

From ERP to MES - Discussion with Prof. Pellerin, Ecole Polytechnique of Montreal (Canada)

Summary

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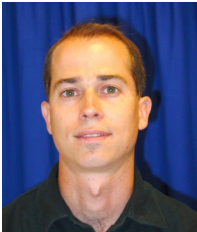
Execution Systems (MES) to significantly evolve into more powerful and more integrated software applications and to the increasing adoption of adaptive manufacturing practices. The objective behind MES and the adaptive manufacturing concept is the optimization of the manufacturing processes and resources.

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Adaptive manufacturing, process reengineering, and the development of optimisation and simulation approaches for solving manufacturing problems – these are the major interests of Professor Robert Pellerin from Ecole Polytechnique of Montreal (Canada), who collaborates with SAP Research Dresden, with SAP Canada, with SAP Centers of Excellence, and with a number of SAP customers. In recent projects, his research team was able to integrate advanced optimisation techniques within ERP and MES systems. But is that really required by manufacturing organisations?

From ERP to MES

For more than 25 years, companies have invested in information systems to achieve productivity gains which brought the enterprise information system market to grow steadily. Some information systems, such as the Enterprise Resource Planning systems (ERP), gained a major status on the market as 80% of the Fortune 500 firms are now using ERP to manage their operations and a growing number of SMEs are adopting the same strategy.

For modern companies, processes are the privileged form of action; they represent the added value of the organization within their supply chain. It is also why they have invested in the integration of their processes into ERP. But until the emergence of new requirements in reactivity, in quality, in adaptability, the information system specialists did not pay much attention to the shop floor. Companies are just starting to look at ways of improving their shop floor operations. Fortunately, this recent attention has led the Manufacturing Execution Systems (MES) to significantly evolve into more powerful and more integrated software applications and to the increasing adoption of adaptive manufacturing practices. The objective behind MES and the adaptive manufacturing concept is the optimization of the manufacturing processes and resources.

Scheduling or... re-scheduling

However, we still find only a few examples of real production process optimization. The most common optimized production function, if not the only one, is scheduling. Scheduling is usually defined as allocating a set of resources to perform a set of tasks. In production systems, this translates to allocating a set of machines and resources to perform a set of work orders within a certain time period. For the past three decades, scheduling has been researched from a mathematical point of view, embodied by the operations research, operations management, and artificial intelligence communities. As of today, more than 20,000 research articles about the scheduling problem have been published and a wide variety of scheduling software is now available on the market. This suggests that scheduling is the primary need for optimisation in manufacturing organisations.

Surprisingly, our recent study conducted with SAP Research Dresden (link to Future Factory Initiative page), which include series of interviews and observations with 20 production planners, brings us to a different conclusion. Our observations indicate that planners need scheduling tools and MES systems mostly for providing information and comparing different options. Calculation and the advanced optimization tool itself is not a priority.

On the other hand, planners are looking at decision-making tools capabilities to support them to respond to unpredicted change or unforeseen events such as machine breakdown or material defects. As MES is naturally strongly connected to the manufacturing processes, it is probably the best tool to detect and communicate problems to the planners. It is clear that having the right information at the right time helps to make the right decisions. However, MES applications still fall short of adding decision-making tools capabilities. Current systems can assure the availability of information, but it cannot assure that the information is meaningful. The difficulty is to develop explicative models in order to interpret events and to react in real-time to hazards like defects or failures, and to integrate the corrective actions across the entire organization. Consequently, the decision-making support capacities need to be developed and be connected to the ERP and MES systems.

In conclusion, despite the fact that optimization might not be a major issue for planners when scheduling, they are asking information system providers and researchers to provide them with decision-making tools that optimize ... re-scheduling!

Continue the [discussion with Prof. Pellerin](#)

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