

Smart Factory: Realizing the Potential of the Digital Revolution in Manufacturing

Executive Summary

The Smart Factory is the inevitable future of manufacturing. [According to a recent market analysis](#), Smart Factory initiatives will revolutionize manufacturing by enabling a 7X increase in productivity by 2022. The same analysis concluded that smart factories will accelerate on-time delivery of finished products by 13X, with quality indicators improving at more than 12X the rate of improvement since 1990. Capital Expense (CAPEX) and inventory costs are predicted to be rationalized by 12X and material, logistics & transportation costs expected to be rationalized at 11X the rate of improvement since 1990.

Industry 4.0, considered the fourth industrial revolution, is driving this transition towards smarter plant operations and more flexible production. This white paper shows how manufacturers can realize the potential of Industry 4.0 with real-time visibility and actionable insights from asset and operational data. This contextual visibility and control are the key forces to achieve the transformative business outcomes of Smart Factory.

Distinguishing Benefits of a Smart Factory

The Smart Factory is a leap forward from industrial automation. In a Smart Factory, ubiquitous connectivity of factory assets unfolds many unprecedented opportunities. Connected assets generate valuable operational data. Continuous monitoring of this operational data enables manufacturers to obtain real-time insight on asset performance and thus improve their situational awareness.

Connected and Optimized Operations for Agility

A Smart Factory helps unlock the value of more manufacturing data. A digitally-connected factory can integrate data from system-wide physical, operational and human assets to optimize operations. Actionable insights from the data can improve productivity, predict maintenance and track assets, among other things. The result is improved agility, reduced equipment downtime and a dynamic ability to predict and adapt production, leading to more flexible positioning in the marketplace.

Lower Operational Costs

The most compelling incentive that's driving manufacturers to adopt Smart Factory solutions is the reduction in operational expenses. A smart factory enables remote monitoring and data-driven control of operations in real-time. Remote monitoring coupled with data analytics capabilities enables early fault detection, and thus reduces the associated time and costs of addressing the problem. When the factory sites are geographically distributed, centralized remote operations management optimizes resource utilization and eliminates the need to dispatch personnel onsite. The associated operational cost reduction on an annual basis can make a significant improvement to the bottom line.



Case Study

Smart Factory Minimizes Asset Downtime

N3N's comprehensive Smart Factory solution enabled a global steel manufacturing company (POSCO) to detect and predict issues across their global operations with real-time visibility and control. This helped POSCO to reduce the mean time to detect and repair issues leading to \$4.2 million in maintenance cost savings.

Reduced Downtime

In manufacturing plants unscheduled downtime has been the main reason for lost productivity and is a large contributor to lost revenue. According to a study by analyst firm [Aberdeen Research](#), unplanned downtime can cost a company as much as \$260,000 an hour.

Critical asset failures largely contribute to these unplanned shutdowns. In [a survey conducted by GE Digital](#), 70 percent of respondents are unaware of when their factory equipment is due for either maintenance, upgrade or replacement.

Finding effective ways to predict and prevent asset failures on the factory floor has always been a challenge. A Smart Factory connects information sources and draws insights from their actionable data. Based on real-time analytics of this factory data, manufacturers can gain prescriptive and predictive insights for early fault detection, and subsequently minimize unplanned downtime, enhance asset performance and improve profitability.

Making the Transition to Smart Factory with N3N

In the era of Industry 4.0, Smart Factory adoption is a business imperative. However, the idea of implementing a Smart Factory solution can feel complicated, overwhelming or even insurmountable. The good news is that you probably have most of the infrastructure and data needed to take the first steps toward building a smarter factory.

N3N's operations visualization solutions have been proven to make smart factory adoption simple and effective for manufacturing companies. Leading global manufacturers trust N3N to deliver innovative digital transformation and IoT solutions to achieve powerful business and operational outcomes. N3N provides a feature-rich portfolio of capabilities to unlock the value of manufacturing data.

Centralized Command and Control

Manufacturing companies often have widely distributed site and field operations. One of the most effective initial actions you can take to speed up your Smart Factory journey is to centralize your disparate data sources in one place. Creating a single unified viewpoint where all your stakeholders can visualize key data helps you break down the walls of your existing disparate systems, providing much needed insight into the health of not just your machines, but when properly applied, your business as well.

N3N's visualization platform enables remote access and control of manufacturing systems and applications via a centralized command center. Using N3N, leading manufacturing companies have realized up to 500% reduction in annual global dispatch costs through remote operations management.

N3N's centralized command and control can integrate data from traditionally closed systems. By using N3N, LG Electronics was able to remotely monitor and control the systems within their manufacturing cleanrooms. Cleanrooms are dust-free zones with highly controlled access. N3N's remote control mechanisms allowed LG technicians to remotely monitor and perform corrective controls on plant equipment in the cleanrooms. The need for onsite equipment access was eliminated totally.

Intelligent Data Aggregation and Insights

Manufacturers are inundated with data from a multitude of disparate and often closed (legacy) manufacturing systems, machines and sensors. By seamlessly converging data from sensors, connected devices, maps, video and legacy equipment and displaying that data with the proper situational awareness and context, your teams will have visibility to the right data, in the right place, at the right time. The result: fewer missed deadlines, fewer backorders, lower lead times, lower production costs and higher productivity.

Device and Vendor Independence

Your team relies on a multitude of systems, devices and applications to keep your factory running at peak efficiency. Unfortunately, many of these technologies operate as closed, siloed systems that do not talk to one another. N3N's platform can layer on top of any IoT platform, analytics or BI tool, and intelligently display and visualize data. It is agnostic to data source, location, format or protocol; thus facilitating data aggregation from any sensor, connected device or closed system.

Scalable, Extensible and Secure Platform

For most factories, the migration to a Smart Factory will take place in stages. A state-of-the-art manufacturing operation processes a wealth of data. Applying an operations visualization solution on this existing data set already provides an operations team with valuable insights of - and production efficiency improvement of - their current operation. And as manufacturing units migrate to smart factory solutions, an ever-increasing number of assets and manufacturing sites will be digitally connected. To accommodate the newer sites, assets and data types, the operations visualization solution must be easily scalable and extendable; and at the same time be able to keep all your assets and data secure.

To support your migration to a Smart Factory, you need a data visualization solution that can be used and grow with your current factory, can be used when you integrate smart factory solutions and can be used to integrate geographically distributed operations. The N3N platform is designed to address a broad range of manufacturing use cases, and securely scales to your needs. The platform has been proven to scale from a simple use case to a very large, complex deployment such as a smart city. And it is extendable to allow manufacturers to painlessly integrate state-of-the-art IoT solutions specific to their business or industry.



Visualization in a Single View

State-of-the-art production machinery and equipment generate vast quantities of data on an ongoing basis. Utilizing this data, and presenting the data in the most effective way, is one of the challenges of next-generation manufacturing systems. Operations data visualization solutions help combine data from different processes and production equipment to produce a comprehensive visual representation of the entire production line or of multiple production lines. Whether your manufacturing operations are widely distributed across geographies with hundreds of video feeds to monitor your operations, or whether you are monitoring multiple production processes or a multitude of equipment in one location, not being able to see your entire operation in one glance is suboptimal. Your visualization platform needs to provide you with the single view of your operations for efficient production control and production optimization.

N3N provides complete visibility and control across complex manufacturing operations by providing a real-time integrated view of a sensor, map, video and other application data. Seamless integration with machine, SCADA, real-time industrial video and analytics enables early detection to predict manufacturing issues.

With N3N, Samsung Electronics gained a unified view of production data, global satellite maps, sensors and real-time feeds from more than 3,600 video sources to optimize facilities & operations management across plants in three different countries.

Real-time Condition Monitoring

In manufacturing sites, assets are often placed in remote field locations or in areas on the factory floor which are not easily accessible. Dispatching field technicians for both proactive and reactive monitoring of asset conditions significantly adds to operational costs. So does equipment downtime in the event of a failure. In a smart factory, manufacturers are able to remotely monitor asset performance in real-time across all their sites. This gives a significant boost to the bottom line by reducing operational costs and factory downtime.

Real-time condition monitoring allows your operators to detect events and anomalies and provides them with situational awareness in case of a safety, security or production emergency. Real-time monitoring is vital if you have - or are developing - a digital twin of an asset, factory floor or production process. The N3N platform integrates sensor and video feeds to deliver real-time contextual information. The platform provides manufacturers with tools for intuitive visualization creation and editing to build virtual copies (a.k.a. digital twins) of factory assets, factory floor and/or entire facilities.

Multi-dimensional topology mapping makes it easy to identify problems and to zoom in on the root cause.

Flexible Deployment Options

Due to both business and technical reasons, some manufacturers may not opt for cloud-hosted services. Your manufacturing use case also may require certain custom capabilities. However, these factors should not prevent you from harnessing the benefits of the advanced control and visualization capabilities of a Smart Factory solution.

The N3N platform has been designed for deployment either on-premise or in the cloud. N3N's operations visualization solutions are tailored to satisfy the unique needs and environment of any manufacturing organization. Operators can access data on the production floor or remotely via any browser-based device.

Embrace the Brave New World in Manufacturing

Industry 4.0 is redefining the bold future of manufacturing. Denying the digital transformation of manufacturing plants can be a costly mistake. This is the time to collaborate with the right partner to digitally transform your manufacturing operations. N3N's globally proven Smart Factory solutions can greatly simplify your digital roadmap. Our cutting-edge yet easy-to-deploy solutions can fully optimize your factory processes, control every aspect of your business operations and ultimately enable you to achieve greater success.

Sources

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