

# Highlighting improvement opportunities through visualization

*It is well known that problems have a tendency to hide in manufacturing processes with poor information sharing and high levels of work in progress. But the question is, could these problems be illuminated by using new, upcoming technology and visualizing the symptoms of the problems?*

In a competitive environment, metrics and measures of performance are useful and essential tools for managing operations. Performance management and information management is necessary and important for managing the business and provides a foundation for decision making and resource allocation. Further, performance management facilitates proactive decision making rather than reactive. Performance measures also provide transparency in communication among people and assets, leading to better cooperation and overall increased performance on an organizational level as well as between organizations. Reasons for measuring performance are understanding of processes, confirming known facts, highlighting hidden facts, ensure fact based decision making and identifying where problems, such as bottlenecks and waste, occur.

Since the first industrial revolution in the late 18th century, the revolution has evolved from Industry 1.0 to Industry 4.0. The opportunities within the new industrial era seem countless, almost infinite. The new era is characterized and driven by cutting-edge technologies for its time, e.g. Artificial Intelligence, Internet of Things

and Additive Manufacturing. Neglected concepts developed during the late 20th century, such as Manufacturing Execution Systems and Shop Floor Control, can now reach their full potential by means of the new technology. Technology is now sufficiently sophisticated in order for physical systems and control systems to be designed and implemented in an integrated matter. For manufacturing processes this entitles pioneering the concepts of monitoring and controlling systems.

One of the possible transformation areas enabled by the thriving technology is pedagogical visualization of information across assets, processes and orders. Data captured in real-time enable organizations to act responsively to take completely informed decisions in planning, operations and maintenance. These decisions can be made by either intelligent systems or human operators monitoring the operations. In addition, visualized data increase the ability to predict future outcomes thus allowing organizations to navigate and predict challenges ahead, ultimately leading to improved production processes and customer satisfaction.

The master thesis recommend companies to evaluate the root causes of experienced process problems and available technology or techniques, and from that, derive suggestions of what and how to visualize. Lastly, solution suggestions should be prioritized according to feasibility and possible impact.