

ORDER FULFILL MENT

**PROFITABILITY AND COMPETITIVE ADVANTAGES THROUGH
LEAN ORDER FULFILLMENT**

A White Paper from Staufen AG

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Summary

The mechanical and plant engineering industry in Germany is facing major changes. The focus is no longer on the product as a masterpiece of German engineering, but on complete product/service packages. What is needed are solution providers who know their customers' needs and processes inside out and offer them tailor-made solutions.

A change that is not easy to manage for mechanical and plant engineers. Especially as customers are also becoming more demanding. They demand ever shorter delivery times with high delivery reliability and a maximum degree of individuality and flexibility. As a result, many companies in the industry find themselves in a precarious conflict of objectives: Although they want to accommodate their customers as much as possible in all respects, they struggle with frictional losses, clarification loops and rescheduling. The result: Companies' process flow is stagnating more and more, and costs are rising. At the same time, technical progress increases the complexity of products and processes. The main lever for meeting the challenges ahead lies in optimizing order fulfillment. This is the backbone of plant and mechanical engineering. It determines both the performance perceived by the customer and the financial success of the company.

Although it is here that all interfaces to the customer are managed, mechanical and plant engineers do not typically attach too much importance to order fulfillment processes. A self-perception as "ingenious inventors" instead of "customer understanders" is still predominant in companies. Many companies are also not fully responsible for order fulfillment. Rather, a lack of central coordination promotes departmental and silo thinking. This type of organization is the reason why departmental objectives are often sought instead of overall optimization. Frustration is then accordingly high, when the "customer as king" looks for the correct partner in vain.

This problem can be solved by consciously designing the order fulfillment process according to the principles of Lean management. The focus here is on a consistent orientation toward value creation from the customer's perspective, from incoming orders to successful commissioning. As a result, throughput times can be reduced by 20 to 35 percent and deadlines can be met at more than 95 percent. This increases customer satisfaction, customer loyalty and lowers costs, thus making a lasting contribution to the company's success. The order fulfillment process is increasingly becoming a core competence of successful mechanical and plant engineers. This white paper shows what distinguishes the order fulfillment process and the details of which approaches are available to companies.

Individualization forces mechanical engineers to change

Meeting customer expectations

Customers have become more demanding and set new standards in terms of delivery performance. They seek customized consultation and product design as well as accompanying services.

The focus is therefore no longer exclusively on products, but also on knowledge of customer processes. In international comparison, customers expect mechanical and plant engineers to transform into system and solution providers.

In order to remain internationally competitive as a company, this development must be recognized and integrated into business processes. Mechanical and plant engineers are forced to bring their business models into line with increased customer expectations. However, the demand to offer individualized services requires a high level of process competence.

The current study "Best Strategy 2018," for which more than 200 companies were surveyed by Staufen AG, underlines the importance of customer proximity as a factor for economic success. These companies are among the top performers either in their industry or in their segment. A clear statement from world market leaders: Customer proximity is and remains the most important factor for success (see figure p. 5).

Focus on product instead of customer as king

Until now, thinking in the field of mechanical and plant engineering has been driven primarily by technology. The focus is on improving the properties of an existing product in order to bring it up to the current state of the art. With this approach, the customer's needs often only play a role when it comes to sales.

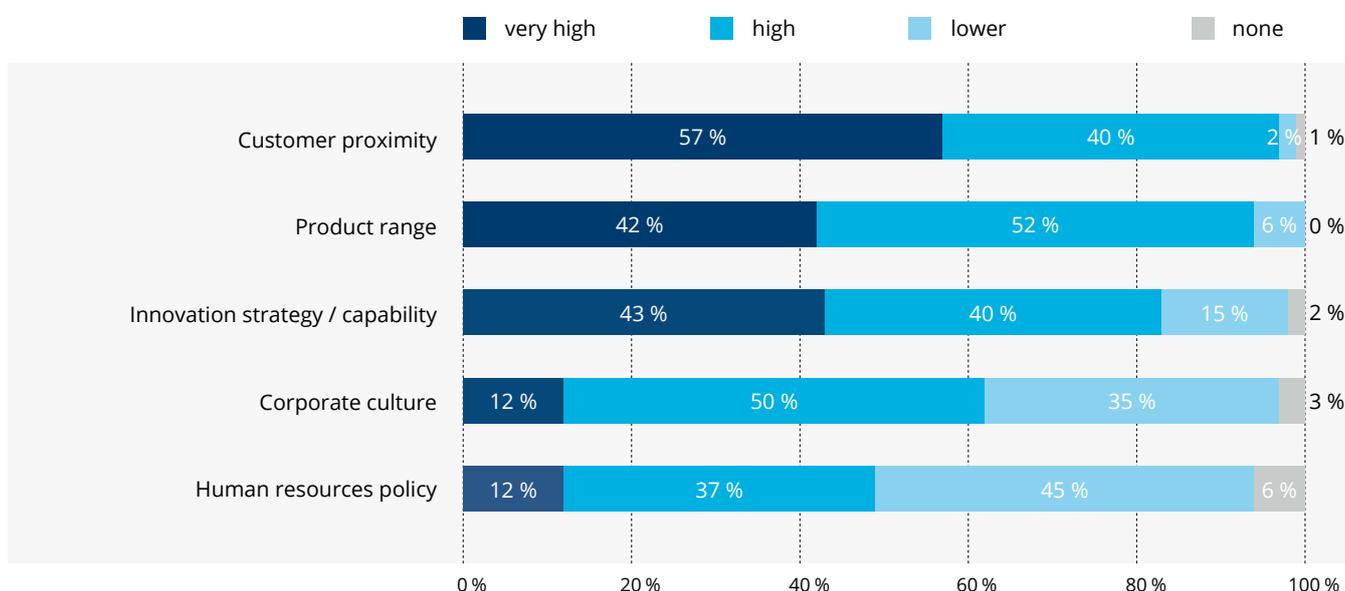
It is therefore important to consistently align all areas of the company to increasing customer value. This requires specific knowledge of the processes and real problems of the customers. This is the only way to offer them the right combination of products and services. This also includes quality features and functions of the products as well as the appropriate services.

German companies still tend to over-engineer. Whereas very complex, high-quality solutions are often important for domestic customers, this does not necessarily also apply to customers in other markets. In order to remain competitive here despite growing competition, for example from Asia, standard variants must also be offered.

It should also be noted that customers' purchasing behavior is also undergoing change.

The following factors contribute to the company's success:

Industry evaluation:  **Mechanical and plant engineering**

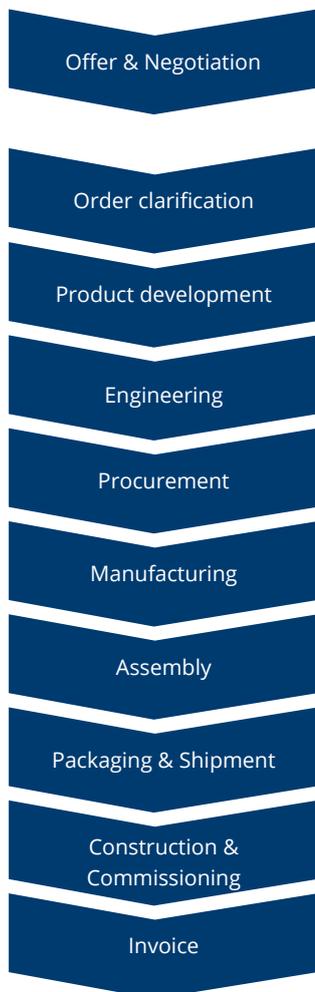


They no longer want to coordinate a wide range of suppliers but rather have solutions from one source. They are increasingly resorting to international procurement networks. At the same time, customers have become more price-sensitive, punish delivery delays more severely than before, demand clauses on plant availability or pass risks on to their suppliers. For machine and plant engineers, this not only leads to greater cost pressure, but also, among other things, to increasing demands on product development and all fulfillment processes.



Order fulfillment as core process

Order fulfillment is a complex sequence of activities that are required in order to fully process a customer order.



Definition of the order fulfillment process

The order fulfillment process represents the entirety of all interdisciplinary procedures and processes, which are provided to fulfill concrete customer needs in the context of the supply of an industrial product as well as the associated services. The process begins with a customer requirement and includes all engineering, procurement, transport, production and assembly processes in addition to the specification of the scope of supply. It ends with the stable operational readiness of a machine or plant at the customer's site. In order to meet customer needs, it is necessary to optimize the complex order fulfillment process.

The process runs in phases (generic structure), but in practice it is designed in a custom manner, depending on the product and customer. It requires a superordinate orientation, planning and control.

Design and complexity of the order fulfillment process depend on the order classes

In mechanical and plant engineering, a distinction is made between different order classes. They depend on the degree of individualization of the product.

Assembly to Order (ATO) and Make to Order (MTO)

In the "Assembly to Order" order class, products are assembled from various assemblies. Subassemblies are mostly produced in stock without orders and are only assembled according to customer specifications after receiving the order. When selecting the assemblies, dependencies may occur. ATO enables a variety of desired and technically possible end products. Due to the modular character of the product structure, the design effort is low to non-existent, depending on the manufacturer. Make to Order represents an increase in this order class. Here, components and assemblies are procured and produced to order.

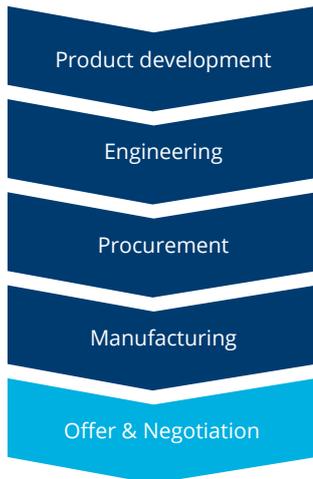
Engineer to Order (ETO)

Traditionally, the design and manufacturing processes of ETO products are only initiated after the order has been received. Thus, ETO is characterized by a high percentage of customer-specific possibilities for customization. Depending on customer requirements, components can be adapted or redesigned. This results in an increasing design effort and a greater need for clarification with the customer. This also increases the complexity of the order fulfillment process.

"Order process: the process of fulfilling customer orders from the time the customer places the order until the supplier receives payment for the service."¹

¹ Gabler Wirtschaftslexikon, Keyword: Auftragsabwicklung [Order fulfillment], <https://wirtschaftslexikon.gabler.de/definition/auftragsabwicklung-29192/version-252805>, accessed on 10/30/2018

Assembly / Make to Order



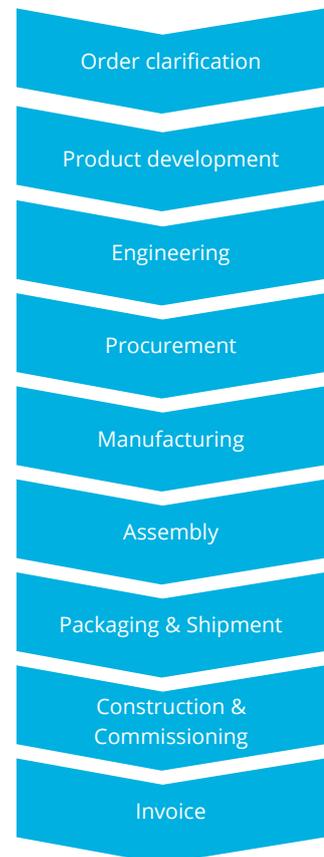
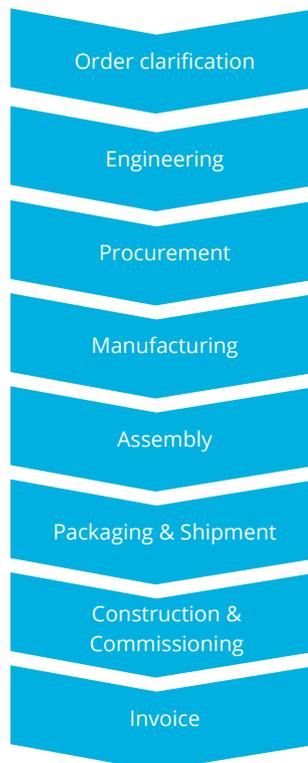
Engineer to Order



Develop to Order



Incoming order

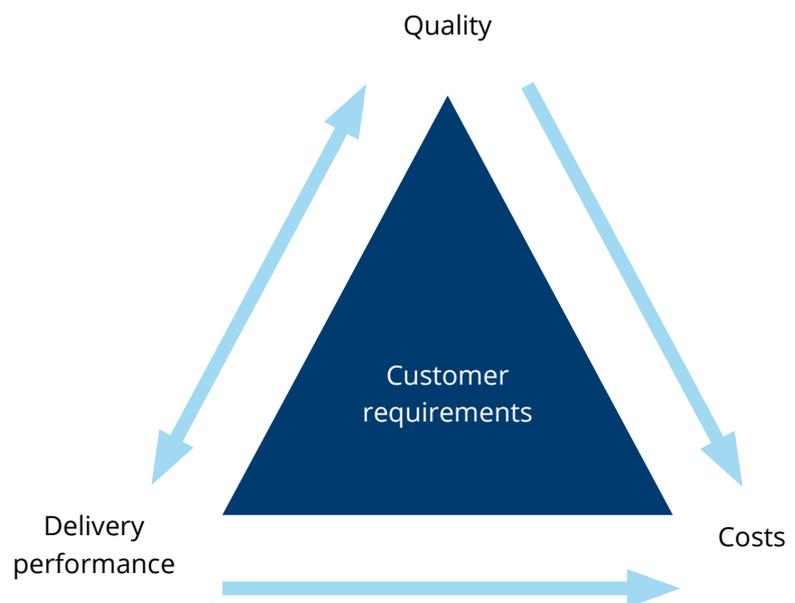


Develop to Order (DTO)

The DTO order class focuses on plant engineering in the field of mechanical and plant engineering. Compared to ETO, in addition to design and manufacturing processes, new product developments are only initiated after the order has been received. This results in very high complexity of the order fulfillment process. DTO also differs from ETO in a broader range of additional service packages such as process consulting.

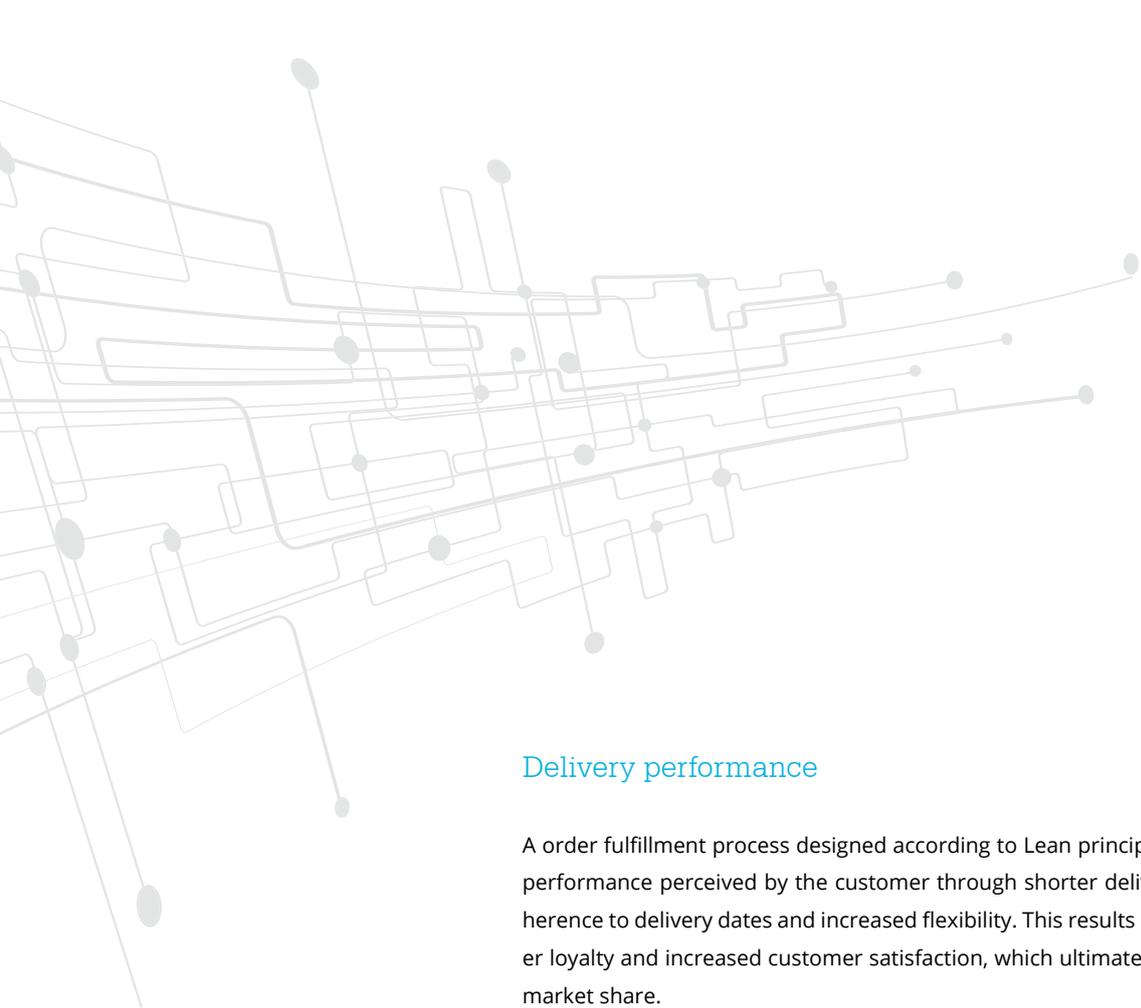
Importance of the order fulfillment process for the sustainable success of the company

The success of a company is decisively determined by the orientation, design and organizational embedding of the order fulfillment process. The quality triangle and the theses based on it underscore the connection between a Lean order fulfillment process and positive revenue and cost effects.



"Success comes to those who can deliver the required quantities in the required quality at competitive prices at the times requested by the customer and make a profit."²

² Markus H. Dahm, Aaron D. Brückner, Lean Management im Unternehmensalltag, Springer Fachmedien Wiesbaden GmbH, 2017, p. 54 und Tobias Wille, Lean Thinking, Springer Fachmedien Wiesbaden GmbH, 2016, p. 57



Delivery performance

A order fulfillment process designed according to Lean principles increases the delivery performance perceived by the customer through shorter delivery times, increasing adherence to delivery dates and increased flexibility. This results in more intensive customer loyalty and increased customer satisfaction, which ultimately increases sales and the market share.

Costs

Process flows are closely aligned to the needs of the customer: Only an order fulfillment process that is geared to customer needs can be lean, efficient and thus cost-optimized. Companies that align their order fulfillment process with the value stream in a performance-oriented manner achieve higher results, have lower change and adjustment costs and less rework on the product. Costs can be forecast, influenced and allocated more quickly and transparently.

Quality

An order fulfillment process geared to the needs of internal and external customers creates the basis for increasing the value of the products in the interests of the customer. It thus forms an indispensable foundation for the business, such as consultation tailored to the customer's needs. This results in decisive unique selling points compared to the competition - the quality of service increases.

Increased customer satisfaction leads to a closer customer relationship: Customers become regular customers, their recommendation rate rises, the willingness to accept higher prices grows, the hit rate increases - and in reverse, acquisition and marketing costs fall sustainably.



Characteristics of a Lean order fulfillment process

The classic Lean approach, i.e. to increase the share of value added and minimize waste, also applies to the alignment and design of the order fulfillment process. Value creation is defined by the increase in value of the product from the customer's point of view. Activities that increase the benefit exclusively from the manufacturer's point of view, but do not directly add value for the customer, are not value-adding and are therefore defined as waste.

What characterizes the Lean order fulfillment process:

- Uninterrupted and loop-free method of working.
 - Clear rules, roles and responsibilities for internal customer-supplier relationships; clear transfer points.
 - Transparency: At all times, target/actual deviations in the dimensions quality/cost/delivery performance are transparent. Progress and status are defined at all times.
 - Planability: Dates and costs can be planned correctly.
 - All activities in the order fulfillment process lead to the fulfillment of customer requirements, there is an equal understanding of individual areas with regard to standards and customer needs.
 - Changes in the target state and deviations from it are immediately counteracted with the right response.
 - Resources are evenly utilized.
 - Production and procurement meet the customer's needs
-

Procedure and methods for introducing a Lean order fulfillment process

The Lean order processing process is designed according to the Lean features

Disturbance-Free, Flow, Rhythm and Pull.

1. Disturbance-Free

- » Earliest possible order clarification (front loading)
- » Defining standards and rules
- » Defined quality gates and quality criteria (in the direct and indirect area)
- » Defined TCR³ and interfaces

2. Flow

- » Continuous processing of the orders and work packages
- » Segmenting the orders according to their capacity
- » FIFO during the order process
- » Creating spatial proximity in the sequential steps



4 Characteristics of Lean processes

4. Pull

- » Procurement strategies dependent on the delivery time requirements of the market
- » Reduction of the order throughput time for the application of optimal procurement strategies

3. Rhythm

- » Planning with coordinated capacities
- » Even control of orders
- » Planning of indirect activities according to defined time units
- » Timing and synchronization of activities in the order fulfillment process

³ TCR: Tasks, Competencies, Responsibilities

1. Disturbance-Free

A disturbance-free state is characterized by a low level of errors. As a result, reworking or missing parts are rare. There are no queries or corrections. Information about materials is available at the right time in the right place with the right quality. Clear rules are defined and implemented. Disturbance-free forms the basis for optimizing the order fulfillment process.

The methods for achieving disturbance-free include work templates, quality gates (incl. front loading) and clear TCRs.

2. Flow

The state of the flow is reached when there is no waiting time for the inventory of goods or information between individual work/process steps. Applying the FIFO principle ensures that orders do not overtake each other and are processed continuously. Defining order classes enables optimal processing of orders in processes that are specifically designed for them.

3. Rhythm

The state is reached when work packages with uniform processing times result in (operational) resources being continuously utilized. Processes as well as the organization as a whole are aligned to this and oscillate, so to speak, with the takt time.

4. Pull

Based on the three Lean principles mentioned above, the Pull state corresponds to that of a self-regulating system. Processing of work packages is triggered by concrete requirements that arise from follow-up processes.



The design of the order fulfillment process is a management issue

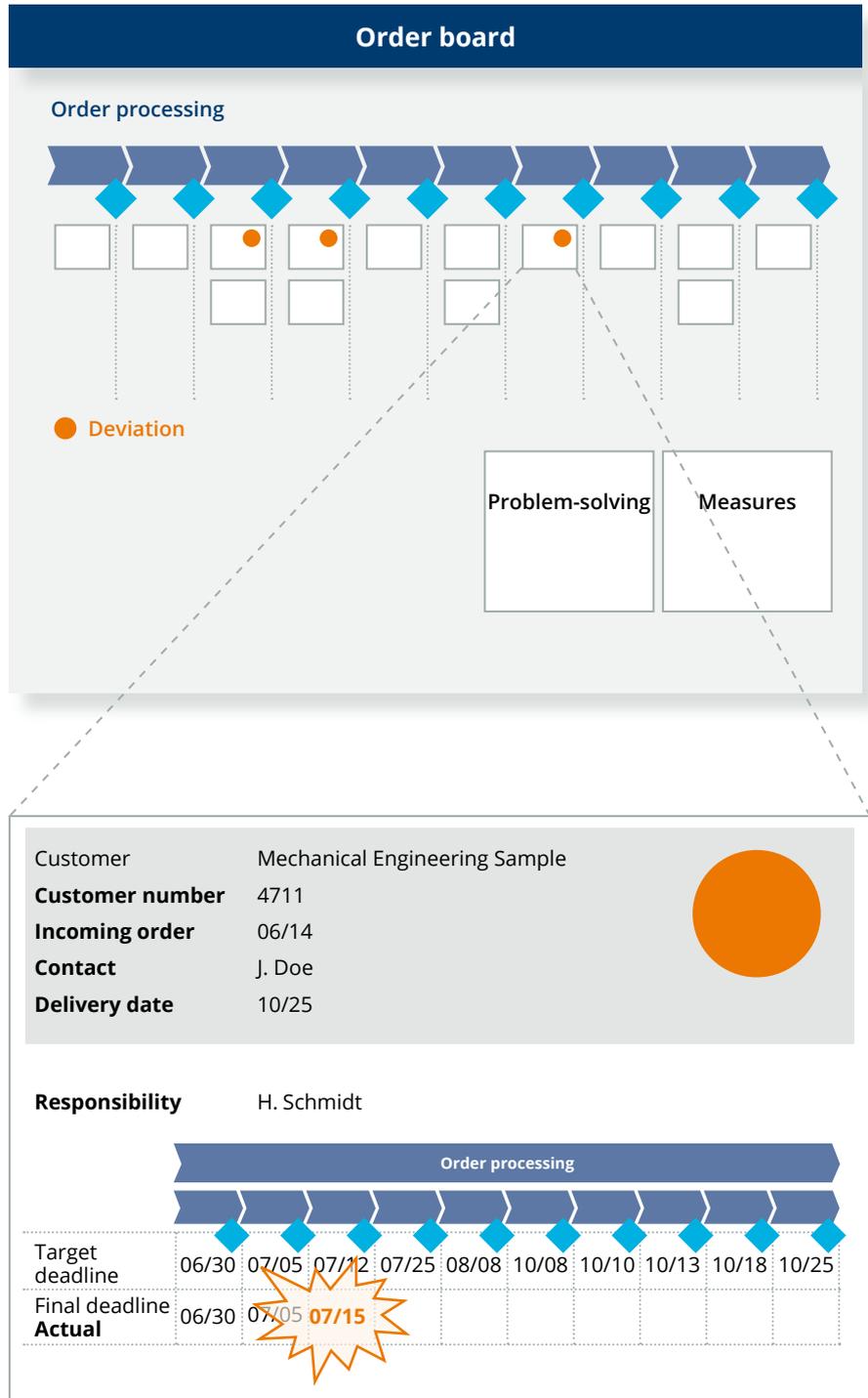
The performance of the order processing process depends to a large extent on the **management** of the employees and the orientation of the system. Thus the design and sustainable implementation of the process is a management issue.

Organization and management structures influence the efficiency and transparency of performance as well as the success of the order fulfillment process. A value stream-oriented organization identifies itself with cross-divisional deviation management. Shop Floor Management with typical building blocks, such as rounds of regular communication and escalation routines are additional helpful tools for leaders.

In order for the tools and methods listed here to achieve their full effect, a structured management and leadership system should also be established, supported by Shop Floor Management. More and more leaders are using this method to set priorities, make decisions, empower their employees and offer them support. In other words: Leadership can be experienced on site and directly by the employees. Leaders transfer this way of working to their teams through their role as a mentor. Step by step, the corporate culture undergoes noticeable changes.

Details and the status of orders as well as possible deviations are always transparent and are regularly the focus of interdisciplinary regular communication along the value stream.

Order boards offer a visualization



Lean order fulfillment in practice: The example of Aerzen

Aerzener Maschinenfabrik GmbH from Southern Lower Saxony is one of three world-wide leading application specialists with regard to conveying and compression of gases. The family business celebrated its 150th anniversary in 2014, but the outlook for the future did not sit well: Increasingly volatile markets, intensified international competition and new customer requirements - these were the challenges the family-owned company was facing.

According to the motto "tradition through change" Aerzen decided to make groundbreaking changes. Two years later, the change process was a success and the company was fit for the future. In figures, this means: The lead time, which is important for the customer, decreased by an impressive 33 percent.

In addition to order fulfillment, the project also focused on assembly, logistics and engineering. The particular challenge was therefore to redesign all four areas at the same time. This made it possible to coordinate all the processes involved with each other and to align them entirely to the takt time.

The heart of the project was consequently order fulfillment. Today Aerzen orders are divided into classes and they are clocked with standardized lead times throughout the company. In the future, errors that carry over into subsequent processes can be avoided. At the start of the project, the lead time was around three and a half months - but only two weeks of that was actual processing time. The rest consisted of questions, clarification and idle times.





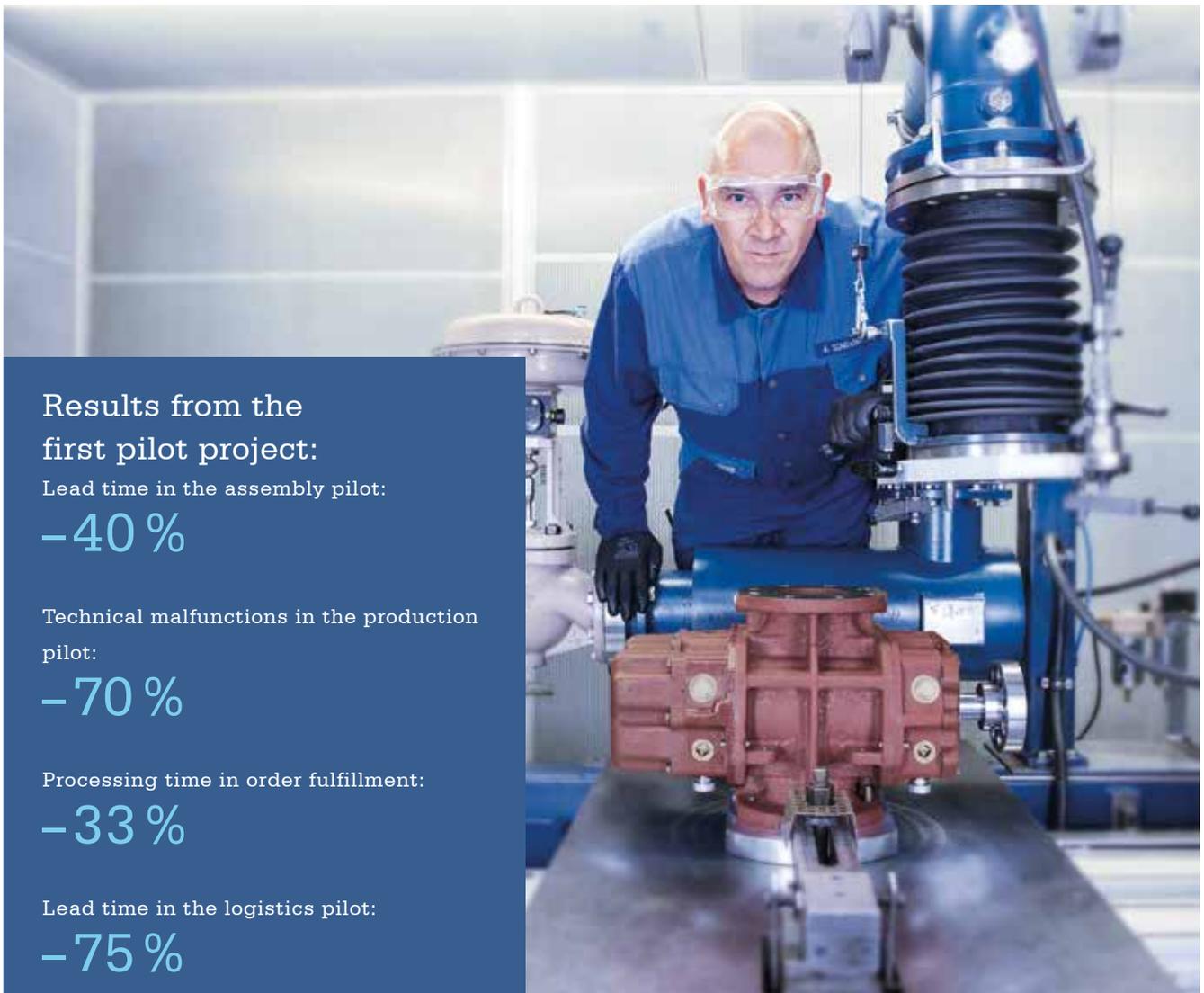
"The management is the driver of such a transformation. It must inspire leaders and employees for this kind of project and explain it in many ways: What's the goal of Lean and why are we doing this?"

Klaus-Hasso Heller
Managing Partner,
Aerzener Maschinenfabrik GmbH



Not only do the processes and the organization have to be right at Aerzen, but also the management performance. The company therefore began implementing Shop Floor Management along the entire product value stream at the same time. This laid the foundation for the prompt detection of future deviations in order fulfillment and the early resolution of problems.

The level of success is impressive: Today's managers spend significantly more time on-site and can develop processes sustainably and entirely in the interests of their customers. Communication between the upstream and downstream production areas also functions much better than before. Employees and management thus laid the foundation for Aerzen to be able to successfully assert itself on the world market as a family business in the future.



Results from the first pilot project:

Lead time in the assembly pilot:

-40 %

Technical malfunctions in the production pilot:

-70 %

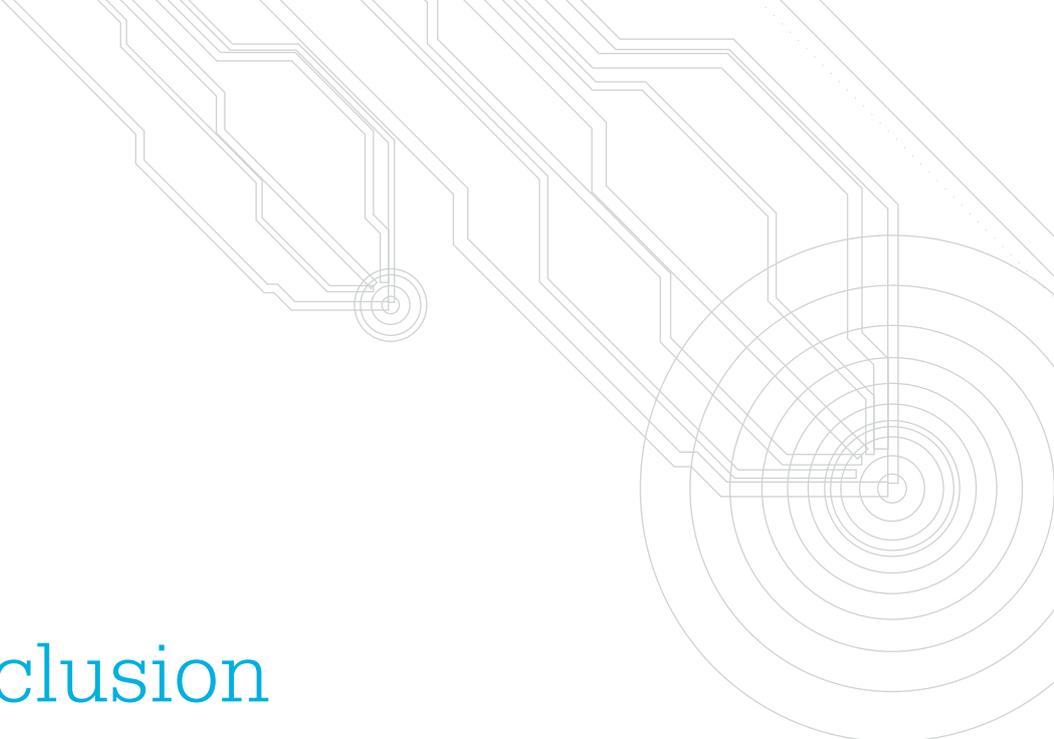
Processing time in order fulfillment:

-33 %

Lead time in the logistics pilot:

-75 %





Conclusion

German mechanical and plant manufacturers still pay far too little attention to the important aspect of order fulfillment. However, with aggressive competitors and new digital business models, this can quickly pay off. Even companies that are used to success should also reinvent themselves in this respect - by consistently orienting their processes and organization towards customer benefit and thus focusing on value creation.

In order to implement such a project successfully, it requires a clear orientation and consistent leadership. All processes within the value stream with interfaces to the customer must be put to the test. A Lean order processing process can then be designed based on the Lean characteristics of disturbance-free, flow, rhythm and pull. The effort is worth it, because order fulfillment is immediately reflected in the balance sheet. Increasing customer satisfaction and loyalty form the basis for a permanently positive revenue situation. Additional costs that arise in the company as a result of a stagnating process flow can also be prevented.

Both mechanical and plant engineers and their customers benefit from achievable success, such as the reduction of lead times by 25 to 35 percent, adherence to schedules at over 95 percent and increased planning capability. The simultaneous change in corporate culture is accompanied by a new understanding of leadership. The consistent introduction of Shop Floor Management creates the basis for this and provides the necessary tools. As a result, cooperation is characterized by improved communication and increased competence and responsibility.

All of this forms the foundation for a change in mentality in mechanical and plant engineering in Germany, in which fulfilling customer wishes is no longer perceived as chore, but rather as an ultimate discipline.



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