. The nuts and bolts for improving mastery of a complex situation lie in the greatest possible flexibility and adaptability, and in the design of intelligent capacity, material or time buffers for responding quickly to unscheduled changes. For production planning, this means leaving the staff responsible for planning and production as many degrees of freedom as possible. To put it simply, it is better for planning to be roughly right than "precisely wrong".

## Cutting throughput times

As 41% of the companies are satisfied with their current throughput times, 59% are dissatisfied (Fig. 2). A shorter throughput time leads to a shorter forecasting horizon for planning. Planning data thus become more reliably and the plan more exact. At the same time the response time is cut and the flexibility of production generally rises very clearly.

One lever for reducing throughput times lies in smaller batch sizes. As this frequently leads to greater setting-up inputs, it must be made possible by cutting the set-up times. Downtimes in the form of e.g. changing formats or articles, or cleaning, can be reduced continuously by applying the SMED (Single Minute Exchange of Die) methodology. Either this allows more product conversions to reduce the necessary batch size – or the time saved is used to increase production.

A further way of reducing throughput times and at the same time increasing flexibility is to introduce a "customer decoupling point" in the production process. Prior to decoupling, the product is not allocated to any customer order. Depending on the orders, this is done at the decoupling point, as of which time the customer-relevant delivery time starts. This means that semi-finished products are separated into the planned finished variants as late as possible. The method can also cut down on longer format changes, or even cleaning operations.

In order to support these points, projects for harmonising formulations and packaging materials and to reduce e.g. laboratory releases and delivery times should be initiated. Around one third of the companies surveyed are already working on continuous improvements (year by year) in connection with new setting-up and cleaning times, working capital and throughput times (Fig. 3).

## Frozen zone and pot planning

The term "frozen zone" means that the production plan is frozen for a defined period, i.e. it cannot be changed. The larger the "frozen zone", the more the costs and capacity utilisation rates of the production process can be optimised. However, this also limits the flexibility for short-term modifications. Continuous increases in flexibility of resources and shortening of set-up times make it possible to reduce the necessary "frozen zone".

The express goal of pot planning is to minimise the input of production planning for balancing capacities and scheduling, and at the same time to provide steering and

control with a high degree of autonomy and hence scope for action. Orders are planned in parallel in capacity pots and all work steps in one pot are given an identical finishing date. Capacity pots symbolise the capacity supply of identical resources over a defined period. For example, five Tetra-Pack facilities that are each available 16 hours per day from a capacity pot of about 80 hours per day or 400 hours per week. The sequence in which the orders in a pot are processed lies in the sphere of responsibility of e.g. the production staff. Minor deviations in planning are balanced within the pot width and the delivery reliability of all orders is secured when all the pots are "empty" at the end of the respective pot schedule.

## Drum Buffer Rope (DBR) and supermarkets

DBR is the production planning variant of the Theory of Constraints. Each production line in the food industry features a constraint that limits the output. Controlling the constraint allows direct controlling of the output. If the capacity required to satisfy the customer needs is available in the area of constraint, then all other resources should be available in sufficient supply. On the other hand, full capacity utilisation of non-constraints is not necessary.

The best-known form of supermarkets is represented by Kanban control systems. In the food and beverage industry, Kanban control systems are applied to a considerable extent in the machinery and equipment (spare parts, operating and auxiliary materials) and for steering packaging materials. The goal is to level and steady inventory management or production by decoupling it from concrete customer demand. Short-term peak demands are covered by the stock in the supermarket. In times of low demand the supermarket is stocked up again. The task of planning lies in dimensioning the supermarket optimally, but the re-ordering is steered directly on site by the staff. Continuous improvement measures to reduce replenishing times lead to reductions of the necessary safety stock levels and thus lower costs directly.

## Conclusion

An appropriate planning and control strategy is essential for the sustainable success of a company. The selection of the right planning and control method is based on an analysis of the resources, the products, the customer requirements and the processes. Flexible and easily adaptable solutions are more important than mathematically optimal processes. In practice it has frequently been shown that the optimal planning strategy is a mix of the solutions described.

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