Complexity that is driven by customer requirements, new technologies, and an overwhelming quantity and velocity of data are challenging businesses across various industries. Traditionally, shop floors and supply chains have been optimized by applying various lean principles, methods, and tools. Nevertheless, today’s ever more complex manufacturing systems cannot build on customary lean management, as the constantly increasing level of manufacturing complexity is not manageable by any employee – even if supported by the above-mentioned tools. This “complexity barrier” makes evident an area of conflict consisting of (a) the reduction of manufacturing complexity, which results in manageability for all employees and (b) the increase in variety and flexibility which is required to serve increasing customer requirements.

The real value of modern digital technologies lies in solving this area of conflict and thus enabling both efficiency gains and positive effects of complexity (i.e., individualization and flexibility) simultaneously. Pioneer companies already utilize selected Industry 4.0 technologies, such as additive manufacturing, virtual and augmented reality, predictive maintenance, quality analytics, and advanced automation, to name just a few, with expected production cost reduction of more than 30 percent.
In a nutshell, these technologies enable...

... complexity reduction for the workforce
through intelligent software systems that simplify program codes and technology interfaces which bring technological solutions into a format that can be processed by the current workforce. Despite the fact that significant training is required in order to utilize those systems most efficiently – an advanced IT university degree will not be required for managers and shop floor operators.

... variety allowance – accelerated by cloud computing and flexible assets – in order to connect multiple devices and data points to apply optimization algorithms as well as to sense and fulfill customer requirements.

Fig. 1 – Overcoming the Complexity Barrier

Source: Deloitte Digital Factory
Fig. 2 – Key Challenges

**Collaboration**
Cross-functional collaboration is a matter of success to achieve integrated solutions. This by-nature established communication barrier between IT and other departments needs to be overcome and managed.

**Technological Vision**
Companies clearly lack clarity on state-of-the-art solutions already available on the market and how to combine those technologies to improve performance tremendously. Hence, they are too slow aligning their aspirations with today's possibilities and tend to get lost in a multitude of isolated initiatives.

**Acting Digitally**
Employees lack the digital skills necessary to manage smart devices and processes. More than 50% of companies have no sufficient digital talent but less than 20% of these are developing their existing talent. Training needs and offerings are not analyzed or miss the critical skillset.

**Digital Backbone**
Even if silo solutions could work hand-in-hand, the infrastructure is not built to unlock their full potential. Companies spend too much time in developing their technological backbone without sufficient knowledge about integration of Industry 4.0.

Organizations and processes need to be streamlined before moving on to the digital path. Otherwise, excessive investment will be wasted on digital initiatives. To a certain extent, Industry 4.0 builds on lean management and provides the additions needed to elevate lean to a next level by providing an infrastructure that overcomes the complexity barrier.

Our Digital Factory offers an innovative environment showing integrated solutions for your individual requirements. We support you in connecting the right dots to match business and technological requirements. Together we will secure your manufacturing profitability and set a long-term growth path while staying tuned for the digital age.

Will Industry 4.0 state the end of lean manufacturing?

Source: Deloitte Digital Factory