The Challenge of IT/OT Convergence in Manufacturing

BY LUIGI DE BERNARDINI | MON JUL 25 2016

The convergence of information technology (IT) and operational technology (OT) is one of the key mantras in smart manufacturing. This convergence has many different faces with several organizational and technical implications.

OT typically refers to the control and automation technologies supporting operations, which historically have been intentionally separated from IT. This separation originally generated from the different technologies involved and the different skills needed. Early IT systems were proprietary, required internal programmers and were used to calculate finance-related figures, including payrolls or commercial transactions. At the opposite end, OT consisted of turnkey, proprietary systems designed to operate only on vendor-specific equipment.

With the more pervasive use of IT technologies at the operational level, things are changing from a technical point of view. Some simple examples include the usage of Microsoft technology with continued adoption of SQL databases to collect and analyze production and process data; the rapid adoption of Ethernet-based communication protocols at the machine level; the rapid diffusion of web-based user interfaces; and the increased popularity of mobile solutions to access data and perform tasks requiring Wi-Fi networks at the shop-floor level.

Nevertheless, there's still strong resistance to change at the organizational level.

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They have different people, goals, policies and projects. They not only operate in a very separate way, but sometimes they even have conflicting approaches, like they're fighting to expand supremacy and take control of Middle-earth (or avoid doing that). And, worst of all, they do not seem to trust each other.

This is a situation that needs to be solved urgently. Continuing to operate separately not only slows the adoption of solutions based on technologies that fall outside of operations' comfort zone, but also exposes companies to fault or security risks that could significantly impact production.

To rectify this situation, some strategic and organizational challenges need to be addressed. First, the strategies of the IT and OT departments need to be aligned. Responsibilities need to be unified, or at least the IT and operations managers (CIO and COO) need to have partly common and overlapping goals and targets, which would force them to work cooperatively. A joint task force—if not a specific department—with joint governance and responsibility must execute projects, harmonize duplicated or overlapping systems and processes, and promote the development of the interdisciplinary skills that are now missing in most companies.

This is not a process that will happen overnight, nor can it happen solely based on a change in the organizational chart (although that does need to be done). It's a cultural shift that requires time, effort and a progressive plan.

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One of the first things to do (after having put the organization in place) is to identify simple pilot projects that can offer tangible value and a low-risk benchmark for the company. These projects should not only provide a good opportunity to train resources and progressively develop the specific mix of IT/OT skills in the team members, but also help managers learn to share goals and develop a new shared governance model to effectively and continuously support the initiatives.

The difficulty in developing an effective governance for IT/OT projects should not be underestimated. IT typically has stronger models than operations for managing projects; they cannot just be taken as they are and applied to OT. The cooperation between IT and OT needs to extend to adapting those models for use in operations, considering the different impact of projects and the different culture of the involved stakeholders.

Being smart in manufacturing is the only option. That's not new, but you must adapt quickly to stay smart in such a rapidly changing environment. Effectively solving the IT/OT convergence challenge is a must. It's not a short journey, so get the journey started as soon as possible.