

# **Industry 4.0, the Smart Factory, and Self-Service Industrial Analytics**

## **What's the Relationship?**

If you work in the manufacturing process industry, for some time now you've heard about Industry 4.0 and smart factories. And now you're probably hearing about self-service industrial analytics. You might be wondering..... Industry 4.0, smart factories, and self-service industrial analytics – what's the relationship? Well, I'll give you some background and explain this, starting with a bit of history:

### **First: The Timeline of the Industrial Revolutions**

I always loved studying history. I loved my university history courses because knowing what happened before gave me an understanding about where we are today. The same is true for understanding Industry 4.0; it's good to know the historical progression of manufacturing. I'll start by explaining the timeline of the four industrial revolutions and add a bonus about what's to come: Industry 5.0.

### **Industry 1.0**

**1784** – The first mechanical weaving loom was created which was the introduction to manufacturing processing. What followed was the introduction of water and steam to power mechanical manufacturing facilities.



## Industry 2.0

**1870** – The first production lines were established at the Cincinnati, Missouri (USA) slaughter houses. Add electricity to assembly line and division of labor processes, and you get the second industrial revolution.



## Industry 3.0

**1969** – Due to advancements in transistors and integrated circuit boards, the first programmable logic controller was built affecting a rapid development of computers and IT. Manufacturing thus became automated by the adoption of computers and associated software.



## Industry 4.0

**2011** – This industrial revolution was brought on by the information era and the Internet of Things (IoT) and the Industrial Internet of Things (IIoT). What resulted are plant ecosystems of connected industrial infrastructures of smart and autonomous systems fueled by data capturing, artificial intelligence, and machine learning.



## Industry 5.0

**(Inevitable, conceivably within 5 to 10 years)** The next industrial revolution will showcase manufacturing that uses greater team work and alliance between humans and smart systems, in particular robots. Smart machines will do the repetitive and dangerous work, and humans will do the creative work.



Industry 4.0 is here; it is reality. Modernization and technological advancement will continue, so it's time to embrace this fact. It's time to take action.

## **Second: The Smart Factory**

Think of a Smart Factory as a highly digitalized system of sensors and machines that are intricately connected through modular devices. Sensors throughout the factory capture immense amounts of data related to the operational process referred to as "Big Data".



Big data is commonly defined by the three "V's" – volume, velocity, and variety. The amount of big data is mind boggling – thousands of sensors on hundreds of different machines and processes continuously collecting readings every day. Envision this systematic data collection scenario, and you can understand the speed and array of the data.

This information can be historical time-series data and contextual data. Time-series data is created by continuously recording a value at different time intervals which can be from minutes to hours. This captured information is recorded and often resides in plant historians but could also be stored in SQL databases or data lakes. Another type of data is contextual data and includes information about quality, maintenance events, operational events, environmental conditions, and process performance. This information typically resides in external business applications. Smart factories allow for smart manufacturing which produces a heck of a lot of data and in turn can be used to better understand and improve factory operations. But who can make sense out of this big data?

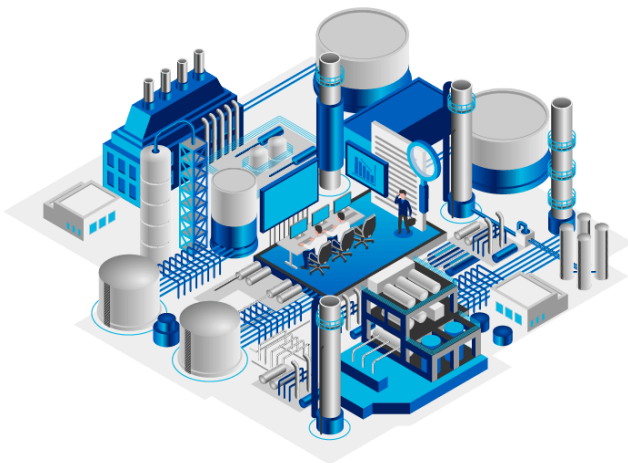
Traditionally, highly specialized data scientists would make sense of big data to provide the necessary information to plant managers to solve process problems. This work chain created a situation in which data was in the hands of a limited few thus creating data silos. By keeping data restricted, resources are wasted, and productivity is impeded. And this centralization of data leaves the immense untapped potential of subject matter experts who understand how the data relates to operational process.



If the data could be shared and put in the hands of process experts who know about the manufacturing process, then plant operation can be maximized. When process experts have access to the data, they can fully contribute to the running of the factory. In essence, you gain the full potential of your team and your plant. Data needs to be in the hands of the many – democratize information to maximize productivity – this is the way. And this is where self-service industrial analytics comes in.

[Learn more about smart factories >](#)

### **Third: Self-Service Industrial Analytics Software and Its Relationship with the Smart Factory**



Analytics is the interpretation of data patterns into meaningful and understandable information in order to make data-driven and thus informed decisions. Self-service analytics is a software that can be used by individuals at any level, not just data scientists, to make sense out of data and is one that is also easy to plug into the system, easy to learn, easy to use, and easy to understand.

Using pattern recognition and machine learning, a self-service industrial analytics platform makes sense of data retrieved from a smart factory. This capability gives experts a more thorough understanding of plant operations allowing them to make better decisions. It also makes it possible for the experts to solve process performance issues themselves without the help of data scientists who build complex and time-consuming data models to address issues. The result – experts can make faster and more effective decisions to maximize plant operation.

All of the data from the entire production and manufacturing process can be integrated and used to continuously measure, observe, check, and control the process. This software allows for increased awareness about what's happening everywhere in the factory. So you see, a smart factory is only a smart factory collecting but not using data unless you give your process experts a self-service industrial analytics tool to translate that data into information they can understand and use.

### **Final Takeaway**

**What's the final takeaway?** Industry 4.0 is now, and smart factories are reality. If your factory has not yet achieved digital transformation, it will. This is good because your smart factory will use thousands upon thousands of sensors to capture information about the manufacturing process. By using a self-service industrial analytics platform, your process experts can interpret and use the resulting big data to their advantage. They can analyze and monitor processes, solve problems, and even predict future problems. They will increase their understanding of the manufacturing process and be in a position to improve it.

Your key to success, your way to achieve production process optimization is to capture all your plant's data and to use a tool like TrendMiner's self-service industrial analytics to

translate it into actionable information. Industry 4.0, the smart factory, and self-service industrial analytics – there is a relationship.