Unlocking the power of data in factories

Part 1: Benefiting from data as an operations manager in industry

orange™ Business

Tomorrow's industrial winners will be those that fully exploit data

"Manufacturers face an ongoing challenge: how to increase speed and agility while simultaneously reducing costs and risks in the production process. In this series of ebooks, we explore the benefits of developing a comprehensive data utilization strategy for industrial facilities, along with practical advice on implementation.

Digitalization and automation play pivotal roles. They empower shop floor personnel to optimize continuous data flows, gaining valuable insights into product lifecycles and production processes for informed decision-making. By integrating advanced technology, companies can streamline processes, optimize resource allocation, enhance productivity, reduce errors, and enable real-time monitoring.

Effective data management provides shop floor teams with meaningful insights into production line activities and beyond, serving as a foundation for intelligent decision-making. Leveraging data collected across the production environment allows factories to secure processes and operations while optimizing overall performance to maintain a competitive edge."

Emmanual Routier,
Vice President Smart Industries,
Orange Business

Benefiting from data as an operations manager in industry

Data can unlock many business benefits. We highlight some use cases and approaches to getting the most out of your industrial data.

According the World Economic Forum[1], effective use of data in manufacturing is essential to making businesses more sustainable and profitable. It is an abundant source of wealth, particularly for production, quality control and maintenance operations.

However, the use of data on industrial sites is far from widespread and is not yet optimized. In fact, the WEF reports that only 39% of manufacturing executives had successfully scaled data-driven use cases beyond a single product.

So how can manufacturers unlock the value of data in factories? Are they aware of all the benefits? Is the implementation of these data valuation strategies under control? Operational managers are the key to success in data projects, and in this ebook, we highlight the business benefits and use cases enabled by data in factories.

80% **of machine-generated data in the data economy remains unused to date, according to the European Commission[2]**

Our experts' opinions

Olivier Chapel, Manufacturing Excellence Organization group manager & Industry 4.0 at L'Oréal

"As an industry operating in a constantly evolving landscape, we face challenges such as meeting consumer expectations, competitive pressures, and aligning our production methods with increasingly ambitious environmental goals.

The key to success lies in establishing a global and harmonized approach to industrial data utilization. Several years ago, we created a substantial data lake, granting as many collaborators as possible access to our collected data. It functions like a self-service data repository!

While we did need to train operational managers in the field, the concept has gained significant traction. We no longer need to promote Power BI internally."

Managing production more effectively

The first area to leverage data is managing production more effectively; and there are three aspects to this.

1 Thinking about productivity beyond overall equipment effectiveness (OEE)

The OEE indicates the utilization rate of a machine by comparing its actual output with its theoretical maximum output. However, other factors need to be considered to assess the real productivity of industrial sites. Combined with the OEE, production data such as machine settings, raw material types, and quality control results provide an overall understanding of productivity and identify areas of improvement.

2 Improving operator's safety and motivation

Providing real-time data access to operators can significantly reduce the effort required in undertaking manual machine information checks. This not only alleviates worker fatigue but also enhances concentration, safety, and overall performance.

Even if the data already exists and is visible on the human-machine interface, delivering it to the right person at the right time requires dedicated tools and effective global data management.

Involving machine operators in reporting, quality control, and data utilization is also motivating. They benefit from a simplified daily routine and are empowered to improve key performance indicators (KPI).

3 Golden Batches and Digital Twins

"Golden Batches" enable manufacturers to consistently reproduce high-quality products. These batches represent the optimal production standards, ensuring synergy among equipment, materials, processes, and other production aspects.

However, reproducing Golden Batches is a complex process. It involves identifying the optimal setpoints on production lines and having access to robust, reliable databases.

Enter Digital Twins. By modeling the manufacturing environment, they allow for more cost-effective production with higher output. At the same time, production managers can use Artificial Intelligence (AI) to validate predictive models by identifying inconsistencies and making necessary corrections.

Read more about Digital Twins here

Anticipating and optimizing maintenance operations

The next area where data can make a difference in factory operations is through improving and optimizing maintenance activity. This includes implementing condition-based and predictive maintenance.

Analysis of multiple data points such as breakdown history, machine parameters or what type of raw material, allows factory operators to identify normal production conditions. In turn, they can then detect deviations, along with anomalies or failures that can impact the production process. Using data in this manner allows them to react quickly to a problem, or even anticipate a problem before it occurs.

To take this a step further, predictive maintenance uses a history of situations and machine learning to statistically predict the evolution of equipment deterioration and certain other events, such as machine breakdown.

Benefits of this approach include:

- Reducing machine downtime
- Cutting back the time to restart machines
- Replacing parts at the right time: preventing breakdowns while avoiding too-early replacements
- Improving team confidence
- Setting-up automatic alerts
- Facilitating equipment diagnostics: identify frequency, origin and causes of anomalies

$1.5 trillion

A Senseye report predicted that unplanned downtime cost Fortune Global 500 industrial companies almost $1.5 trillion in 2023, 11% of their annual revenues[3]

Our experts' opinions

Pablo Lluch, Senior IoT business Expert, Orange Business

"On an aircraft, changing a faulty electrical cable only costs a few thousand dollars, but the aircraft downtime can cost the operating company up to $150,000 an hour. That's a worrying thought.

By combining IoT and AI, assets can be better mobilized. Continuously collecting data from equipment an combining it with other external data, such as meteorological or historical data, allows manufacturers to better plan their maintenance operations. This anticipation increases machine availability, reduces costs and therefore increases profitability."

For further information on predictive maintenance and artificial intelligence read here

Improving quality processes

The final area where data can deliver benefits for manufacturers is in improving quality processes. There are three different ways it can does this as outlined below.

1 Optimizing production quality and reducing scrap rates

The waste issue concerns all manufacturers, especially in highly regulated sectors such as pharmaceuticals and cosmetics.

Scrap is associated with environmental factors such as temperature, humidity, machine failures, and material quality. By analyzing data related to these factors, you can pinpoint their exact causes and address them at the source. The result: improved compliance rates, time savings, and reduced financial losses.

2 Facilitating quality control through product traceability

The quality of a product is influenced by the characteristics of its raw materials. Data collected throughout the manufacturing process allows us to trace the entire value chain of the product and quickly certify its conformity. This includes details about raw materials, manufacturing dates and locations, material quantities, and production conditions.

An additional benefit is that it helps meet quality requirements set by customers and regulatory authorities.

3 Conducting more appropriate controls

Access to more data facilitates the study of a broader range of characteristics in isolation. By carefully selecting the most relevant data, precise controls can be conducted at various points throughout the manufacturing process.

Additionally, new types of controls are emerging. For example, analyzing product appearance using video data and AI enables quality managers to perform automated inspections using only computer vision.

Our experts' opinions

Virgile Dier, Product Manager, Mixed Reality and Computer Vision at Orange Business

"In industry, the risks of non-compliance are a daily problem and are becoming more complex. New standards and regulations, growing customer expectations and an increasingly competitive environment mean that production line operators are faced with new challenges. To maintain or restore their productivity levels, highly efficient and cost-effective solutions exist, such as those offered by computer vision."

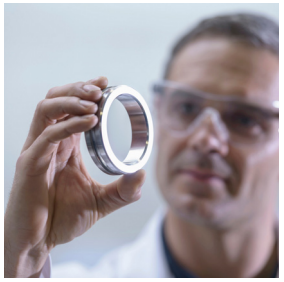
Industrial data success stories

We have worked with a wide variety of customers to realize the value of their data. We have listed some examples below.

Indoor 5G for new industry 4.0 use cases

Orange has rolled out a private, virtualized indoor network meeting industrial requirements at the Schneider Electric site in Vaudreuil, France. This co-innovation approach ensures convergence between information and operational technologies (IT/OT), and allows the company to test out innovative use cases.

Read more



Smart tracking for tooling

Thanks to IoT and a smart tracking solution, Safran Aircraft Engines is optimizing the traceability and management of its equipment in a 55,000 m2 building.

Watch the video

New services thanks to IoT data

Veolia Water is transforming its IoT data into high value visual information thanks to a dashboard-as-a-service offering. This has been realized through a strengthened business data collection infrastructure.

Read more

Machine Learning for quality

World leader in manufacturing cables for the energy and telecommunications sector, Nexans has automated its quality check process by using machine-learning to continuously monitor production lines and report any problems.

Read the article

Smart Tracking for Inventory management

The Santos Group is using data to better manage its stock of 2,500 spare parts. The lead time to find a spare part has been considerably reduced from 15 minutes to 15 seconds.

Watch the video

Why Orange Business

Orange Business has a unique skill set as a global integrator, communications operator and service provider along with genuine experience of the industrial world.

- More than 26,000 customers in the industry sector
- 33% of our key international customers are manufacturers
- Specific IoT approach for industry, its infrastructure, and its products
- Cybersecurity expertise tailored to the specific environment and challenges of industry, with expertise from 3,000 cybersecurity experts at Orange Cyberdefense
- Networks designed for connectivity that meets your production requirements, including LoRA, PMR, 4G, 5G, industrial LAN and edge computing

Recognized data and AI expertise

- European leader in Data and AI
- More than 700 IoT and data analytics experts
- More than 50 Orange-approved sensors

Nine success factors

At Orange Business we consider the following nine factors are essential for success in industrial data projects.

1. **Knowledge of the industrial sector (references, jargon, understanding of processes, etc.)**
2. **Data / AI specialization**
3. **Ability to manage the valuation data project from A to Z**
4. **Supply of resources needed to roll out a POC and scale it up**
5. **Expertise in the choice and management of fixed and wireless networks**
6. **Cybersecurity solutions tailored to industrial production environments**
7. **Consulting, global support and change management**
8. **Ability to find external funding to subsidize the project**
9. **Independence regarding industrial OT equipment set up in plants**

We have developed a Operational Xperience factory demo to show the Orange Business capabilities in delivering industrial data projects based on an example of a coffee capsule manufacturing line.

Find out more here

Sources

1. https://www.weforum.org/agenda/2022/09/manufacturing-data-advanced-analytics/
2. https://link.springer.com/article/10.1007/s10657-023-09787-4
3. https://blog.siemens.com/2023/04/the-true-cost-of-downtime/

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