Interreg
Euregio Meuse-Rhine
QRM4.0
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Causes of lead-time problems

TECHNOLOGY SHEET

workitects

Which causes of lead-time problems are often overlooked?

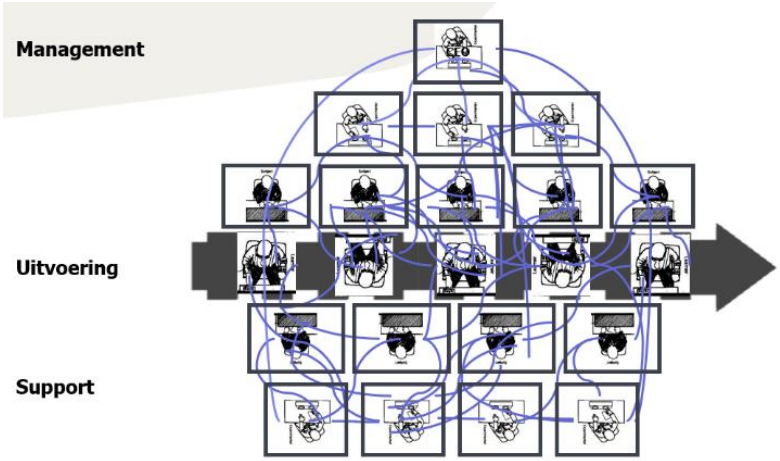
In manufacturing companies, the actual causes of lead-time problems are often overlooked. Mapping the organizational structure is crucial to identifying lead-time problems. Quick response manufacturing (QRM) starts out by splitting your organization into various order flows, within which integrated teams work together on the same product type or for the same customer group. Furthermore, in this new setting it is crucial to cross-train staff so that they can take up various roles in the teams. Lengthy lead times can also be avoided by simplifying decision-making structures and streamlining management.

How does organizational structure affect your lead time? Quick response manufacturing (QRM) as an empirical approach to shortening lead times draws attention to three important structural 'retardants' of lead times.

1. Adopt a flow organization insofar as possible in integrated units or teams
2. Invest in cross-training to avoid the fragmentation of preparatory and support tasks
3. Avoid managerial structures and long decision-making lines

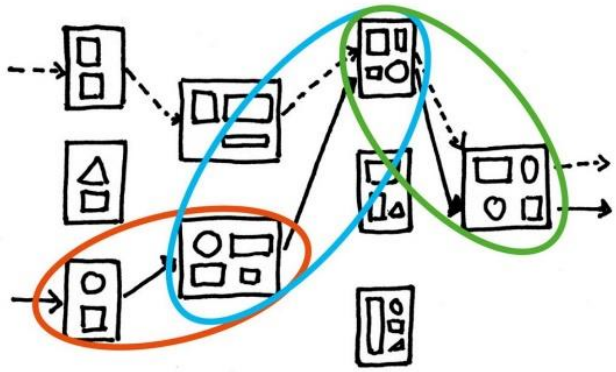
1. Adopt a flow organization insofar as possible in integrated units or teams

QRM is used in companies operating in a rapidly changing market and environment, with customer focus being among the main spearheads. This customer focus cannot be adopted without appropriate coordination between the various functions that should all be focused on the customer (e.g. sales, engineering, production, quality, technology). An inherent part of this strategy is the fact that as a manufacturing company you must be able to deal with fickle customers, resulting in unstable workflows. Research shows us that this unpredictability can be addressed more effectively by human interaction than by complex processes and procedures.



Functional organizational model: every order passes through every workstation

Functional organizations work with buffers and queues as
a line of defence against disruptions. If disruption occurs, this form of organization finds it difficult to see this coming or eliminate it, but as long as there are enough buffer stocks, this is not necessarily a major problem. For this reason, factories often have safety stocks spread between departments: if in the production process one department cannot deliver, then another department can still continue operating. As you can see in the diagram opposite, in a functional setting each order passes through each workstation or department, and buffers are provided for each department. Where such intermediate buffers are economically justified, a functional structure can last for a long time. But what if customers go to competitors because orders can be placed with them faster? And what if there is a higher level of delivery reliability with a direct competitor? The solution is to **sort out various order flows.**



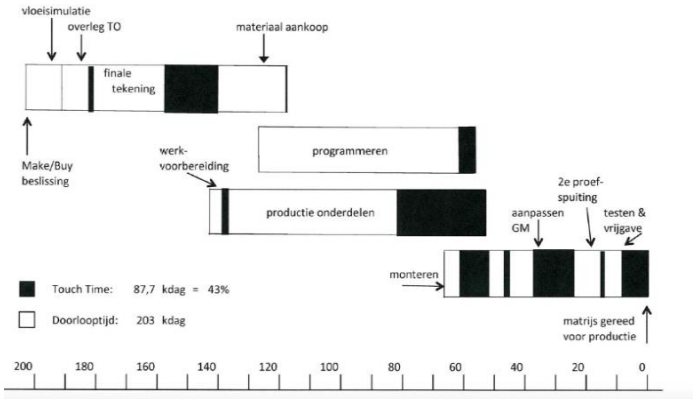
One focused target market segment with various QRCs: an order is placed where necessary

This can be compared with a traffic jam: in a traffic jam you have drivers who stay in the same lane but also less friendly drivers who cut in. There are also slip roads and exits for increasing and reducing traffic. Precisely because of the fact that a lot of unpredictable things happen in traffic jams and everyone is doing their own thing, the congestion gets worse. The same applies to manufacturing companies. Take the example of hollow and solid concrete blocks being produced along the same lines by a concrete manufacturer. Sudden rush orders, problems involved in changing machines, or a change of order type and quantity will cause major delays. This in turn results in lower delivery reliability and a lower level of customer satisfaction.

Going back to our traffic jam analogy, if trucks have to stay in one lane and the cars in the other lane(s), wouldn't the traffic jam be eliminated much faster? The same applies in a manufacturing company: the best thing to do is to bring together as many similar products as possible in the same order flows. These order flows are also referred to in QRM terminology as *focused target market segments (FTMSs).* At the concrete manufacturer, the hollow and solid concrete blocks can remain in one FTMS. However, when deciding on these order flows, the central idea is that **not every workstation must process every product**. Quick response cells (QRCs) – represented by the squares and rectangles in the above diagram – are in fact workstations or teams that will assist FTMSs. These QRCs are staffed by a multidisciplinary and cross-trained team, who only perform similar tasks. This may involve (parts of) production orders, office work or product development work, and sometimes there are also QRCs that take care of a complete process from ordering to delivery on their own. In a nutshell, it can be said that the creation of order flows considerably relieves the burden on the functional structure, and that within those order flows there are teams that prefer to take on as much of the work as possible.

2. Invest in cross-training to avoid the fragmentation of preparatory and support tasks

In manufacturing companies, different departments often operate side by side, and this means that a lot of coordination is required to share and integrate information between the departments. For example, the production department will want to keep machines running as much as possible and to deliver a high-quality product. But if the plans have to be put back, they must reorganize themselves, and even if there is a technical problem, the technical department must provide assistance. The availability of the shift technician is often limited, meaning that repairs have to be scheduled later and production is further delayed. In a functional organizational structure, it is noticeable that everyone's range of tasks is limited, but that there is still a substantial need for information transfer between the departments. Why can't a production operator carry out certain maintenance work themselves? And can't technicians also temporarily replace production operators in the latter's absence? One of the central ideas of QRM is that



The production department: the creation of moulds

cross-training considerably reduces lead times: in a specific team, each employee can take up more roles, and this cuts delays in the production process. The organizational structure determines the length of the lead time not only between different departments, but also within departments. Opposite, there is a diagram showing the production organization of a company that produces moulds for industrial applications. This production organization has a design department and planning, pre-assembly and assembly departments. It is striking that each production step entails only a bit of actually working on orders (the 'touch time'), and this pushes up the total lead time of orders. In other words, integrating buffers after each production step means that products are in production for a long time without actually being processed. If your department, or more generally your organization, is not organized so that everyone can achieve a reduced lead time through their specific behaviour and actions, then this will not be achieved. The design of the macro structure, or how the tasks and responsibilities are divided up in your manufacturing company, is crucial here. We would be glad to help you map and analyse this macro structure so that lead time becomes a central and accessible KPI within your organization.

3. Avoid managerial structures and long decision-making lines

Your decision-making structure, including who is allowed to make which decisions, will also have a major impact on the lead time for orders. Take the example of a Belgian automotive company: if an operator notices that a machine has a fault, a report is created and submitted to the shift manager. The manager collects all reports at the end of his or her shift and creates work orders. These work orders, in turn, are official documents that demonstrate that repairs can be made. Then the head of the maintenance department will receive, view and schedule this (/these) work order (s) for his or her team. This work order is then started by a maintenance employee, but often it is not clear straight away what is being described. As you can see, solving technical problems could take less time if the decision-making structure is reviewed. The more functionally fragmented your organization is, the greater the need to monitor the overview of the flow (s) at the level above that. However, integration into order flows means that you have to rely on less management structures less. Decisions are taken by the people in the order flow. Another way to deal with departments that are heavily dependent is to take away some of the bureaucracy and bring the teams together so that less procedural work is required.

Need help?

The Interreg project QRM4.0 helps production companies improve their lead times by providing practical advice and giving financial support to companies trying to take action to roll out digital tools in their workplace. Want to find out more? Contact sander.smouts@workitects.be or seth.maenen@workitects.be

References:

Maenen, Seth (2018). *Van Babel tot ontwerp, concepten en methoden voor organisatieontwikkeling*. Kalmthout: Pelckmans Pro.