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REALIZING **THE PROMISE** OF INDUSTRY 4.0

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Indisputable Advantages

There's probably not a single manufacturing specialist who would disagree with the premise that Industry 4.0 (I4.0) brings tremendous benefit to industrial operations. At its core, I4.0 embodies the assurance of a better, more efficient production ecosystem. A network of machines and sensors that communicate seamlessly, providing real-time process feedback, enabling quick actionable solutions to problems, predicting downtime and maintenance requirements, tracking materials through production and continuously learning and reporting while working in close concert with human labor – this is I4.0 utopia.

Artificial intelligence (AI) and machine learning capabilities enable automation systems to quickly and easily be "taught" – or programmed – to undertake complex tasks and decision-making functions. The end result is more nimble production lines. In fact, we have seen this agility play out during the COVID-19 crisis; manufacturing lines around the world have been quickly re-purposed to produce medical or sanitary goods to offer ample supply to front-line workers and medical treatment centers. This adaptability translates to core competencies, too, as the need to quickly changeover lines for new product builds is achieved seamlessly with little downtime.

The benefits of I4.0 have been brought into focus during this era of enforced social distancing, where processes that can be monitored remotely and allow for minimal human presence and oversight. Essential goods can continue to be produced and critical services provided. Companies that have made strategic investments in I4.0 are able to further differentiate themselves competitively, maintaining robust supply chains and a high level of responsiveness.

The Implementation Equation

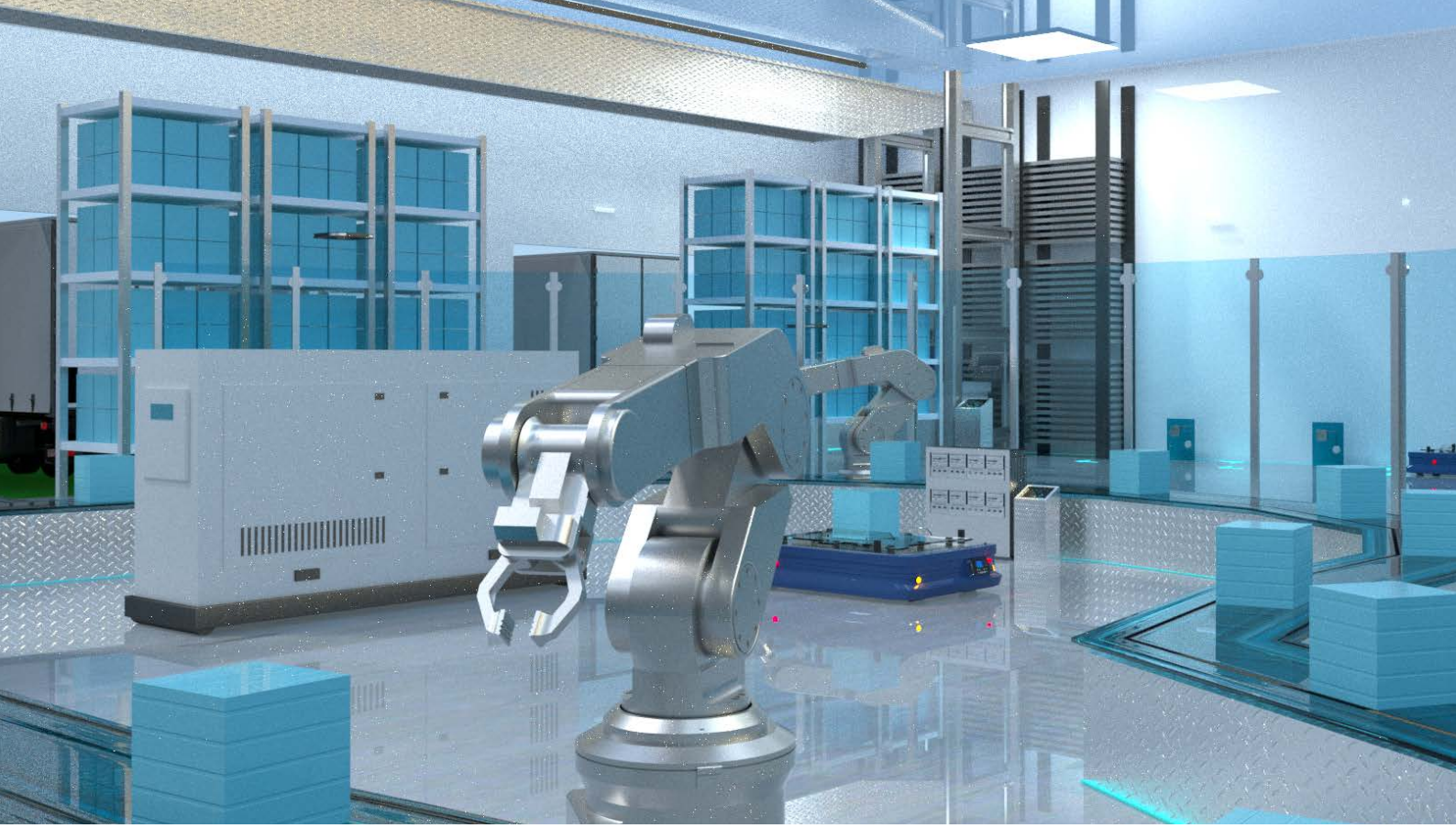
For enterprises that embrace I4.0, the positive results on profitability, quality, output levels, environmental footprints and employee satisfaction are well-documented. However, to realize the I4.0 upsides, companies must construct a solid implementation plan. It's important to first understand what the business objectives are and then develop a detailed strategy.

Goals could include small improvements in product quality, a more transformational shift in goods and services provided, reduced downtime for greater output, or holistic factory efficiency enhancements. And, while the ROI for increased automation is clearly a motivating factor, the move to more automated enterprise can also be a significant element of a company's corporate citizenship strategy.

> **Inherent byproducts of automation include waste reduction, energy conservation, yield improvements and protection of employee health through reduction in strenuous or repetitive tasks.**

Though software capability and next-generation communication standards are foundational to I4.0 success, industrial automation hardware – from machinery to automated robots and maintenance systems – brings the promise to life. Arguably, the advances in hardware functionality and reliability are just as significant – if not more – as software drivers. A mere 15 years ago, for example, a medium voltage switchgear was an electromechanical switch with a single, small ASIC and a few lines of code.

Current state-of-the-art solutions include multiple ASICs processing over one million lines of code, numerous communication protocols, standby power capability, and self-diagnostic capability to ensure diminished risk to people and machines downstream when the switch is reset after an event. Progress, indeed.



There are similar examples in robotics. Today's logistics robots are autonomously guided vehicles (AGVs) that incorporate sensors and decision-making functionality similar to that of an automotive ADAS system. They operate at slower speeds, of course, and the environments are often more controlled, but the capability is analogous. There are many commercial deployments of this technology in place already with lower risk and less legislative barriers than in automotive applications, making the smart factory an ideal proving ground for AGVs.

Finally, implementation can be a significant investment and, while this may seem daunting, the payback is often quick and the continued financial benefit exponential. There are countless examples of this, including a recent investment by Toyota to overhaul a transmission manufacturing site in North Carolina. Working with Cisco, the plant invested US $1.2 million to revamp its IT network. According to the company, nearly US $ 1 million was recouped in a mere nine months, mostly due to maintenance savings.[1]

The road to I4.0 implementation is certainly not without challenges, which can range from workforce training to complex societal and legislative considerations. In addition, large scale capital and operational expenditures can carry a significant amount of risk, unless – as in the example above – a solid implementation plan is in place.

Other potential challenges include security and data ownership vulnerability, machine and system reliability if not secured and lack of standardization between system communication protocols. However, on balance and if managed properly, I4.0 implementation stands to produce positive, measurable results over the long-term.

Infinite Promise for Manufacturers, Workers and Consumers

Though a plurality of surveyed employees believes AI and I4.0 may negatively impact the workforce[2], I think – as do many analysts – that the opposite is true. A place where machines are completely in charge will not exist, in my view.

What I envision is an optimization of activities and a hybrid approach where robots or automation will take over tasks which they are capable of managing and humans will oversee other activities.

Historically, this has been the case in every industrial revolution; there hasn't been mass unemployment spurred by innovation but, rather, the creation of new jobs. This reality, in combination with the clear benefits to manufacturing efficiency and sustainability, as well as the cost reduction and product output advantages for consumers, make Industry 4.0 a promising transformation for all stakeholders.

Justin Kolbe

The Author

Justin Kolbe currently serves as Henkel's Director of Market Strategy for Power and Industrial Automation within the company's Adhesive Technology business unit, where he is focused on setting broad strategic guidance and market insights. In 1996, Kolbe joined The Bergquist Company (acquired by Henkel in 2014) as a Process Engineer and has since worked in various capacities including process development, applications engineering, R&D and marketing. A chemical engineer by training, he has extensive experience in thermal management solutions and electronic materials development and processing.

With an impressive professional track record and a long history of providing reliable solutions for customers in multiple markets including power conversion, automotive, industrial automation and power electronics, Kolbe is passionate about ensuring Henkel materials not only deliver on performance, but also on cost and sustainability objectives. Based in Henkel's Chanhassen, MN facility, Kolbe holds a Bachelor's degree in Chemical Engineering from the University of Minnesota.

Sources

[1] *www.iotworldtoday.com*

[2] *www.hrexchangenetwork.com*

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