

# LEAN AND ERP: SQUARING THE CIRCLE?

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Do you know what a pushmi-pullyu is? No, it's not a new concept from the Toyota dictionary. It's actually a two-headed gazelle-unicorn cross with the two heads unfortunately situated at opposite ends of its body. In order not to lose step completely and succumb to a self-induced demise, the pushmi-pullyu must develop strategies to deal with the fundamental contradiction that is inherent in its very being. It solves the problem by relying on a division of labor – one head can always speak when the other head is busy eating, making the pushmi-pullyu a very effective animal. However, this is not as easy as it seems, since the pushmi-pullyu is a somewhat cantankerous creature if we can believe the man who invented it, the British children's author Hugh Lofting.

There is probably no better analogy for the complicated relationship between lean philosophy and ERP. In practice, the two worlds are almost at cross purposes with one another. Lean experts rarely apply their principles to ERP systems and almost never include them in their solutions, as the contradictions appear to be so large. Thus the central aim of ERP – maximizing capacity utilization and minimizing costs – is pitted against a production that is synchronized with customer takt and the elimination of waste shared by all lean approaches. The flow or pull principle that is so systematically applied in the lean world can scarcely be reconciled with order-based push systems.

And finally, there is a fundamental difference between the two approaches when dealing with complexity. While lean philosophy – a predominantly visual approach – focuses on simplification and the reduction of complexity and can often be implemented without the support of IT, managing complexity in the digital ERP world is significantly more important than reducing it.

However, the attempt to master unstable and excessively complex processes with even more complex IT systems generally failed in practice and will continue to fail in the era of Industry 4.0 as well. Awareness is growing that it is essential to seek to reduce the complexity of the production system, using measures like segmentation, flow-orientation, line balancing and pull control as a first step. IT can then be deployed based on these simplified, improved and more robust processes and its benefit fully exploited.

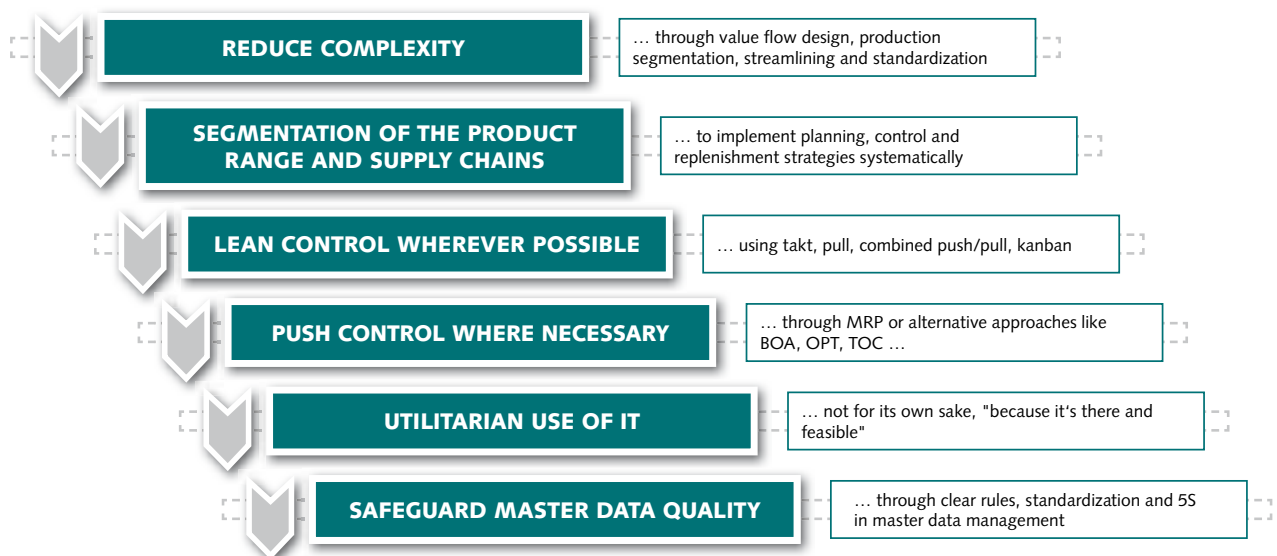
It is therefore hardly surprising that a common goal of both approaches – the creation of transparent, efficient and predictable production – has often been tackled in completely different ways in the last few years. In this context, those fighting in the IT corner rolled out heavy artillery – using comprehensive planning tools (advanced planning systems) with finite capacity scheduling and the desire to use mathematical optimization algorithms to plan every production step down to the last detail, wanting to achieve the ideal of the perfectly operating factory. Online quality and production progress data, immediate information about the availability of machines and causes of disruption and product costing analysis for every production job were intended to make manufacturing plant processes efficient and transparent.

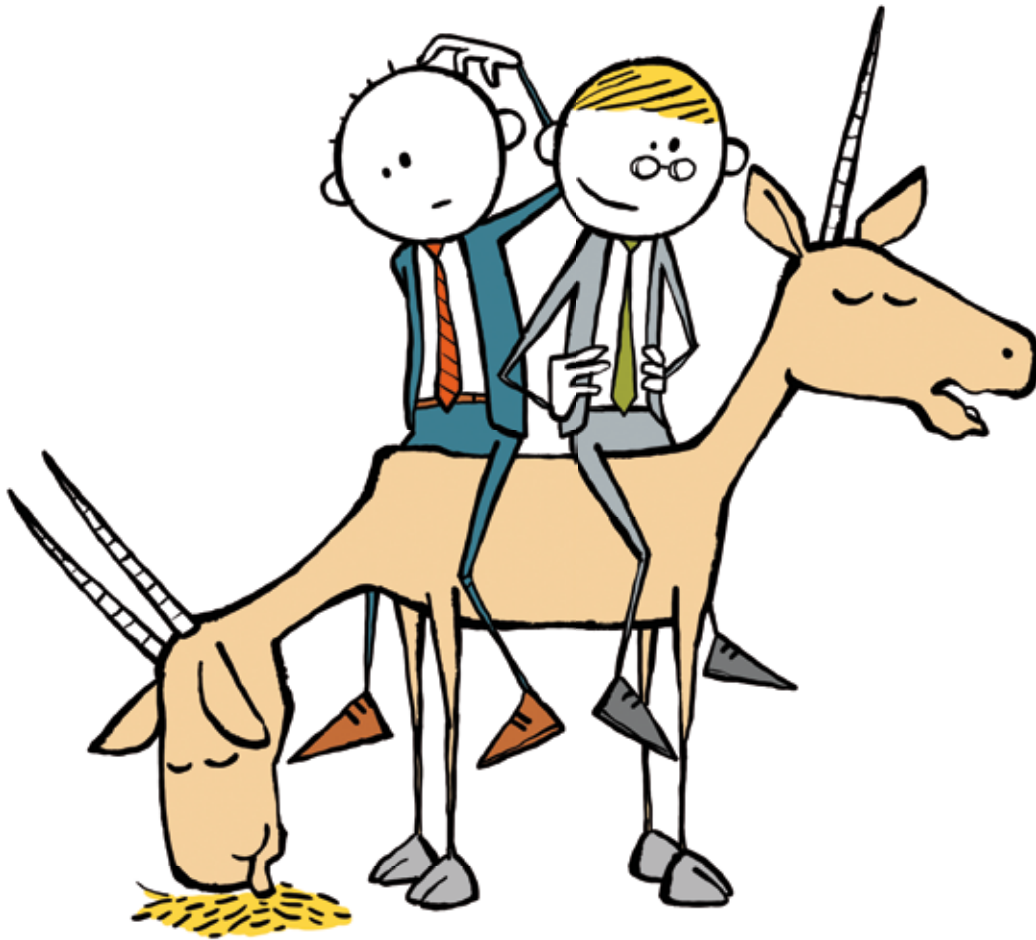
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In the best case, this accords with a number of other applied lean ERP principles that achieve improvements in several areas in a structured manner (see figure). The user-oriented deployment of IT plays an important role in this, in addition to the rule of thumb "lean control wherever possible, push control where necessary", as many dimensions of cost and complexity can be prevented by "thwarted, over-hasty actions". It is preferable to make the effort to reassess new IT investment from the point of view of intended purpose and sustainability than to take the wrong decision under the pressure to change and because it is feasible. And the use of IT is only sustainable when lean management is practiced with IT systems. A good example of this is ensuring a high level of data quality through the application of 5S.

Optimum interaction between lean principles and ERP is usually achieved in practice when production control is effected as an "ERP-free zone" based on self-regulating control loops and IT support is concentrated at the boundaries of the production system, for example on the medium- to

### LEAN ERP CASCADE PRINCIPLE





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long-term planning of material and capacity requirements and on the end-to-end integration of customers, suppliers and partner production plants. And of course, in all those places that require the use of IT to provide transparency over volume and value flows as well as traceability.

Lean processes alone are not sufficient to master complex structures. Data acquired by ERP systems offer great potential for understanding and thus better controlling such complex structures. First, they can be used to make processes

more transparent in real time, to understand relationships and to intervene in operations in terms of specific process control. Second, data can also be used ex post to identify patterns in problems with productivity, quality and delivery and then, on this basis, to extrapolate remedial actions for them.

The successful interaction between lean principles and ERP requires, above all, an end to dogmatic confrontation. It does not require one approach to be forcibly adapted to match the other. Instead there should be an alignment with the intelligent definition and organization of areas of application and technical and procedural interfaces. A pushmi-pullyu cannot be avoided if ERP is to be used alongside lean concepts in production. However, care can be taken to ensure that its special nature becomes a significant advantage and not a handicap.