7 TECHNOLOGIES TO ACHIEVE INDUSTRY 4.0 INNOVATION, TODAY

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WHITE PAPER +
CASE STUDY +
COMPANY OVERVIEW

7 Technologies to Achieve Industry 4.0 Innovation, Today

Introduction

Industry 4.0 technologies are revolutionizing industry. Many companies have adopted these technologies to revamp their processes, resulting in dramatic gains in productivity and efficiency. These companies are undergoing digital transformations to change how they manufacture and/or distribute their products. These enterprises have increased their information collection on their factory or warehouse floors and set up real-time networks to collect the data. They analyze this data resulting in powerful insights, better decision-making, and massive innovation. Industry 4.0 adoption can lift the curtain on all facets of an industrial operation, making the unseen now visible.

Here are 10 industry 4.0 technologies companies can adopt today to drive innovation.

1. **Network & Connectivity**
2. **People Positioning Intelligence (PPI)**
3. **Internet of Things (IoT)**
4. **Cloud Computing**
5. **Big Data**
6. **AI & Machine Learning**
7. **Digital Twin**

Network & Connectivity

Companies will benefit greatly from this new technology as the world moves from 4G to 5G with its approximately 10x speed improvement. 5G uses its 5G New Radio interface and other technologies to provide faster speeds, reduced congestion, and lower latency. 5G uses dramatically higher radio frequencies, 28 GHz, than 4G's 700 MHz - 2500 Mhz. While 4G can support about 4,000 devices per square kilometer, 5G will support around 1,000,000 devices per square kilometer. Currently, latency for 4G is approximately 20-30 milliseconds, but for 5G, it will be under ten milliseconds, and in some cases, around one millisecond. While consumers won't probably notice the difference in latency, it will be critical for manufacturers with remote-controlled heavy machinery.

➔Get Started Today (Network)

Manufacturing, logistics, and warehousing companies should look at 4G, 5G, Wifi and mesh networks to build a foundation for technology adoption. Having a robust network will allow your organization to reap the benefits of Industry 4.0 technology.

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2. People Positioning Intelligence (PPI)

People Positioning Intelligence (PPI) technology gives manufacturers and warehousing operators the ability to know where all their employees are and where they have been in real-time. PPI is like IoT but for People. For many industrial operations, the only data about the whereabouts of their employees is when they clock in and when they clock out. It is impractical to track and analyze the location of hundreds or even thousands of employees on the factory or warehouse floor until now. Companies can improve productivity by using PPI to analyze individual workforce location and movement patterns over time to discover ways to optimize floor layout and routes. Labor costs can be efficiently managed by any measure – by shift, role, SKU, and work zones. Companies can improve worker safety with real-time whereabouts of all individuals during an emergency or by alerting the worker they have entered a forbidden work zone.

➔Get Started Today (PPI)

Volan Technology is a leader in People Positioning Intelligence for manufacturing, logistics, and warehousing operations. We shine a light on the movements of your workforce, allowing your company to increase efficiency, reduce unproductive hours and maximize profits. Our VPS (Volan Positioning System), like GPS but for industrial workers, can be quickly installed at your location and is completely wireless.

3. Internet of Things (IoT)

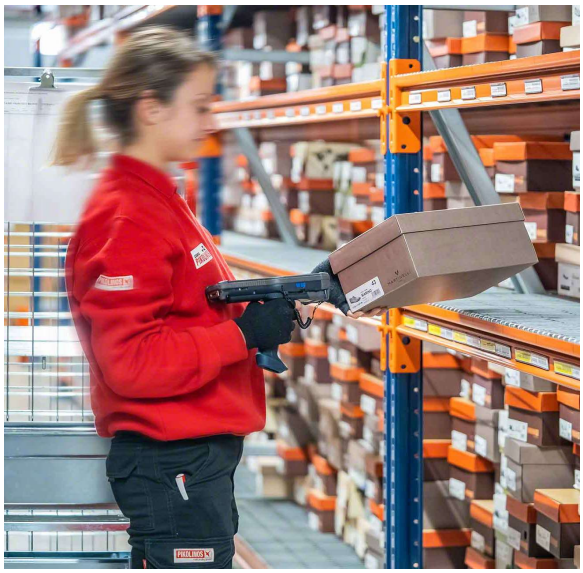
A manufacturing floor has many people and many things. All these things like machines, trucks, forklifts, etc., can be equipped with sensors with an IP address to connect with other internet-enabled devices. The network connectivity makes it possible for enormous amounts of critical manufacturing data to be collected and analyzed. IoT and its cousin, IIoT (Industrial Internet of Things), allow manufacturers to optimize their production machines and reduce their inventory management, leading to cost reductions. IoT allows for a shorter time to market as production can be cut dramatically.

➔Get Started Today with IoT

Companies use IoT in their manufacturing and warehouse operations to identify efficiencies and reduce production time. Harley-Davidson used IoT at one of its manufacturing facilities to reduce the manufacturing time to produce a motorbike from 21 days to 6 hours.

Volan Technology Success

Using our PPI solution, one of our customers was able to identify over $10M in labor efficiency at one factory (see our case study on page 6).



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4. Cloud Computing

Cloud computing and network connectivity are the foundation of any Industry 4.0 adoption. Uploading data to the cloud with no limits on capacity and where it can be processed more efficiently and cost-effectively. Knocking down internal silos allows various departments, including engineering, production, sales, distribution, supply chain, accounting, and customer service, to connect seamlessly. The cloud enables each factory to communicate with other factories and suppliers, vendors, partners, and customers to streamline and accelerate production. The benefits of implementing cloud computing for your company are numerous.

- **Cost:** Cloud computing is generally less expensive than in-house servers, which must be maintained and upgraded.
- **Reliability:** Cloud computing is more reliable than software on individual computers.
- **Scalability:** Your business can quickly and easily scale or downsize, depending on your business outlook.
- **Consistency:** Software-based software is consistent across your organization, removing the need for software upgrades.
- **Competitive:** Cloud-based companies have a competitive advantage in communication efficiency and productivity over machine-based companies.

5. Big Data

Companies need big data to leverage AI, machine learning, and Digital Twins technology. Big data is only possible because of Cloud Computing. Big Data has several characteristics that conveniently all start with the letter V.

- **Volume:** Big data is enormous. While there isn't a minimum amount, big data is usually measured in terabytes.
- **Variety:** Big data has many different types, including structured and unstructured data, processed and stored in the same computer system.
- **Velocity:** Big data includes real-time data that is generated at a swift pace.
- **Veracity:** Ability to quickly measure how accurate and trustworthy different data sets are.
- **Value:** The business value of big data must be understood to use the data effectively.

➔Get Started Today (Cloud)

By 2025, there will be over 100 zettabytes of data stored in the cloud. To put this in perspective, a zettabyte is a billion terabytes (or a trillion gigabytes). Your competitors are using the cloud, for its productivity and cost-savings benefits.

➔Get Started Today (Big Data)

There is no shortage of big data solutions for your big data implementation. The key is to lay out a vision and ensure that your company's business objectives are aligned with that vision. Identify all the available data sources and how you will collect the data. Create a project roadmap that prioritizes the big data use cases and identifies gaps in your big data architecture.

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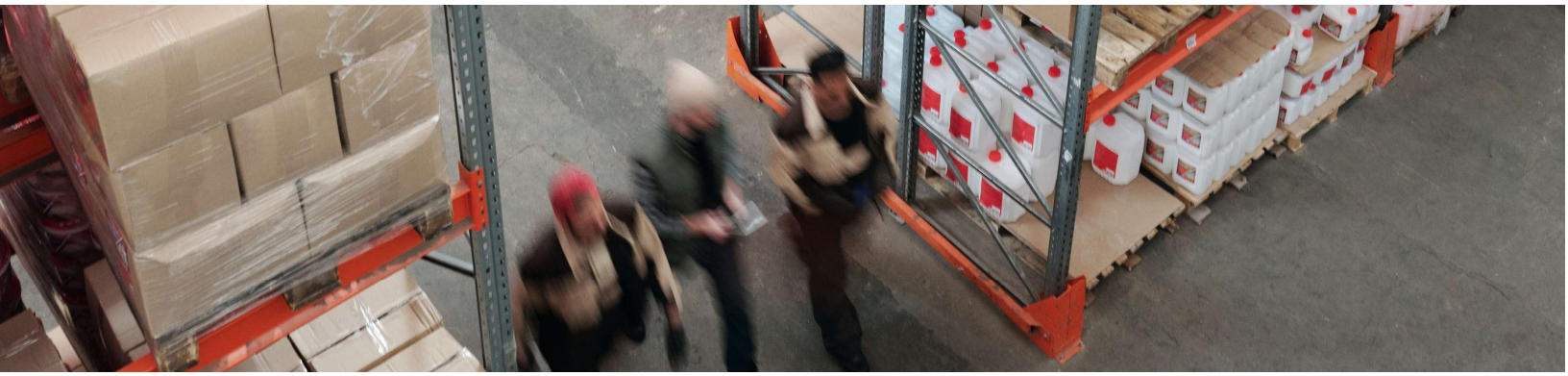
6. AI and Machine Learning (AI & ML)

Artificial Intelligence is a system or group of machines that mimic human intelligence to perform tasks. The system has "intelligence" to iteratively improve using machine learning to perform tasks hundreds, thousands, or even millions of times. Manufacturing companies can use this technology to analyze all the functions performed on the factory floor and across the organization. New processes are recommended and implemented. The cycle is repeated indefinitely, driving improvement. These technologies allow for better forecasting, production, and efficiency. AI and machine learning can create a predictive maintenance schedule based on historical data, resulting in more machine uptime and higher efficiency and saving time and money.

➔Get Started Today (AI & ML)

Companies are implementing AI and Machine Learning Today. Adoption of these technologies accelerated during the pandemic as companies took the opportunity of reduced demand and the new marketplace reality. Here is a good article about how to get started with AI and machine learning.



7. Digital Twin

Digital twin technology allows manufacturers and warehousing companies to create a virtual copy of their factory and warehouse floors, outlining all manufacturing processes, production lines, warehousing, and supply chains. Digital twins are created by pulling the location data from machine sensors, people location data, and vehicle sensors. Manufacturers can use digital twins to run scenarios to improve productivity, realign manufacturing workflows and create new products. Companies spend an estimated $350 billion a year on warehousing, so it is advantageous to use digital twin technology to virtually experiment with different floor plans, process workflows, SKU mix, seasonal demand scenarios, and other variables.

➔Get Started Today (Digital Twin)

Digital twin technology is available today, leveraging AI, machine learning, and big data.

- Manufacturing can dramatically improve product development, refine production lines and enhance predictive maintenance.
- Warehousing companies facing international pressure to reduce costs and increase speed can use digital twins to stay competitive.

Volan Technology Case Study

Fortune 500 Manufacturer

Company uses Volan Positioning System to crack the code on actual labor utilization and identify true cost of production

The Company

- 11B in Revenue 40K Employees
- 90 Facilities in 15 Countries
- 500 Production Machines
- 24x7 Operations

The Scope

- Digitized movement of workforce Instant access to actionable reporting
- Independent self-healing network works with zero impact on existing infrastructure
- 1 factory
- 3 work zones
- 1 of 17 machines geofenced

Objective

A globally recognized flooring manufacturer had a costly blind spot. They did not know their true labor productivity during production. This was causing issues with managing their workforce, planning resource allocation, and identifying cost savings opportunities. Without visibility into their true cost of production, they had no way to identify and prioritize high margin SKUs over low margin SKUs.

Solution

Volan implemented its Volan Positioning System (VPS) and analytics software as a continuous improvement operations platform. Work zones and machines were digitally geofenced with network sensors. As workers move in and in between the geofenced work zones, wearable sensors publish location information to the network every few seconds. VPS collected millions of data points that were analyzed by Volan's analytics engine and transformed into meaningful, actionable reports. The information provided allowed the operators to immediately improve productivity and reduce operating costs.

Results

- Hours of Unproductive Labor Time: Identified 12,500 annualized hours of unproductive labor time and a 20% difference in estimated vs. actual hours. This enabled more accurate resource planning and P&L reporting.
- Where Labor Spends their Time: Discovered exactly where, what and how much labor is spent across the site by day, time, machine, shift, job, and role. This allowed for unprecedented operations optimizations.

Customer Financial Impact

- $10M annual labor cost savings in one facility.
- 71% average difference in assumed vs. actual cost of production by SKU, allowing for effective pricing.

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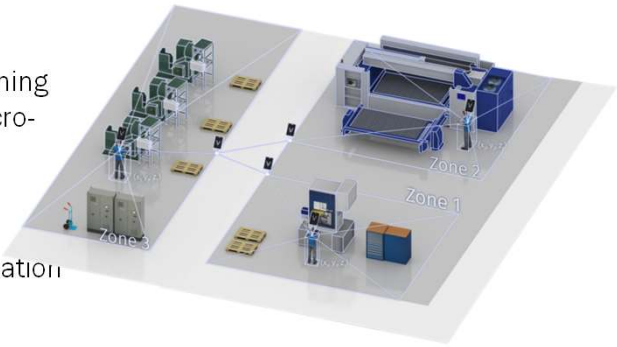
About Volan Technology

What We Do

Volan Technology provides People Positioning Intelligence Solutions to manufacturing, logistics and warehousing companies. Our Volan Positioning System (VPS) technology provides actionable insights from real-time micro-location data.



Our Technology

The Volan Positioning System(VPS) is an entirely new real-time micro-location technology built to optimize labor productivity.

How It Works

- Wireless sensors form a dynamic, self-healing mesh network that geofences the worksite.
- Every few seconds, wearable sensors stream data packets with rich location information through the network.
- Location data streams through a gateway to our encrypted cloud analytics platform.
- The self-healing mesh network ensures data is always flowing. If one sensor fails, another mends the network.
- Credit card sized sensors form the dynamic mesh network.
- No wiring or network integrations make for a fast & flexible deployment.
- Zero dependency on WiFi, cellular, GPS, or smartphones.

Manufacturing Solutions

Volan's technology provides a real-time view into people's precise location and movements, resulting in powerful insights to improve your key metrics.

- **Maximize Productivity:** Identify, measure, and analyze unproductive time to optimize site layout and reduce bottlenecks.
- **Manage Labor Cost:** Discover and reduce actual labor cost by any measure – by shift, by role, by SKU, and work zones.
- **Improve Worker Safety:** Monitor the whereabouts of all workers to restrict access to dangerous work zones.
- **Reduce Turnover Costs:** Identify your most productive workers to improve retention.

Logistics & Warehousing Solutions

Volan provides a real-time view into people's precise location and movements, streamlining your operations to reveal labor cost savings.

- **Pick Task Intelligence:** Assign pick tasks to the worker nearest to the bin. Eliminate unnecessary time and movement with each pick task.
- **Workforce Measurement:** Identify, measure, and analyze unproductive time to optimize site layout, eliminate bottlenecks and reduce time in transit.
- **Talent Recognition:** Identify your most productive workers to incentivize retention and reduce turnover costs.
- **Accounting Insights:** Capture labor cost by pick task, by shift, by product category, or by customer.