PART 4: LEVERAGING ROBOTIC PROCESS AUTOMATION AND AI FOR SHOP FLOOR EFFICIENCY

In this latest article in our “Road to Industry 4.0” series, we discuss another powerful approach to improving operational excellence in industrial environments: the use of Robotic Process Automation (RPA) and associated artificial intelligence (AI) functionalities to execute high-volume, labor-intensive transactional tasks and support decision-making on the shop floor.

RPA is a form of automation that uses robots to mimic human actions and perform repetitive, rules-based activities across transactional systems. Deploying RPA can lead to streamlined workflows, enhanced productivity, reduced business risk and improved business performance.

While manufacturers’ initial forays into RPA have been in back-office functions like finance and human resources, the technology is proving increasingly useful in automating critical transaction activities such as quality management and maintenance.

In parallel, AI applications – generative AI (GenAI) in particular – are also emerging as a powerful first step in autonomous process execution and decision-making support.

In this article, we explore manufacturing processes that are ripe for RPA adoption, the real-world applications of the technology and the automation benefits achieved by manufacturers that have deployed it.

Ripe for RPA

Within a shop floor environment, tasks that demand significant human input are ideal candidates for RPA. These include routine information entry tasks in quality management, manufacturing execution, maintenance and compliance.

Industries such as automotive, aerospace and life sciences are especially well-placed for RPA implementation given their need to adhere to stringent industry standards and regulations for production, testing and maintenance data storage and records management.

In aerospace manufacturing, for example, factory workers must fill in certification forms generated by the ERP/MES system for thousands of parts that make up an aeroplane, in order to provide a clear audit trail for regulators. They also need to enter data into the plant’s quality testing labs and maintain key quality measurement information in the Lab Information Management System.
Integration between the ERP/MES and LIMS is often patchy and dealt with manually. Such complexity can be smoothly handled by deploying RPA. First, RPA can be used to enable direct data entry from non-integrated document management systems, and second, it can automate data transfer from LIMS into the ERP/MES, updating the products’ quality and traceability records.

Three Key Benefits of RPA on the Shop Floor

1. Resource Optimization

RPA applications free up time for employees to engage in tasks that require creativity and critical thinking instead of rote manual entries. Human expertise is then channelled towards more strategic and value-adding activities, fostering a more agile, efficient and innovative workforce.

2. Removing Biases and Errors

Human errors are a significant challenge in manual processes, leading to inconsistent outputs and potential quality issues, and therefore business risks. RPA bots eliminate this issue by executing tasks precisely according to predefined rules. As a result, organizations can rely on dependable and high-quality outcomes.

3. Enhanced Quality Control

For businesses that need to maintain high output quality, the accuracy improvement offered by RPA is a game-changer. By leveraging RPA, organizations can achieve higher accuracy in data processing, analysis and reporting. This not only leads to better products and services but also enhances customer satisfaction and loyalty.

From Automated to Autonomous: Looking to GenAI for Even Richer Results

RPA can be combined with AI to achieve greater shop-floor efficiency by identifying trends and patterns, and autonomously triggering actions in response to unexpected events (or even intervening in anticipation of problems occurring).

Taking this a step further, GenAI-enabled chatbots can transform data analysis and information record retrieval processes in areas like plant maintenance. For example, GenAI can advance predictive maintenance platforms, offering assistance to the engineers overseeing the reliability of plant processes. We explore this emerging transformative capability further in the next article in our series.

How A&M Can Help

A&M has developed a comprehensive digital factory diagnostic model based on three key pillars: Leadership, Technology and Business Value. As part of this work, we have conducted Proof of Concept exercises and run pilot implementations, which include large-scale, multi-site rollouts of the digital techniques highlighted in this article.

Our team of experienced operators and data scientists are equipped to help companies not only generate insights from existing data, but also assess, prioritise and roll out solutions at scale to achieve maximum return on investment as quickly as possible. We work with clients to implement and train large teams, building strong business processes and decision-making capabilities that are complementary to the new data and digital tools.

Contact us today to learn how A&M can tailor these ideas to your business objectives and deliver tangible, sustainable results.
