Aycada simulation game for production and capacity management

Legal Notice

Previous Board of Directors:
Britta Wadle (Chief Executive Officer)
Klaus Paasch
Claudia Calik
Petra Ladwig
Thomas Ekhof

Ready for handover

Britta Wadle walks up the marble staircase to the board's meeting room on the first floor of the administration building. She is in a good mood, in which there is also some melancholy. These were successful years as spokeswoman for the production board of the generic drug company C*. The committee had the task of selecting the planned production quantities and planned production capacities on a monthly basis. The work had been exhausting, but also fulfilling. As she takes one step at a time, she feels some regret that her contract is now expiring. At the same time, she is very much looking forward to the new challenge that awaits her in a mechanical engineering company. She opens the door to the meeting room in a sweeping way.

"Good morning, ladies and gentlemen." Britta sits down on her usual black and red chair at the front of the U-shaped meeting room. "Welcome to our last board meeting. I am pleased that we have worked well and trustingly together over the past three years. We were rewarded with a nice success. A cumulative operating profit of approximately €10 million achieved over the three years is a respectable achievement. Admittedly – we had a difficult time initially and also a few months with losses, but for 18 months we have only been delivering positive and tending to increase figures for operating profit." Britta looks into the round and looks into satisfied faces. "I want us to make it as easy as possible for our successors to build on our success. I therefore propose that we use this sitting to discuss critically what we have succeeded in doing and where we could have decided even better – from today's point of view."

Klaus Paasch looked up. "One of our strengths was that we knew and understood our customers and their wishes well. Our market and we as a company are regulated to such an extent that it ultimately only depends on the reliability of our deliveries, whether the customers were satisfied or not." Nod of approval from the round. Aritir is in fact a country with a very far-reaching regulation of pharmaceutical products. Also in the case of generics which, by definition, contain all the same active ingredient. Differences in effects and side effects are therefore excluded. Product differentiation? Not possible. Not even marketing can be used to create artificial differences of completely interchangeable products. Marketing activities are prohibited by the Aritir medicines-Agentur (AAA). Petra Ladwig sounds slightly annoyed: "It is particularly unusual that the AAA even regulates the prices of generics. As a consequence, we could not decide on prices, but had to take them as they were prescribed." "The only advantage of this extreme regulation is that we were able to understand the ordering behavior of our customers well," Klaus added and recalled. "When we had delivery difficulties with a product for a few months, it was clear that customers were waiting and hoping to receive the ordered quantities. There were only a few cancellations at first, but the longer our problems persisted and the larger the outstanding delivery quantities got, the higher the cancellations became." "Fortunately, we rarely had delivery difficulties and therefore also manageable cancellations in terms of quantity. Otherwise it would have been really expensive." Thomas Eckhof leaned forward a bit. "The contracts that we have signed with our customers include penalties for

cancellations." "Thomas, you forget that the cancelled orders were only one side of the coin," Claudia Calik added. "The other side of the coin was a painful decline in new orders. Not immediately in the following month, but the worse our delivery reliability became the more our customers reacted." "True", sighs Britta. "Our customers placed their orders with the competition. Or ordered abroad if the competitors themselves also had delivery difficulties. In addition, I remember well that it had taken a few months until this dent was completely ironed out again. Our customers were really resentful." "I took a close look at it at the time," explains Claudia. "Our customers have high expectations of our delivery reliability. But they don't expect us to be perfect and always deliver their orders 100% in the same month they place them. We don't know the exact average value for all customers, but it has to be somewhere around 90%." "Against this background, it is unpleasant that we have problems again with product 3. We must explicitly draw the attention of our successors to this. They should get a grip on this issue construction quickly." Petra looked contrite at Britta, who nodded in agreement.

The customers of C* - these are not the patients taking the drugs, but pharma-wholesalers and large pharmacies. C* does not accept orders from patients. Deliveries are always made only to wholesalers and pharmacies. Because the production and packaging of the products take more than a month, contract manufacturing as in a tailor's shop is not possible. Customers would not accept the waiting time. Therefore, C* must produce before knowing demand.

The drugs are produced in four process steps: granulating, mixing, tableting and packaging. The weighed raw materials (essentially active ingredients, excipients and additives) are first granulated in a granulating machine. This increases the flow ability of the raw materials and improves their compact ability. In the second production stage, the granulated substances are mixed in a stainless-steel mixing bulb. This ensures the homogeneity of the ingredients of each individual tablet. In a stainless-steel granulate container, the granulate is transported from mixing to tableting. Tablet presses form and compress the mixture into tablets. The still unpackaged tablets are called bulk ware and collected in stainless steel containers. These containers are transported to a packaging line and packed there. This is the last step of the manufacturing process. A largely automated packaging machine first packs the tablets in blisters. These are then packed together with the leaflet in cardboard boxes. Finally, the machine collects a certain number of boxes and packs them into a carton. An automated palletizing system bundles the cartons into pallets.

Quality testing is essential in the pharmaceutical industry. During production, samples are repeatedly taken and analyzed in the laboratory. Only if the analysis results meet the specifications registered with the AAA do so-called qualified persons release the drugs. While the drugs await the release, the pallets are in quarantine. After the end of the quarantine, the boxes are transported to the warehouse – unless there are backlogs of delivery for the drug. In this case, it will be shipped directly to the customer. Because the drugs are sensitive to temperature, they must be stored in a cold store.

"What we could perhaps have done better," says Klaus, "is to weigh the costs of holding inventory against the costs of non-delivery. Actually, we have only ever made sure that we exactly meet the forecast demand. And since we did not want to rely seriously on our forecasts, we always planned a generous surcharge. Supplying the market was always our top one priority. You explained earlier, Claudia, that our customers are demanding and expect a high level of delivery reliability, but according to your statement, 100% perfectionism was not their wish either." "Then maybe we could have stocked our warehouses a little more carefully," Petra agreed. "The cost of refrigerated storage of the drugs is not insignificant."

"With our cost accounting, however, we are up to date." Klaus looks proudly into the round. "We are good at distinguishing between fixed and variable monthly costs. We do use direct costing so that the fixed costs of a month are also attributed exactly to this month and are not misallocated to other months. We show the operating result as the result of a monthly contribution margin calculation. By this, we can see well how much the products contribute to covering the fixed costs. "You're right, Klaus," Petra agrees. "The information from accounting is good and helpful. When I created a break-even analysis for our products some time ago, it was no problem to get the necessary data." "Our absorption costing

approach is not bad either," adds Petra. "After all, it has four steps. We attribute material and quality overhead costs to the product via absorption rates. The indirect production costs are allocated via hourly machine rates, and the administrative and operating overheads are again allocated via an absorption rate. This gives us full unit costs per unit of packing with reasonable accuracy." "It is important that we do not focus only on contribution margins and variable costs per packaging unit." Klaus straightened up. "In addition, the profit per unit of a product is a valuable piece of information. However, I hope that our successors will not make the mistake of eliminating a product immediately if there is a negative number here. Associated fixed costs do not automatically disappear."

"Thank you very much for all these important points." Britta looks over at her assistant, who was busy taking notes. "I would like to draw our attention to capacity planning. We complained a few times in our meetings that we had reacted too slowly to developments in market demand. Thomas, you have always been particularly emphatic in promoting changes in our approach. What would you recommend to our successors?" "Thank you, Britta," says Thomas. "I would advise them to think more about the demand forecast. In my opinion, we have made it too easy for ourselves." "Correct", Petra nods in agreement. "In my training a few months ago, I learned about methods that still deliver good results even with trends or seasonal fluctuations." "It would be desirable for our successors to have more data analysis skills than we had." Thomas raises his eyebrows. "At the same time, it would certainly be good to take a closer look at the obvious learning effects in production. We have repeatedly observed that our productivity is increasing. But we never derived any consequences for our capacity planning."

"You're probably right, Thomas, with your self-criticism." Claudia looks a bit contrite. "But we also deliberately focused on getting correct and well-prepared information about our production. We're not bad at that. We know exactly how high the workload of the four production departments is in a month. We compare this workload with the available production capacity and see very clearly how well or how poorly our resources are being utilized." "It is right and good, Claudia, that we leave our successors with a better information situation than we had found." Britta continues: "These were our early projects. We first had to concentrate on collecting, evaluating and processing the data. In this respect, our successors now have it much easier. They have very quick access to the relevant data from production via the information system we have established." "We haven't been able to use this new information properly yet," says Petra. "Our successors are therefore definitely recommended to take a close look at the performance of the production stages and to look for ways to improve them."

Britta closes the meeting and thanks her colleagues. The next day, she talks to the Supervisory Board and hands him the note that you now hold in your hands.