

What Lean Manufacturing Means in the Age of IoT

Manufacturing operations executive's guide to streamlining plant operations with accurate job time tracking



EXECUTIVE SUMMARY

Anyone responsible for manufacturing operations has to deal with a long and growing list of potential headaches. Workforce shortages, high labor costs, inefficient workflows and more can make “improving productivity” a finish line that never gets closer. Demands to eliminate inefficiencies are never-ending and the complexity of many operations doesn’t allow for easy analysis. Optimizing workflows and specific segments of the manufacturing process is too often a case of trial-and-error when it should be driven by precise analysis based on hard data.

But where does that data come from?

The challenge doesn’t stop there. Every element of the manufacturing process needs a separate dataset to deal with its own unique issues and configuration. Before productivity can be improved, inefficiencies have to be identified and measured. Your ability to recognize areas of potential improvement is only as good as the methods you use to understand where the inefficiencies come from. Manual productivity and labor time reporting is prone to error and inaccurate. Digitization of physical workflows is the only way to achieve the insights needed to gain a competitive advantage through truly lean operations.

Yes, digital transformation applies to all areas of business, including manufacturing. Sorry, make that especially manufacturing.

The IoT offers easily deployed and managed, scalable solutions. Manufacturing operations executives are turning to IoT to provide them with location services and data to improve cost visibility, increase labor productivity, and improve planning and scheduling. Equipped with such data, they can reduce their costs, increase throughput, reduce inventory, and price their services more accurately.

In short, they’re boosting every KPI they have.

This whitepaper will introduce you to:

- What motivates manufacturing companies to rethink their productivity
- What areas of their day-to-day operations are hardest to optimize due to the lack of accurate data
- How job time tracking addresses their challenges and why IoT is the most viable option for implementing it
- The benefits that IoT-based digitization of manufacturing assets brings

WHY IMPROVING PRODUCTIVITY IS BECOMING BUSINESS-CRITICAL FOR MANUFACTURING PLANTS

Improving productivity means completing the manufacturing process more quickly using the same or fewer resources. **This challenge is a constant pressure** on every facility but it's taken on a sharper edge as a result of a combination of factors that affect more plants than ever.

Missed order deliveries and scheduling challenges

When a tiny margin for error is built into planning, getting just a little off-track causes a chain reaction that usually ends in higher costs, lost orders and a damaged customer experience. Without accurate data on performance and efficiency, plants can't plan well and unrealistic resource allocation is inevitable.

Workforce shortages, skill gaps

Getting more out of existing resources is not a new idea, but being more efficient in a tight labor market requires maximum utilization of skills and organization. Anything that doesn't help move throughput from A to B is costing you money. Ignoring the gap between value-added time and non value-added time is like running your air conditioner with all the doors and windows open—you won't get the result you want until you've synchronized all the moving parts in the ecosystem.

Cost pressure

Labor costs are the main driver of COGS. The allocation of staff based on anticipated need alone is an educated guess at best. To reduce labor costs, eliminate waste and improve resource planning to get better margins, manufacturing facilities have to go beyond boosting productivity to the proper assignment and scheduling of labor assets. Eliminating non-value added time and processes within the manufacturing cycle requires a deeper level of insight into each step.

Inventory/process management

Delays happen, bottlenecks often don't reveal themselves until it's too late and it only takes one backup to slow an entire factory down but identifying the source isn't always easy. The larger the facility, the more difficult it is. Without a unified source of information about workflows, asset location and downtime, pinpointing the problem is difficult.



ROADBLOCKS ON THE WAY TO OPTIMIZING PRODUCTIVITY

Before you can improve, you have to measure. That means knowing exactly where things stand now and using that information to make benchmarks for progress, set realistic goals for improvement, and quantify incremental steps towards meeting them. Data is essential to knowing if you're moving in the right direction or you're moving at all. For many operations managers, several major issues stand in the way of any meaningful optimization of productivity:

Lack of visibility into labor costs per job & profitability per order

Labor costs are typically the biggest input into the manufacturing process. Knowing how much is spent on each job and workstation is fundamental to cost and pricing structures.

| If you don't know exactly how much the production of an order cost, how can you price it effectively or accurately document profit & loss?

No visibility into plant capacity and utilization or cycle time, making it hard to plan for lean or busy seasons

It's easy to know when things are busy or slow, but not being able to take a deep dive into exactly how much of your capacity is deployed means driving blindly into seasonal fluctuations. Getting stats after quarterly reports are made does you no good when you need to know now.

| How long does it take to complete a process? How much of the time are machines being used? Which areas of plant floor are over- and underused?

No visibility into productivity of time spent on manufactured goods or non-value added time for products manufactured

Overall productivity can be acceptable or even great but that doesn't mean particular segments of the process can't be optimized. When broken down into its parts, things like differences in shift production, workstation efficiency and even time wasted on searching for tools and equipment can tell a deeper story.

| How much time are employees spending actively vs. non-actively on different jobs and what causes slow-downs?

No measure of worker productivity and difficulty with incentivizing and motivating them to improve

Efforts to boost productivity work better with specific goals and contexts. Knowing what your starting point is and identifying areas with the largest opportunities for improvement are musts.

At what times of day or during which activities are your workers most productive?
What would improve their productivity at low times?

It's ironic that manufacturing operations, full of expensive precision machinery and processes that turn on carefully measured increments, often turn to guesswork and estimates when it comes to key metrics of the performance of employees and other assets.

Before you can start moving towards greater efficiency, you need to quantify all the moving parts of your operation. Without the "before" stats, the "after" numbers can't tell you much. And that means applying an accurate measurement method to everything, including things listed in the points above.

And the source of that data matters. Conventional methods of gathering data, like manual registration and self-reporting, have been exposed as frequently way off when compared to information gathered on the same variable by a new generation of solutions with a much greater capacity for hyper-accurate monitoring for everything that happens in a manufacturing facility.

Now you can know **exactly** what's going on in every aspect of your operations without asking anyone to manually report on anything.

HOW IOT IMPROVES LABOR PRODUCTIVITY IN MANUFACTURING

Optimizing productivity starts with an informed understanding of exactly where time and money are spent. Every order, every part of the process, and every activity comes with a price tag. Manufacturers need deep, granular visibility into activity time and cost inputs to support scheduling, pricing and asset utilization.

IoT provides effective solutions for digitizing physical workflows and quantifying the inputs of the manufacturing process. Its tracking abilities can integrate the location of employees and other assets into a seamless representation of the activities of any facility. It can track worker location and activity, providing operations executives with data and insights helping them to measure, compare, and improve the performance of individual workers, shifts, or the entire facility. Tools and equipment can be located and followed, allowing for the design of workflows that decrease or eliminate downtime.



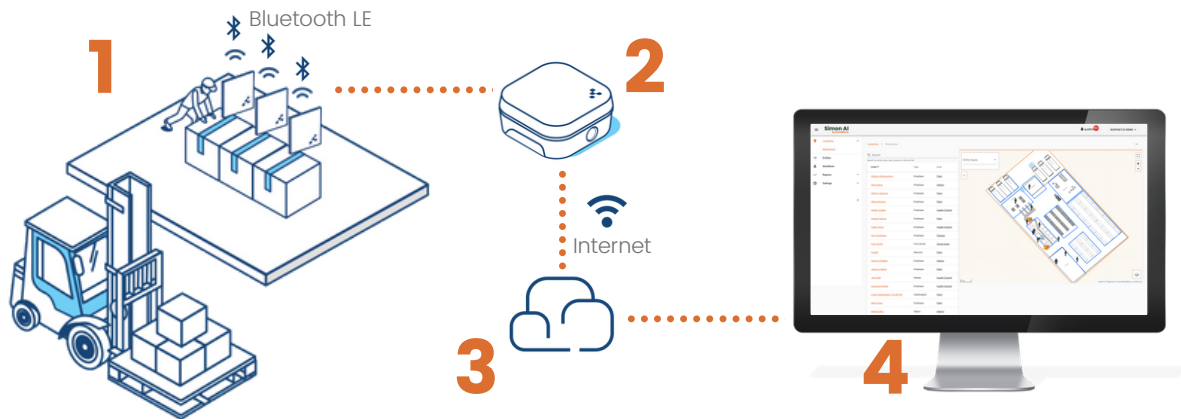
What is IoT

IoT, or “Internet of Things”, represents the applications made possible by extending internet connectivity beyond computers and phones to other things, processes and environments. It’s about creating digital representations of these assets and workflows so you can collect data on them and analyze them.

Applied to the example of manufacturing, an illustration of the capabilities of IoT might look like this:

Without IoT	<p>Let’s say a particular worker’s job is to assemble products.</p> <p>His main working station is a production line but he sometimes leaves it to find product components, to report to his supervisor that a part is missing, or maybe he just waits for other processes to catch up before he can proceed. When you have many such workers in your facility, you can’t follow each one all day to see how long they actively spend on the job, where they spend non-active time, and why.</p> <p>Even if the worker logs in his time at his working station, you have no way of telling if the logged time actually represents the time he spent there. The best you can get is a general idea of how productive they are.</p>
With IoT	<p>Now employee workstations, tasks, and assets have a digital representation. You can see where they are at any time, which tasks they’re performing, reasons why they leave their workstations, and how long any non value-added activities take. You can analyze any individual performance over time and compare it to any other.</p> <p>By understanding what causes the stops or delays, you can eliminate the source of the problem, resolve bottlenecks and help everyone to work more efficiently. You can give them access to tools to report missing or faulty components so they don’t have to leave their workstation.</p> <p>Now multiply enhancement by the number of your workers and you can clearly see that IoT gives you unprecedented visibility into your people, assets, and workflows and enables you to solve problems you couldn’t even see before.</p>

How IoT solutions for manufacturing work



1. Assets and elements in the manufacturing process need to be recognized as they move around physical space. This is achieved through the use of tags that can be affixed to or carried by employees, machines or anything else that can supply useful data. The tags can additionally have sensors to collect data on environmental conditions like temperature or humidity.
2. Gateways or access points installed in strategic zones create geofences that collect the data from sensors within range of the gateways. Every time an asset or person enters (checks into) or leaves (checks out of) the zone, the time of such an event is automatically recorded.
3. Data gathered from tagged assets is continuously sent by the gateways to a cloud via the Internet.
4. The data is plugged into a solution that translates it into meaningful insights, dashboards, reports, and maps.

'Simon says' from data to AI recommendations



◀ Simon AI translates collected performance data into actionable recommendations and integrates with existing communication workflows

BENEFITS: IT'S ABOUT BUSINESS OUTCOMES

The insights provided by IoT solutions translate directly into business results. They can affect every aspect of a manufacturing operation but are typically grouped into one or more of these categories: improved cost visibility, improved planning, and improved labor productivity.

Improved cost visibility

IoT-based solutions can supply the most accurate cost measures possible at any scale. Furthermore, these solutions make it possible to divide any process into segments, each with its own separate metrics. In advanced operations, obvious procedural inefficiencies are identified early on but beyond a certain point they become harder to spot.

But that doesn't mean they're not there. When you can quantify every aspect of your process, you can compare and analyze them independently. By having accurate labor costs per job and visibility into how much time each job takes, operations executives can better understand what affects their entire cost structure and address their costing and pricing policies accordingly. This leads to:

- Reduced discounting

Inefficient resource allocation often results in slowdowns, backups and missed deadlines. Discounting becomes the default way to keep customers happy but can easily consume already-thin margins.

How many times will a customer accept a discount before they decide that reliable on-time delivery from a competitor is more important?

- Responsive pricing

More precise data can inform pricing policies that match your actual COGS. With IoT solutions, there's no need to lose revenue while guessing where the optimal point might be.

When was the last time you carefully analyzed how much each step of your production process really costs?

- Lower labor costs

A data-driven analysis will show you the areas where your labor allocation is out of alignment with your needs. Better management of your staff means less downtime and more value-added time.

How much profit does an increase in labor efficiency of 20% translate to in your business?

Improved planning

Knowledge really is power. With IoT solutions, Operations Managers can make better decisions when allocating resources and create more accurate and realistic forecasts when changes in schedules, orders or other factors demand revised plans. Using historical data, benchmarks based on any number of metrics can be used as a guideline to keep resources deployed at just the level that throughput requires. With **data-driven production planning**, it's easier than ever to maintain all manufacturing inputs at Goldilocks level—not too low, not too high, but just right.

Data-enhanced planning in manufacturing means:

- Increased overall throughput with constant inputs & lower cycle time thanks to fewer and shorter delays
- Lower Raw, Work In Progress, Finished Goods, Work Tools inventory
- Lower Expedited Freight Costs resulting from fewer delayed shipments and missed deadlines
- A better customer experience

Increased labor productivity

As a major input into the manufacturing process, labor efficiency also benefits from the same factors that improve overall planning. Being able to break down the physical and spatial patterns involved at every stage means identifying the cause of bottlenecks and downtime more easily. From there, it's a short step to making the necessary adjustments and improving workflows. Employees or teams performing at well under or above the norm can be identified and their activities documented.

By better understanding worker movements and productivity over the course of a shift or at different points in the process, appropriate incentive methods or programs can be better targeted and deployed when most likely to have the greatest impact.

- Higher labor productivity means lower labor costs per unit of output
- Better organization results in higher throughput

If you're curious to see how IoT might fit into your own operation, **contact us and let's talk about Simon AI**, our IoT analytics suite for the businesses in the manufacturing space.

Meet Simon AI

Next-generation IoT/RTLS Analytics
Software for line-of-business users

SAFETY & SECURITY

Safety Breach Prevention

Ensure workers are safe and respectful of workplace policies by getting alerts upon unauthorized entrance

Incident Reporting

Equip workers with wearable panic buttons to report accidents in real-time so you can provide immediate help

Attendance Time Registration

Automatically register the time when your workers enter and leave the workspace

EFFICIENCY & CONTROLLING

Asset Tracking

Reduce search time for movable assets and equipment by tracking their location in real-time over time

Job Time Tracking

Improve Cycle Time, and Time to Completion of jobs in operational environments by locating them throughout operations

Labor Time Tracking

Improve product pricing and cost controlling by understanding productivity, labor utilization and labor costs for specific jobs orders and activities

 Plug & Play
Deployments

 No Development
Skills Needed

 Workflow
Centric

 Machine Learning
Recommendations

Get started with a pilot in less than 10 days

[SCHEDULE A DEMO](#)