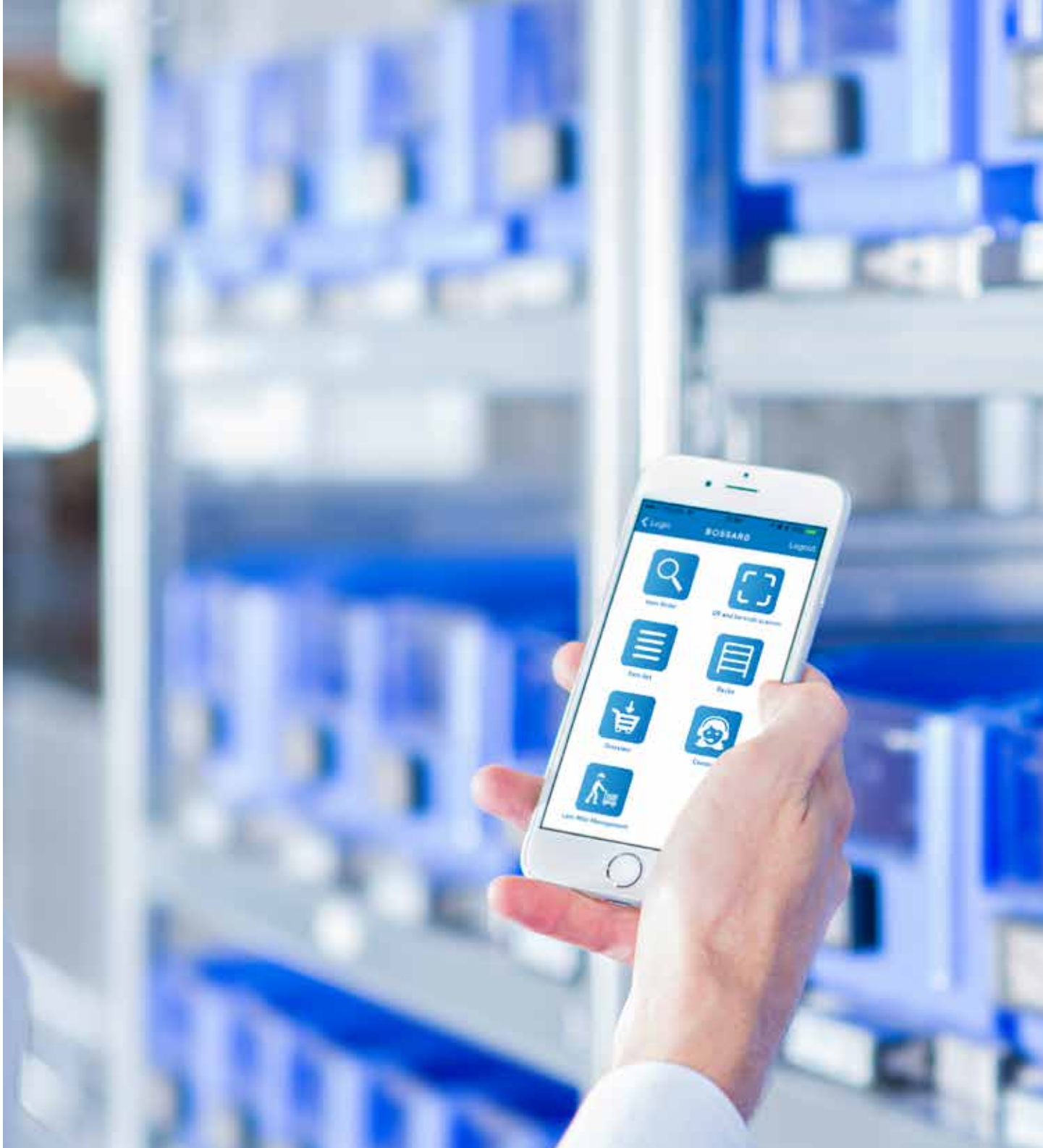




How will Industry 4.0 impact your supply chain?

A Bossard Q&A eBook



While many still discuss the term and meaning of the Fourth Industrial Revolution, Bossard launches a concrete methodology that prepares manufacturers for change: Smart Factory Logistics.



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What is Industry 4.0 and the Internet of Things all about?

The First Industrial Revolution occurred with the advent of several new manufacturing processes in the late 1700s and early 1800s.

These processes included harnessing water and steam power to mechanize production, the development of machine tools, and new chemical and iron production processes. Manufacturing booms along with an agricultural revolution in Britain led to gains in both average income and population. The First Industrial Revolution evolved into the Second Industrial Revolution in the mid-1800s as mechanical advances gave way to technological growth.

The Second Industrial Revolution created a wave of globalization as utilities, telegraph, and railroad networks expanded allowing for greater movement of people and ideas. Advances in electrical power spurred the growth of mass production and the factory line.

The Digital Revolution, otherwise known as the Third Industrial Revolution was spurred by the widespread adoption of new digital technologies including the PC, cell phones, and internet. In addition to further promoting globalization, this information technology was also used to automate production.

Now the Fourth Industrial Revolution, Industry 4.0, is occurring and it is giving us Smart Factories. Industry 4.0 is the **culmination** of **several technological innovations** all coming to the forefront; **sophisticated sensors, cloud computing, 3D printing, artificial intelligence,** and **advanced robotics.**

These connected devices utilize RFID, Wi-Fi, cellular networks and other technologies to communicate with each other and the cloud to become the Internet of Things. Outside of industry this includes

the Fitbit you're wearing, the app that you use to control your in-home LED lighting, Amazon Echo, Nest thermostats, and other apps for alarm systems, appliances, and even pet feeders. In terms of industry, this revolution entails the utilization of cyber-connected systems which monitor factory processes to **maximize efficiency** and reduce downtime.

FACTORIES AND BUSINESSES THAT HAVE ADOPTED INDUSTRY 4.0 SHARE FOUR COMMON CHARACTERISTICS:

- **Interoperability**
Whether machine, server, sensor, or other; devices must be able to communicate with each other
- **Information Transparency**
Connected devices must be able to create and record data to add context to what is being observed; a virtual copy of the physical world created through sensor data
- **Technical Assistance**
Systems should be able to assist with tasks otherwise difficult or time-consuming for humans as well as support human decision making
- **Decentralized Decisions**
Based on recorded data, systems should be able to push forward processes and make decisions to become as independent as possible

What role is IoT playing in the industrial space?

Previously many of these technologies were emerging on their own, but not considered collectively.

With a recent push toward an integrated approach, the Internet of Things, the focused effort is much more clear. While efforts are being made to allow technologies to be more interchangeable and data non-exclusive, much of the progress thus far has been disjointed. Examples of current IoT integrations include the following:

- Energy savings through machine level energy consumption metrics
- Real-time and historical production visibility in one place
- Alerts and notifications for real time condition monitoring and predictive maintenance for machine
- Machine data analytics available anywhere at any time
- Ability to plan increased or reduced production rates allowing for optimal production planning
- Radar detection and RFID signals to send data regarding consumption or remaining container capacity and more
- Enhanced communication with technicians either line side or in the field to better diagnose potential issues and lead the worker through systematic processes via glasses, tablets, or other devices
- Enhanced communication with other geographical areas (i.e. other machines in other factories); multiple factories work much more systematically together breaking down barriers for multi-location corporations

There are certainly **endless opportunities** depending upon which scenario or process one is working to make better; some of which have widespread applicability whereas others may be limited in application range. In the end, the resulting data should work to achieve a desired goal or lead to a process improvement.

What options are available in the supply chain?



While machine to machine communication on the factory line is a significant stride in increasing operational efficiencies, and reducing downtime, it is all for naught if the raw materials are not on hand. IoT innovations have been implemented within your suppliers and within your own factory but are they connected to create an end-to-end solution?

When it comes to the supply chain much of the innovation being discussed in factories has instead been regarding the tracking of large pieces within the factory via RFID. Other IoT implementations have included measurements of factory conditions or tracking of product type to customize the product production route based on set variables.

Unfortunately, IoT solutions have mostly been slow concerning working hand in hand with suppliers. Apart from shipment tracking, the delivery of and monitoring of purchased raw materials have largely been ignored in the supply chain aspect of manufacturing. Attempting to fill this void the Bossard Group has created a Smart Factory Logistics methodology to provide full inventory transparency and enable you to have a true end-to-end smart factory or inventory center.

What does full inventory transparency provide?

Full inventory transparency provides five key advantages:

1. Visibility

At its very root, full inventory transparency gives you instant access to knowing what you have, where you have it and how long it has been there. When tied in with your suppliers it can also provide reorder lead times and provide a historical record of previous orders. From an ROI perspective, access to this information allows for the reallocation of resources previously dedicated to cycle counts, audit prep, and the reordering of material.

2. Inventory management

As a result of the visibility of the stock on hand, supply management becomes an art form. Visibility of quantities and how they change over time allows you to confidently adjust reorder quantities and reorder in a timely manner to **improve efficiency and cost**. This ultimately provides maximum savings on order management cost and a significant reduction in material handling cost.

3. Supplier relationships & customer service

As a customer, your experience with suppliers has an opportunity to improve when they are granted visibility into your stock. When suppliers can plan based on actual inventory levels rather than working with poor forecasting, they will be **more prepared** when your actual order comes in.

If you are a job shop or company that produces custom products, accurate production times can be realized with full transparency into raw material levels or measurement of existing completed product.

4. Loss management

Whether it's on the way to your facility, in your warehouse, or a finished product ready to be shipped to its destination it's almost impossible for inventory to "fall off the truck" with **sensors tracking** how much product you have and where it's at. If something does go missing, data will be able to paint the picture of when and what factors may have led to it.

5. Operational efficiency

As opposed to inventory being departmental or dated information being sent to management; IoT integration into the supply chain allows for real-time visibility to all who see fit. Having this information shared at every level, between departments, and between facilities allows deficiencies to be **quickly identified** and **remedied**. Delays, waste, overconsumption, and inefficient ordering and processes are also made transparent to multiple levels.

What does Bossard offer?

The Smart Factory Logistics methodology created by Bossard meets customer needs and makes inventory management leaner and more agile.

Bossard has three specific solutions to make your facility smarter:

- **Customer-specific evaluation**

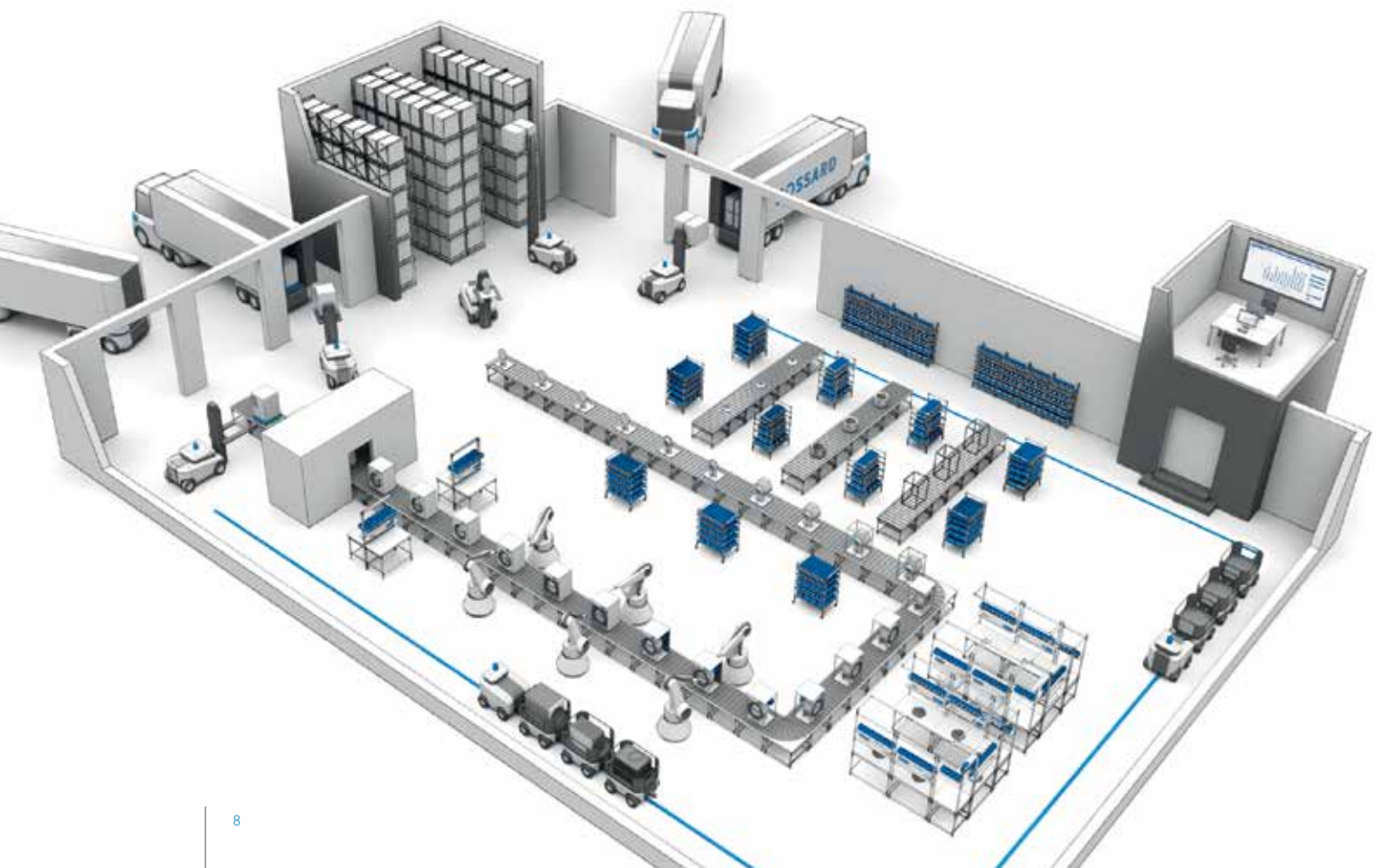
The Smart Factory Logistics approach includes a comprehensive logistics management analysis of delivery, supplier consolidation, operation and maintenance, and even encompasses strategic customer consultation. Smart Factory Logistics systems are engineered to suit different manufacturing environments and production setups ensuring maximum operation flexibility.

- **Intelligent systems**

Patented technologies like SmartBin and Smart-Label communicate the current inventory levels from warehouses, holding areas, or lineside. Automatically triggered orders and replenishment means you have exactly what you need when you need it.

- **Big data software creates transparency**

With our own supply chain collaboration software, ARIMS, we can collect and deliver data on a large scale to create transparency. Beyond plotting usage and deliveries, ARIMS can be used to plan and implement an increase or decrease in planned production.



Check out our intelligent systems:



SmartBin

This unique, fully automated system with sensor monitoring is ideal for supermarket area and line assembly. SmartBin **manages anything** from small parts weighing just a few grams to large parts up to 2,000 pounds per pallet. **Weight sensors** ensure continuous inventory monitoring. Orders are triggered **automatically** and enable a seamless supply.



SmartBin Flex

SmartBin Flex consists of a **weight sensor** that is firmly connected to a bin. Each box is an independently that can be flexibly integrated into an existing point of use layout.



SmartLabel

SmartLabel is an **intelligent label** which can be fixed on every possible storage bin. It displays all relevant product information as well as real-time order status and delivery date. Users can also release orders directly at the point of use at the touch of a button. The SmartLabel display is based on **e-paper technology**. It is easy to read under all lighting conditions and a long battery life ensures minimal maintenance.



How does Smart Factory Logistics affect other aspects of my operation?

Smart Factory Logistics answers the most basic need of supply chain management: **how much do I have and where do I have it?** The confidence that your material is on hand ensures that your operation stays running, both eliminating line down situations and ensuring that your other IoT integrations with M2M are fruitful.

Beyond just ensuring that you have product, however, it ensures that you have **product on hand but not any more than necessary.** It can be unnerving to reduce days of supply for fear of running out of raw material and going line down, but when you are effectively managing your existing inventory and

incoming replenishments via proven IoT you reduce dollars wrapped up in excess inventory, thereby adding to free cash flows.

Custom integrations with ERP software or working with pre-existing APIs cannot only trigger the automatic reorder points for line side delivery or supplier purchase orders but can also automate invoicing and freight signals to ensure timely delivery and payment. When all deployed correctly, IoT integration into your supply chain removes the guessing, increases the bottom line, and keeps your business running.

About the Bossard Group

Founded in 1831 and headquartered in Zug, Switzerland, the Bossard Group is a market leader in specialized components worldwide. For the last nearly **twenty years**, Bossard has worked diligently to become even more efficient in the **sourcing, procurement**, and **delivery** of these engineered parts through the Internet of Things.

From the early days of barcode scanning, Bossard quickly realized greater potential existed. Partnering with **RWTH Aachen University** in Germany, Bossard worked alongside other IoT leaders such as SAP to create a model of Industry 4.0 upon its inception. Through the use of RFID, Wi-Fi, and cel-

lular technologies, Bossard now has the product, software, and support to digitally visualize your supply chain and run **as efficiently as possible** with the power of inventory data at your fingertips.

For more information visit www.smartfactorylogistics.com.



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