Crea8

Smart Factory

Thematic Investing

February 2021

The factory floor has changed immensely from the time that Henry Ford first developed the assembly line technique for mass production of his cars. The products that factories produce may not be too different, but the pervasive use of technology is making the process of manufacturing more intelligent and dynamic, giving birth to the concept of "Smart Factories".

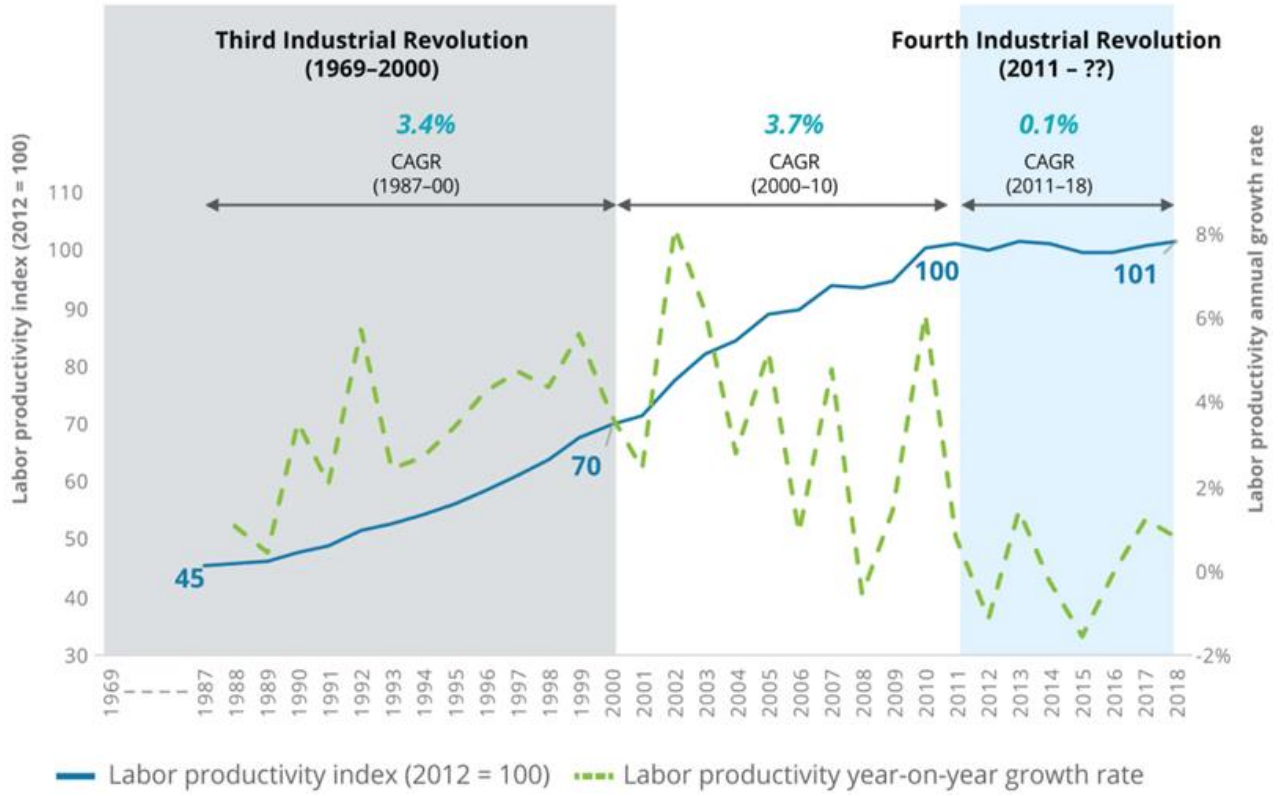
Introduction

Each industrial revolution has transformed production, delivered better economic output, and, consequently, immense economic gains globally. However, in recent years manufacturing productivity has been diminishing, despite advances in factory equipment, software and manufacturing processes. Labour productivity in the US posted annual growth of around 0.1% between 2011 – 2018 vs. 3.4% between 1987 – 2000 (Wellener and Dollar, 2019).

What this means is that economic output from the factory floor is being driven more by the number of hours people work instead of output per hour and as a result, productivity has not been rising as it did in the past few decades.

This brings us to the Fourth Industrial Revolution (IR 4.0). The aim of IR 4.0 is to accelerate operational improvements by connecting machines, people, data and value chains. This can be achieved by building a digital fabric across the traditional factory floor and, eventually, the entire factory network.

The term, "Smart Factory" encapsulates this idea and describes a digitised and connected production process where machinery and equipment work to improve processes through automation. The benefits also extend beyond just the physical production of goods and into functions like planning, supply chain logistics, and even product development.



Source: Deloitte and MAPI Smart Factory Study 2019

Figure 1: Labour productivity through time

Based on UN's population ageing estimates and projections, there were 703 million older persons aged 65 or over in 2019 globally (Figure 1).

Understanding a Smart Factory

The smart factory is essentially a sum of parts – it is a flexible system that can self-optimise performance across a broader network of factories, suppliers and partners; self-adapt to and learn from new conditions; and autonomously run the production process. The transformation of a factory to "smart" requires a concerted effort by capital owners over several years to identify, invest in and refine specific use cases for applying advanced technology to existing processes and workstreams.

The different parts of a Smart Factory can be connected via industrial IoT or integrated circuits that enable sensing, measurement, control and communication in relation to everything that is happening throughout the production process. Amongst others, the technology components involved in a smart factory would include **cloud storage/processing** to provide data storage and application processing on secure cloud servers; **smart supply networks** for transparency over supplier inventories and vehicle logistics to allow for automatic and optimised supply decisions; **data analytics** that can provide real-time analytics for decision making and advanced decision algorithms; **intelligent sensors** integrated in machines to wirelessly stream data; **next-gen manufacturing systems** to make automated decisions (e.g. production scheduling) and allow for remote visualisation, monitoring and control; **additive manufacturing** via 3D printing which allows for rapid prototyping and rapid spare part printing; and **advanced robotics** to automate certain processes and create new forms of worker-robot integration.

With these components in place, a traditional factory can be characterised as "smart" based on the following characteristics in Figure 2.

Source: Deloitte Insights

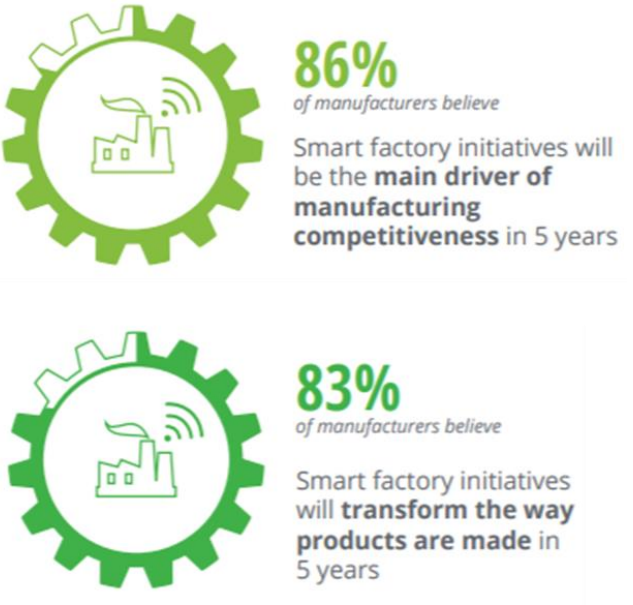
Figure 2: Characteristics of a smart factory

Manufacturers recognise that smart factory initiatives are important

Realising the smart factory vision may be a tall order. However, management teams of large manufacturers recognise the transformational change that smart factory initiatives can bring.

In a Deloitte survey with over 600 executives of manufacturing companies with headquarters in the US and with a global footprint, more than 85% of the respondents said that they believe smart factory initiatives will be the main driver of manufacturing competitiveness in the next 5 years (Wellener and Dollar, 2019). Further, 83% said that smart factory initiatives will transform the way products are made within the next 5 years.

This shows that manufacturers globally have an appetite to invest in smart factory initiatives. This is unsurprising given the measurable results that some companies have already experienced by incorporating smart factory initiatives into their existing processes. Executives of companies that have incorporated smart factory initiatives into their existing processes reported a 10% average increase in production output, 11% average increase in factory utilisation and a 12% average increase in labour productivity over 3 years (Wellener and Dollar, 2019).



Source: Deloitte and MAPI Smart Factory Study 2019

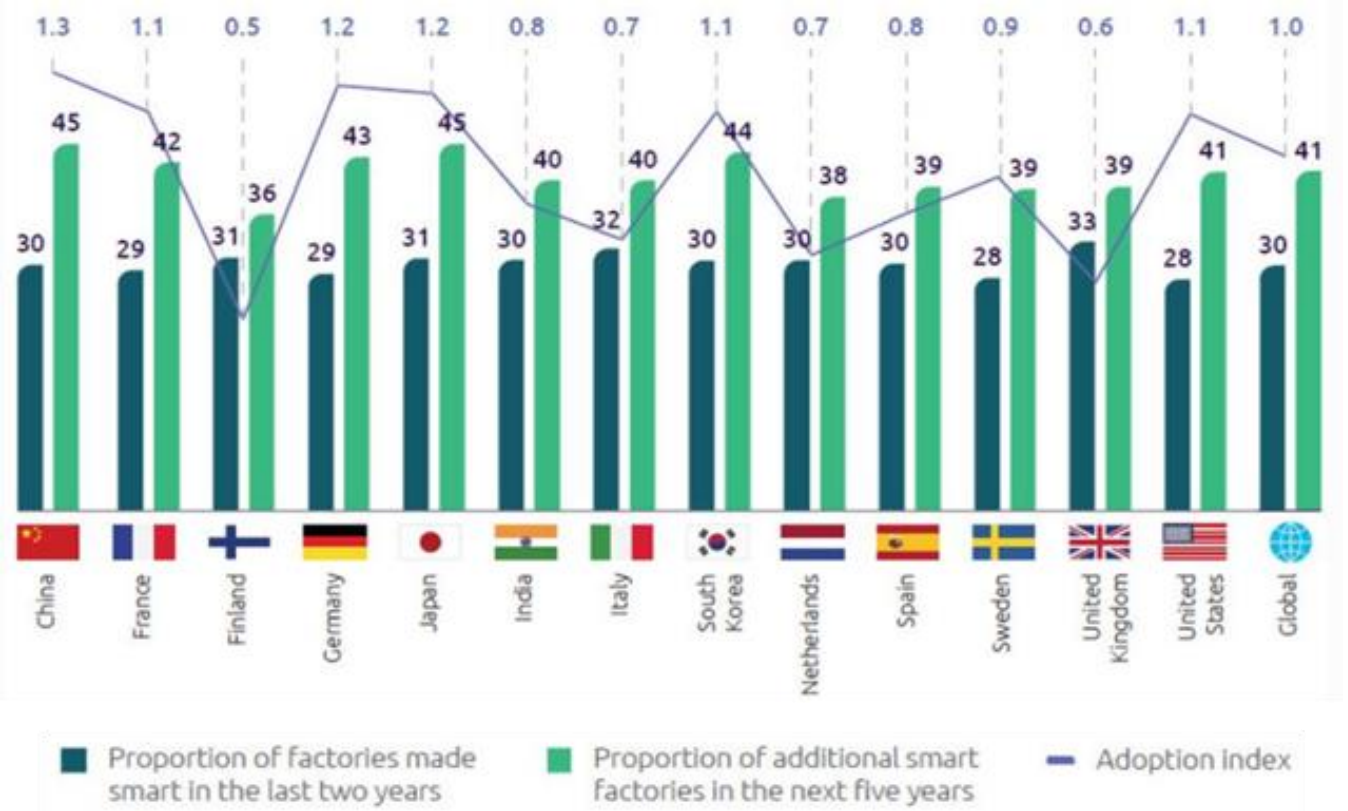
Figure 3: Survey on importance of smart factory initiatives

Adoption of Smart Factory Initiatives are increasing globally

According to one study, major economies are accelerating the transformation of their factory floors to "smart" (Buvat and Puttur 2019).

The smart factory adoption index in figure 4 shows the future smart factory adoption plans in each country. A value >1 means the country has more aggressive future plans compared to average, vice versa.

The adoption index shows China, Germany, and Japan are aiming to aggressively adopt smart factories in the next five years, closely followed by South Korea, the United States, and France. There is also a considerable increase in the proportion of factories that will be made smart over the next 5 years vs the last two years, across all major economies.

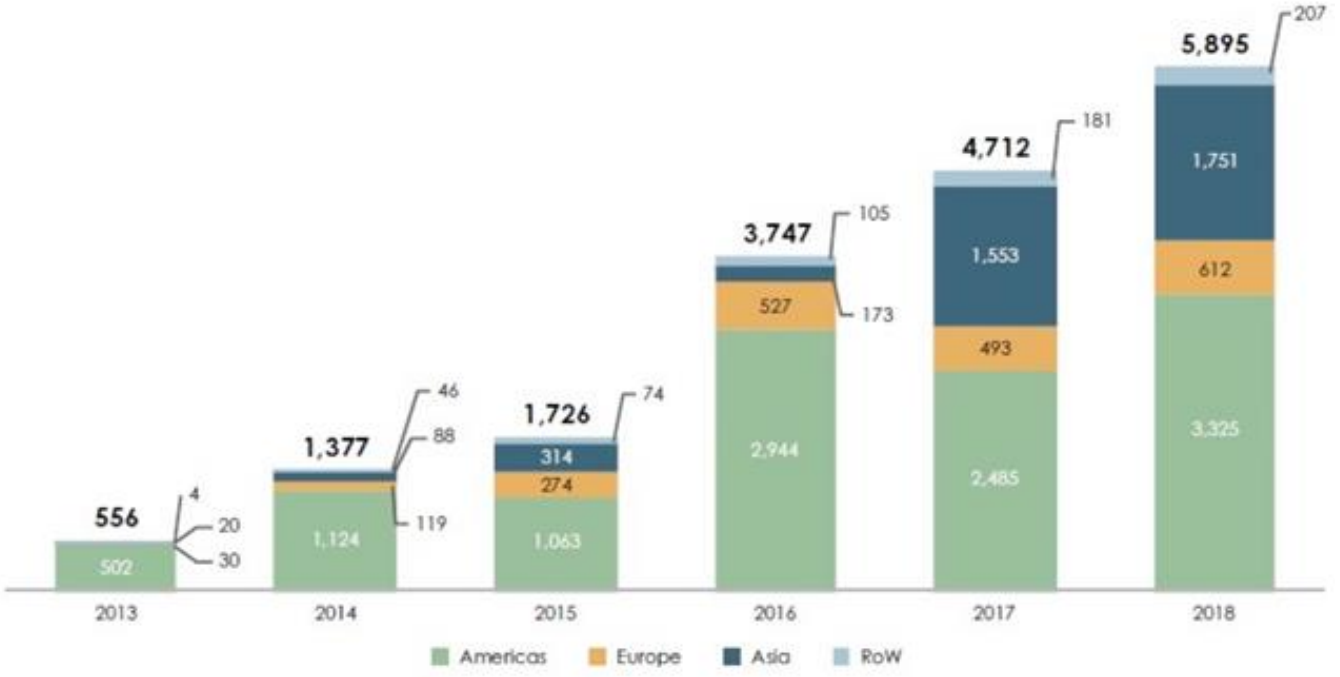


Source: Capgemini Research Institute

Figure 4: Percentage of factories transformed into "smart" between 2017-2019 & future adoption, by country

Investments into smart factory initiatives have also increased

A report by boutique investment bank, GP Bullhound, also reviewed the value of smart factory investments, noting that between 2013-2018, up to EUR17.4 billion was invested in smart factory initiatives. The U.S. led in investments, with American start-ups receiving EUR11.4 billion, compared with EUR3.9 billion in Asia and EUR2.1 billion in Europe ("Smart Manufacturing: The Rise Of The Machines" 2019).



Source: GP Bullhound

Figure 5: Venture capital funding for smart factory initiatives, by region (EUR mil)

Potential winners from this trend

SAP

SAP is an enterprise application software, and analytics and business intelligence company. The company offers SAP Digital Manufacturing Cloud, which, with a manufacturing execution system, improves operations visibility. The manufacturing execution system offers near real-time data and analytics.

The company's SAP Manufacturing Execution simplifies manufacturing operations by monitoring, controlling and optimizing the production processes.

Fanuc Corporation

FANUC Corporation, a Japanese-based group, manufactures factory automation systems, equipment, and robots. The Company's products include computerized numerically-controlled (CNC) equipment, servo motors, laser systems, industrial robots, wire-cut electric discharge machines, and CNC drill.

It is the largest maker of industrial robots globally and brings together robotics and automation with advanced analytics to drive smarter, faster business decisions for industrial companies.

Investing in the “Smart Factory” trend with Crea8

With manufacturers recognising the benefits and planning to turn their factories “smart”, countries pushing for smart factory adoption and capital flowing into such initiatives, the push towards smart factory trend will likely propel earnings for companies behind these initiatives.

With so many moving parts, investing in the future of manufacturing can be overwhelming. A complete portfolio centred on the future of manufacturing should include firms that are creating a more holistic and well-connected ecosystem for companies that focus on manufacturing and supply chain management.

Through Crea8's Factor Based Thematic Investing Service, you get the opportunity to invest in this trend.

Put your own spin on things

Crea8 allows you to adopt our professionally built strategies, such as “Global Smart Factory", and put your own spin on things.

If you are concerned about sustainability, Crea8 has also incorporated Environmental Social and Governance (ESG) factors into our portfolio construction, thereby, ensuring that your portfolio is consistent with your ESG principles.

Alternatively, with Crea8's Analytics, you can use our screener to identify other stocks to add to the strategies, while Crea8's Advisory allows you to use our algorithm add factor tilts to these strategies.

We monitor your plan to ensure you can sleep easy

When you set up an investment plan or strategy with us, your investment plan or strategy is rebalanced automatically, or we will send you a reminder to do so. This way, you can relax knowing that your investment plan is diversified and on track to meet your goals.

Crea8 offers free and automatic portfolio monitoring

In between the rebalancing date, we suggest that you enter cut loss and take profit orders. By using smart algorithms, we aim to cut your losses and let your profits run. Hence, you can sleep well knowing that your portfolio is monitored and up-to-date.

Backtest your strategies with 'what ifs' before investing

For any of the investment plans or strategies that you create, we let you backtest them and evaluate 'what-ifs' before committing your capital.

Crea8's Suite of Thematic Strategies

- FinTech and Digital Security
- Ageing Society
- Electric Vehicles and Driving Technology
- Smart Cities and Smart Homes
- Millennials and Sharing Economy
- AI and Blockchain
- Smart Factory

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Buvat, Jerome, and Ramya Krishna Puttur. 2019. "Smart Factory @ Scale". Capgemini Worldwide. https://www.capgemini.com/research/smart-factories-at-scale/.

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