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Smart factories set to boost global economy by $1.5 trillion by 2023

Manufacturers plan to invest more than ever in smart factories but challenges in scaling must be overcome

Paris, November 12, 2019 – A new study from the <u>Capgemini Research Institute</u> has found that smart factories[1] could add at least $1.5 trillion to the global economy through productivity gains, improvements in quality and market share, along with customer services. However, two-thirds of this overall value is still to be realized: efficiency by design and operational excellence through closed- loop[2] operations will make equal contributions. According to the new research, China, Germany and Japan are the top three countries in smart factory adoption, closely followed by South Korea, United States and France.

The report entitled, "Smart Factories @ Scale", identified the two main challenges to scaling up: the IT-OT[3] convergence and the range of skills and capabilities required to drive the transformation including cross-functional capabilities and soft skills in addition to digital talent. The report also highlights how the technology led-disruption, towards an 'Intelligent Industry'[4], is an opportunity for manufacturers striving to find new ways to create business value, optimize their operations and innovate for a sustainable future.

Key findings of the study, which surveyed over 1000 industrial company executives across 13 countries, include:

Organizations are showing an increasing appetite and aptitude for smart factories: compared to two years ago, more organizations are progressing with their smart initiatives today and one-third of factories have already been transformed into smart facilities. Manufacturers now plan to create 40% more smart factories in the next five years and increase their annual investments by 1.7x compared to the last three years.

The potential value add from smart factories is bigger than ever: based on this potential for growth, Capgemini estimates that smart factories can add anywhere between $1.5 trillion to $2.2 trillion to the global economy over the next five years. In 2017 Capgemini found that 43% of organizations had ongoing smart factory projects; which has shown a promising increase to 68% in two years. 5G is set to become a key enabler as its features would provide manufacturers the opportunity to introduce or enhance a variety of real-time and highly reliable applications.

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[1] A Smart Factory leverages digital platforms and technologies to gain significant improvements in productivity, quality, flexibility and service.

[2] Closed-loop operations involve the use data generated by operations to optimize them in real time.

[3] IT/OT convergence refers to the integration of information technology (IT) systems used for business processes with operational technology (OT) systems that are used to monitor devices, events and industrial processes.

[4] The Intelligent Industry refers to the digital transformation of industrial and tech companies. Capgemini's vision of Intelligent industry incorporates the convergence of the physical and digital worlds, along with the convergence of IT (Information Technology) and OT (Operational Technology). It enables technology-led disruption in R&D, engineering, manufacturing, supply-chain, operations and services.

Scaling up is the next challenge for Industry 4.0: despite this positive outlook, manufacturers say success is hard to come by, with just 14% characterizing their existing initiatives as 'successful' and nearly 60% of organizations saying that they are struggling to scale. The two main challenges to scale up are:

- The IT-OT convergence - including digital platforms deployment and integration, data readiness and cybersecurity - which will be critical to ensure digital continuity and enable collaboration. Agnostic and secure multilayer architectures will allow a progressive convergence.
- In addition to digital talent, a range of skills and capabilities will be required to drive smart factory transformation including cross-functional profiles, such as engineering-manufacturing, manufacturing-maintenance, and safety-security. While soft skills, such as problem solving and collaborative skills will also be critical.

According to the report, organizations need to learn from high performers (10% of the total sample) that make significant investments in the foundations - digital platforms, data readiness, cybersecurity, talent, governance - and well-balanced "efficiency by design" and "effectiveness in operations" approach, leveraging the power of data and collaboration.

Jean-Pierre Petit, Director of Digital Manufacturing at Capgemini said: *"A factory is a complex and living ecosystem where production systems efficiency is the next frontier rather than labor productivity. Secure data, real- time interactions and virtual-physical loopbacks will make the difference. To unlock the promise of the smart factory, organizations need to design and implement a strong governance program and develop a culture of data-driven operations."*
"The move to an Intelligent Industry is a strategic opportunity for global manufacturers to leverage the convergence of Information Technology and Operational Technology, in order to change the way their industries will operate and be future ready," he further added.

Mourad Tamoud, EVP, Global Supply Chain Operations at Schneider Electric said: *"Through Schneider Electric's TSC4.0 Transformation, Tailored, Sustainable & Connected 4.0, a sustainable and connected journey which integrates the Smart Factory initiative, we have created a tremendous dynamic. We had started with just 1 flagship pilot several years ago and towards the end of 2019, we have over 70 Smart Factory sites certified with external recognition by the World Economic Forum. By training our managers, engineers, support staff, and operators, we have equipped them with the right knowledge and competences. In parallel, we have also started to scale this experience across the organization through a virtual network to achieve such a fast ramp up."*
"This is only the beginning - we will continue to innovate by leveraging internally and externally our EcoStruxure™ solution - an IoT enabled, plug and play, open architecture and platform - and use the latest best practices in the digital world," he *further added.*

The report also details that PLM[5], MES / SCADA[6] and robotics are key components of industrial architecture. However, the main areas of investment for at-scale deployments are IoT and AI, which support data-driven operations, as well as remote and mobile capabilities.

A copy of the report can be downloaded here:

Research Methodology:
The research surveyed over 1,000 manufacturers, focusing primarily on organizations that had a smart factory initiative underway from 13 countries (China, France, Finland, Germany, Japan, India, Italy, South

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[5] PLM stands for product lifecycle management.
[6] MES/SCADA stands for manufacturing execution system/supervisory control and data acquisition.

Korea, The Netherlands, Spain, Sweden, United Kingdom, United States) across the industries - discrete manufacturing, process industries, power, energy and utilities, consumer products. The Capgemini Research Institute also conducted nearly twenty in-depth discussions with executives overseeing a smart factory initiative or a smart factory.

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