SMART FACTORIES & INDUSTRY 4.0 - THE NEXT INDUSTRIAL FRONTIER

Gouldian Finch | December 6, 2018   Business

We've all heard about the industrial revolution. Smokestacks, mechanization, and steam power, there is a picture in all our heads of a 19th century in flux.

That, however, is not the end of the story. What with the advents of mass production, electricity, computers, and automation, industry as a whole has now been revolutionized several times over -- Cue the smart factory and industry 4.0.

In recent years, we have again entered a new realm of industrialization. Dubbed 'industry 4.0', this shock to the collective system involves the 'internet of things', cyber-physical systems, and cloud/cognitive computing. In layman's terms, industry 4.0 refers to how our devices communicate with one another and are able to learn over time, thereby heightening efficiency and decentralization. In practice, these advances are manifested most clearly manifested in what has become known as a smart factory.

What is a smart factory?

Otherwise known as intelligent factories, smart factories place an emphasis on complex optimization and adaptation. Through the interconnectedness made possible by the internet of things and other cyber-physical systems, with efficiency in mind, smart factories can integrate with the rest of the supply chain, thus allowing for real-time process alterations and improvements.

In practice, a smart factory's greatest asset is its integration with artificial intelligence (AI). Just because something's automated doesn't mean that it has the ability to make complex decisions, especially ones that may radically alter a business and its processes.

With AI, not only do those decision-making powers become possible, but they'll also experience constant self-correction and improvement. It may sound a bit like *The Terminator*'s Skynet, but in actuality, smart factories are not to be feared. Instead, their features, benefits, and overall impact should entice everyone to jump onboard!
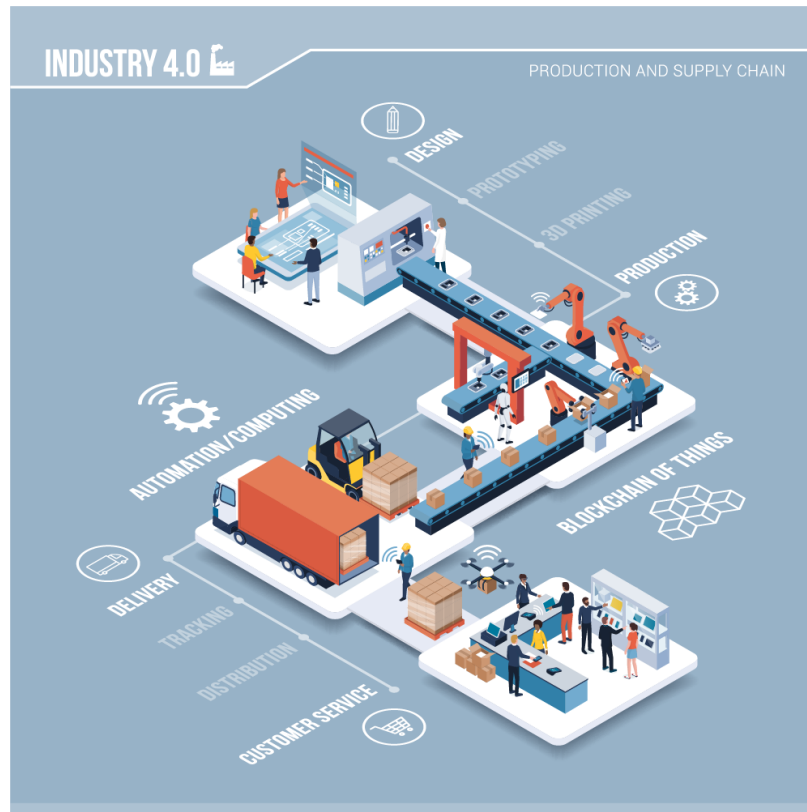
What are the features of a smart factory?

The implementation of smart factory-related processes has revolutionized the manufacturing industry. In fact, many traditional manufacturers and industry leaders have seen industry 4.0, smart factories, and their inherent features to be the solution to several issues endemic to their line of work. Decentralization, optimization, and transparency, for instance, all play necessary roles.

Decentralization

Decentralization, in any context, depends heavily on reliability across all levels, so as to have confidence that overall decision-making and efficiency is maintained without managerial oversight. The same holds true for smart factories, in that they require little manual

interference and are able to optimize and adjust their processes through sheer automation.

Transparency

In the case of smart factories, transparency refers to the availability of relevant data across the supply chain. With information readily accessible across the board, both automated processes and human management will be able to take note of trends, make more accurate decisions, or detect errors before they are able to arise.

Optimization

Smart factories with proper optimization take advantage of their decentralized and transparent automation to become more flexible and dynamic. Therein, not only will the smart factory be able to adapt with ease, but it will also be able to take action against anomalies before they become a threat to the greater infrastructure.

What are the benefits of a smart factory?

By their very nature, smart factories result in an optimized, decentralized, and transparent production process for both the factory itself and the greater supply chain. However, many companies focus on tangible benefits, beyond the broad features. To that end, the benefits of a smart factory include increased efficiency, quality, and output sustainability.

Efficiency

Self-adaptation and its effect on efficiency is a smart factory's greatest benefit. When fully operational, an efficient smart factory will have constant access to an ever-changing stream of data. Therein, a smart factory will

always be analyzing and self-correcting in order to make the production process and output as efficient as possible.

Quality

Considering the smart factory's ability to detect and resolve production issues before they have a chance to become disruptive, its output never has a chance to suffer. Therefore, the quality of any given smart factory's final product will higher than any of those produced by non-automated means, which sometimes yield defective goods.

Sustainable Output

Within traditional factories and manufacturing spaces, disruptions have been known to happen on occasion, whether it be due to labor, environmental, and accidental factors. The adaptability and self-correction processes that come with smart factories eliminate the possibility for human error. Their automation, therefore, can result in increased safety and ensured output sustainability.
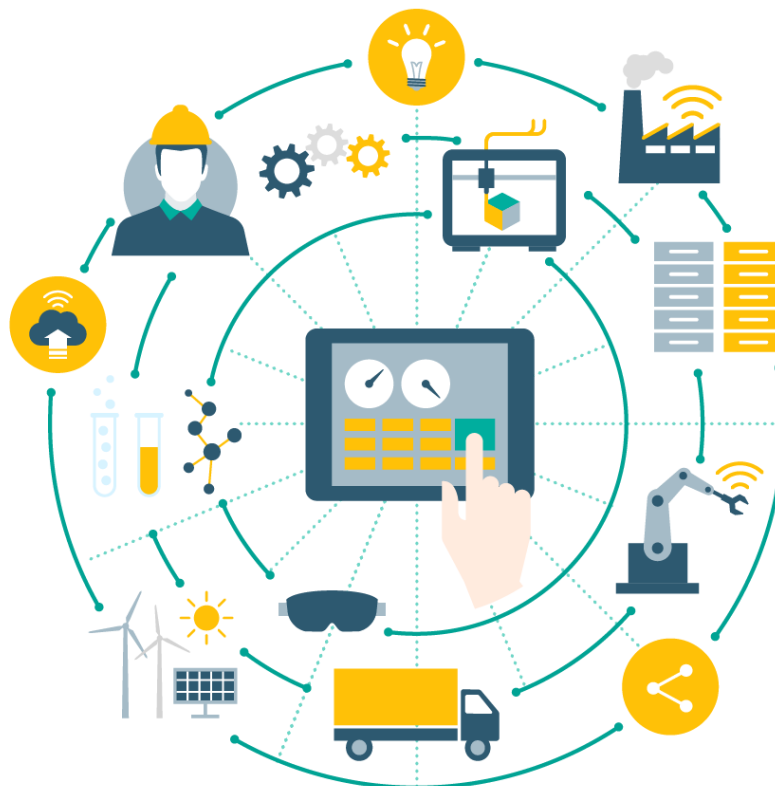
What is the impact of a smart factory?

Smart factories do not simply exist in a vacuum. While their features and benefits have indeed altered the production processes of factories everywhere, their impact goes much further beyond. What effect does this newest industrial revolution have on the workforce, on the supply chain, and on security? The answer might surprise you!

Workforce Alteration

The processes of an industry cannot undergo such a revolution without affecting the worker in some way. Just as in the previous industrial revolutions, the role of the human workforce has changed. Broadly speaking, workers will shift away from physical labor and towards technological support, thereby necessitating a more technical skill set.

Supply Chain Adaptation

All across the supply chain, from manufacturing to quality control and warehouse management, the advent smart factories have forced adaptation at all levels. Since a smart factory's automation and self-correction processes are working at all times, the rest of the supply chain needs to maintain the same level of flexibility in turn.

Security Concerns

In our digital era, information has become accessible like never before, but at the cost of security. Data protection has rapidly become a fully-fledged industry as many entities seek information protection. Smart factories are inherently not free from this issue, but have inspired many companies to make finding a solution a priority.

A real-life application of smart factory technology

To the average person, factories still likely conjure images of 20th-century assembly lines and 19th-century working conditions. However, as discussed, the smart factories that have come about in the 21st century couldn't be further from the stereotypes of yore.

As an example of an old company embracing the business potential of modernization, Adidas has used the internet of things, along with its smart factories [dubbed speedfactories], to optimize their supply chain management processes. Therein, Adidas has been able to reduce the time required for shoe design by 66% and production by a similarly impressive margin.

With these impressive numbers, Adidas has ensured that popular items do not necessarily have to disappear from store shelves. However, the yet to be tested variable is that of expansion and scalability. As demand increases, for instance, will the rest of the supply chain, including delivery, be able to scale proportionally? Since the concept of smart factories and their inherent technology is so new, time will certainly tell.

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