

RESEARCH REPORT

The Manufacturing Paradox: Drowning in Data but Starving for Insights

A new survey of 600+ industry leaders reveals the data-to-execution gap at the root of operational bottlenecks—and how to bridge it.

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INTRODUCTION

The growing gap between knowing and doing

Manufacturing has a data problem.

Plants generate troves of data across machines, systems, people, and processes. Despite an abundance of data, many manufacturers struggle to effectively use it.

Nonetheless, manufacturing data is valuable—especially when it translates to better decision-making. Deloitte reports that most manufacturing leaders plan to invest at least 20% of their 2026 budgets in technologies enabling advanced data collection and analysis.

But even with these investments, manufacturers haven't seen substantial productivity gains in over a decade. According to the U.S Bureau of Labor Statistics, manufacturing productivity has been steadily declining since 2011.

In short, digital transformation was a double-edged sword. It made machines and data collection faster, but it also added technological complexity that hindered operational efficiency. This issue is compounded by the ongoing skilled labor shortage, which 80% of manufacturers already experience to a painful degree, according to the 2025 L2L Skills Report.

This leaves manufacturers in a "data paradox." They have more data across systems, assets, and people than ever, but it hasn't translated into clearer insight or faster action.

To get to the root of this sector-wide problem, we asked over 600 U.S. manufacturing leaders about their biggest challenges with industrial data, including:

- → **How data is collected in their facilities**
- → **Data quantity and quality issues**
- → **Barriers to real-time visibility and execution**
- → **How technologies, including AI, help or hurt**
- → **The cost of manufacturing data issues**
- → **Strides toward better operational insight**

Who we talked to

For this survey, we talked to manufacturing professionals across 48 U.S. states.
Each participant currently holds a site-level or corporate-level leadership position.

Other key demographic and firmographic factors include:

Industry

Industrial machinery materials	29%
Food and beverage	18%
Consumer goods	8%
Metal products	7%
Auto parts	6%
Building materials	5%
Medical device or pharmaceutical	5%
Plastics or rubber products	4%
Textiles/apparel	4%
Electrical equipment	3%
Packaging and paper products	3%
Aerospace components	2%
Chemical processing	2%
Other	5%

Age range

AGE 18-29
11%

AGE 30-45
46%

AGE 46-61
37%

AGE 62+
6%

Years in current role

1 YEAR OR LESS
1%

2-5 YEARS
15%

6-10 YEARS
38%

MORE THAN 10 YEARS
46%

Job title

25%	Operations Manager
13%	Director of Operations
11%	Manufacturing Manager
9%	Production Manager
8%	Plant Manager
8%	VP Ops
5%	Director of Manufacturing
3%	Engineering Manager
3%	SVP Ops
3%	COO
2%	Director of Supply Chain
1%	Maintenance Manager
0%	Director of Engineering
7%	Other

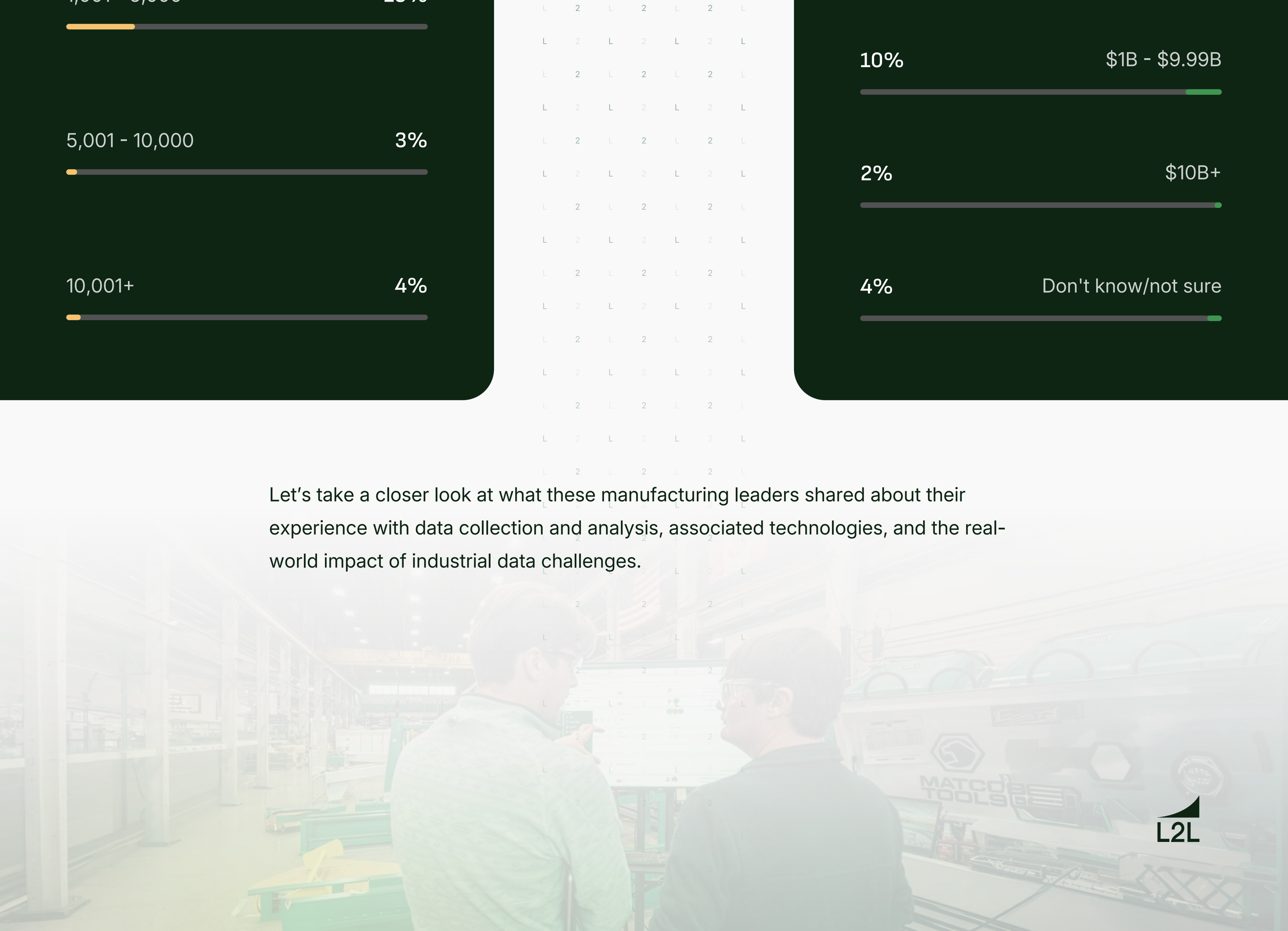
Company size

1 - 10	3%
11 - 50	6%
51 - 200	17%
201 - 500	23%
501 - 1,000	24%
1,001 - 5,000	19%
5,001 - 10,000	3%
10,001+	4%

Company annual revenue

4%	$0 - $999K
12%	$1M - $9.99M
10%	$10M - $49.99M
6%	$50M - $99.99M
13%	$100M - $249.99M
21%	$250M - $499.99M
18%	$500M - $999.99M
10%	$1B - $9.99B
2%	$10B+
4%	Don't know/not sure

Let’s take a closer look at what these manufacturing leaders shared about their experience with data collection and analysis, associated technologies, and the real-world impact of industrial data challenges.



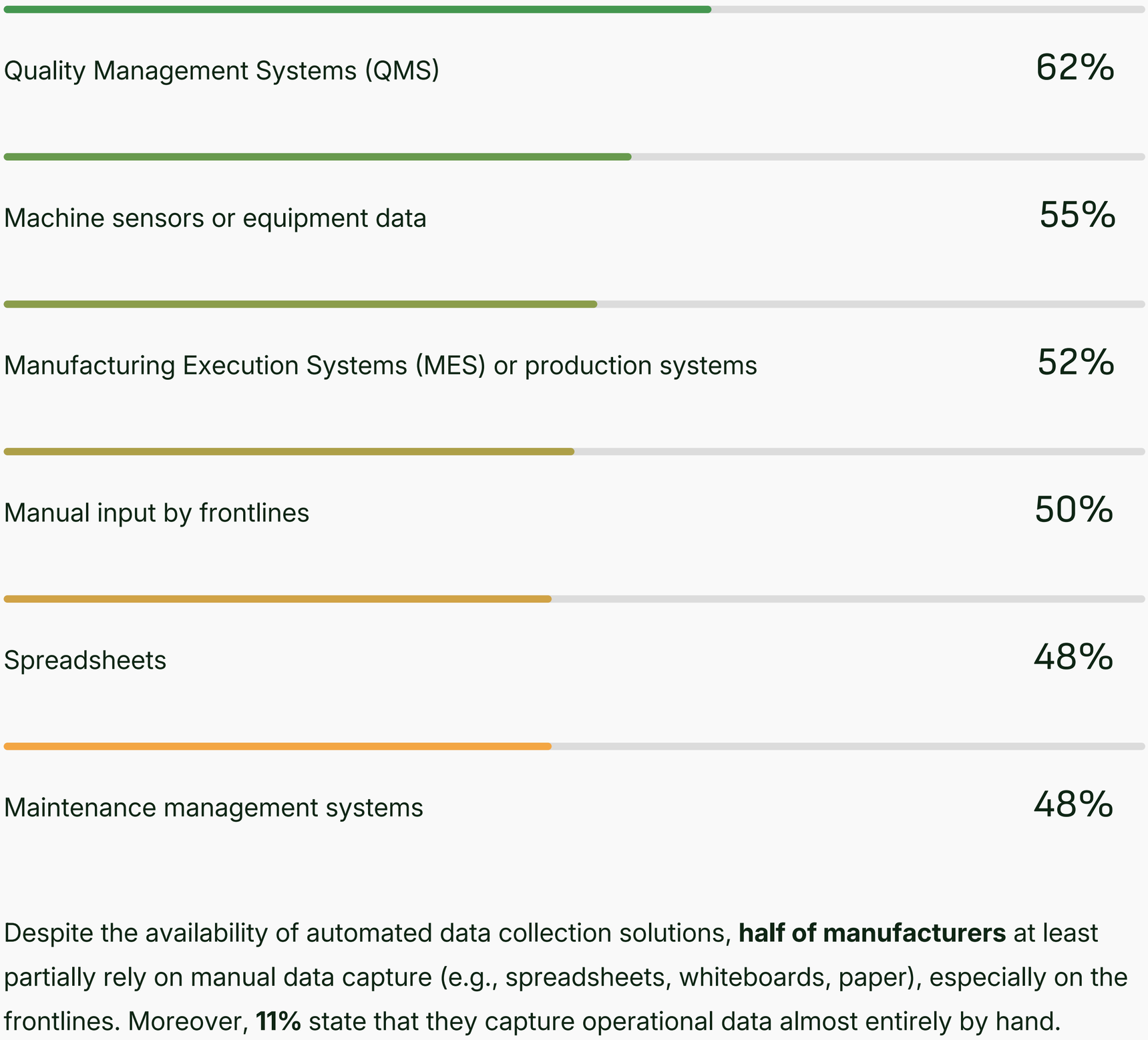
PART 1:

Drowning in data: The current state of data collection

Today, manufacturing leaders have the tools and systems to collect more plant data than ever. But more data hasn’t necessarily translated into better insights or faster action.

From Industrial Internet of Things (IIoT) sensors to complex dashboards, modern industrial technologies promise real-time visibility and clear guidance for process improvements. However, many manufacturers still lack a single source of truth for operational performance.

Nearly half **(47%)** of the manufacturing leaders surveyed report an even split between automated and manual operational data collection. Data is captured through a variety of methods, most commonly:



Despite the availability of automated data collection solutions, **half of manufacturers** at least partially rely on manual data capture (e.g., spreadsheets, whiteboards, paper), especially on the frontlines. Moreover, **11%** state that they capture operational data almost entirely by hand.

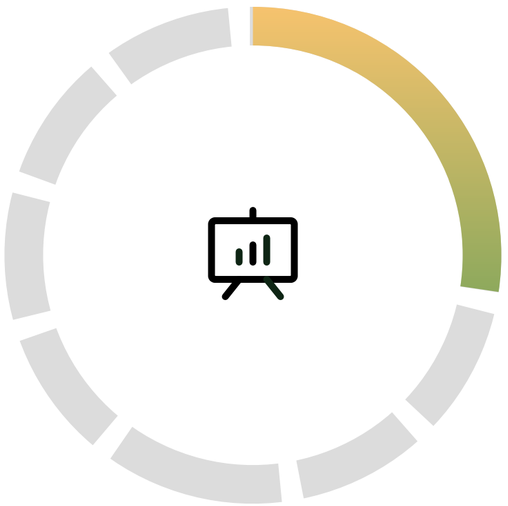
Even with heavy investment in IIoT and sensors, there’s still a disconnect between what systems capture and what’s actually happening on the shop floor. When 55% of manufacturers use automated data collection, yet 50% rely on manual frontline logs, the industry isn’t running a digital operation. It’s a hybrid system where machine data sits idle while managers wait for a paper trail to give them enough context for decision-making, leading to operational friction and lost profits.

In the next section, we’ll uncover why industrial organizations have trouble turning data into action.

PART 2:

Starving for insights: Barriers to trustworthy, actionable data

Operational efficiency, top-quality products, and optimal workforce performance all require a connected, real-time view of shop floor operations. Yet, this level of visibility still isn’t the norm.



3 in 10 manufacturing leaders confirm that their operational data reflects the shop floor in real time.

In fact, only **3 in 10** manufacturing leaders confirm that their operational data reflects the shop floor in real time.

Why is this number so low?

One reason is that tool and system usage are inconsistent. While **89%** of respondents report having a standard set of tools across all teams and levels, **63%** say that usage is inconsistent, even if it’s required.

That’s less than half of respondents who consistently use the data solutions provided for them.

However, standardizing tools isn’t the same as standardizing processes. When tools are introduced as point solutions rather than integral parts of a system, they become extra tasks instead of efficiency boosters. These issues often arise when leadership is misaligned with the way frontline teams work on a daily basis. Implementing new software alone won’t fix broken processes.

Additionally, shop floor communication issues lead to lost context and mistrust of data:

65% say critical operational information isn’t consistently communicated during shift handoffs.

68% aren’t always confident that a problem was resolved correctly or won’t resurface.

41% say that solutions to issues are often not captured for future reference.

Issues that aren’t captured only get worse, causing massive operational drain and an endless cycle of reactive firefighting. Poor knowledge capture leads workers to relearn how to address the same problems, creating team-wide frustration and discouragement.

Moreover, accountability for maintaining usable operational data is often a grey area for most manufacturers. Only **36%** say they have clearly defined roles and processes for data accuracy at the facilities they oversee. Therefore, it’s not surprising that **41%** of respondents say they’re unconfident in their company’s data.

Equally alarming is the systemic prevalence of disconnected and delayed information:

Only 21%

of respondents say it’s very easy to access the data they need in real time.

53%

struggle to organize their data.

68%

frequently have to stitch together data from multiple sources manually.

48%

say their data isn’t actionable.

When data lives in different places, teams have trouble accessing and acting on it in a timely manner. This scenario leads to more manual data input and assessment, resulting in operational delays. It’s also where the gap between data and action becomes a permanent part of company culture.

Organizations often attempt to unify this data with legacy systems (e.g., ERP, MES, or EAM). While these solutions are necessary for modern plants, they act as systems of record—only capturing what went wrong—instead of systems of action that provide real-time guidance. Manufacturers that can’t turn static data into a live workflow struggle to hit production targets, let alone make significant productivity improvements.

PART 3:

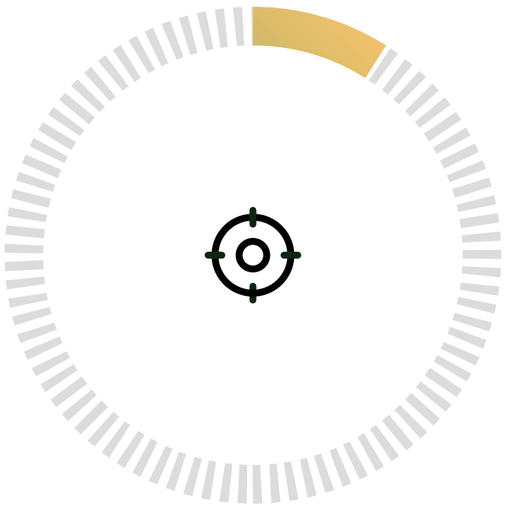
The cost of manufacturing data challenges

The impact of inconsistent and disconnected data on the plant floor is palpable.

Nearly **two-thirds** of respondents say frontline supervisors spend at least an hour of their shift pulling, cleaning, and reconciling data. Some even report supervisors spending **over 4 hours per shift** simply trying to make sense of operational data.

When team leads spend half their time reviewing or cleaning data, they aren't managing the shop floor. Their preoccupation with data handling opens the floor to safety risks and other problems, which can cause massive operational delays.

When turning data into insight takes this long, problems persist for hours or even days. Only **9%** of respondents say they can usually find the root cause of a shop floor issue in real time. This means that the other 91% spend their time fixing and documenting preventable and costly problems. Moreover, **65%** say that root causes are inconsistently documented.



9%

of respondents say they can usually find the root cause of a shop floor issue in real time.

Another consequence of inconsistent information capture is the loss of valuable know-how, particularly tribal knowledge. **88%** of leaders say important operational information disappears when experienced employees change roles or leave.

This makes it much harder to train new employees, maintain standards, and avoid repeat issues. The departure of knowledgeable workers results in inexperienced new hires starting with little to no role-specific knowledge and a much steeper learning curve.



PART 3:

The cost of manufacturing data challenges

Therefore, it's no surprise that unused and inaccessible insights have resulted in increased financial, material, and time-related costs in the past 12 months for respondents:

45% report more scrap and rework.

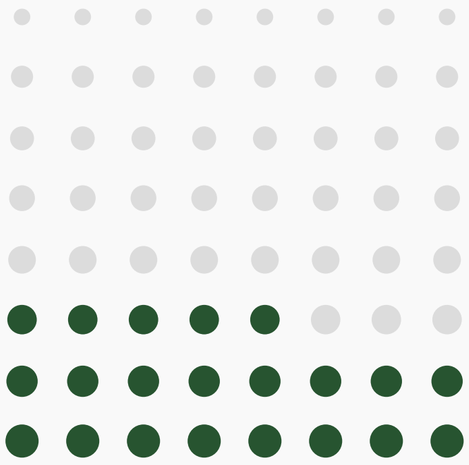
43% report frustration among teams.

43% report repeated issues.

43% report missed production targets.

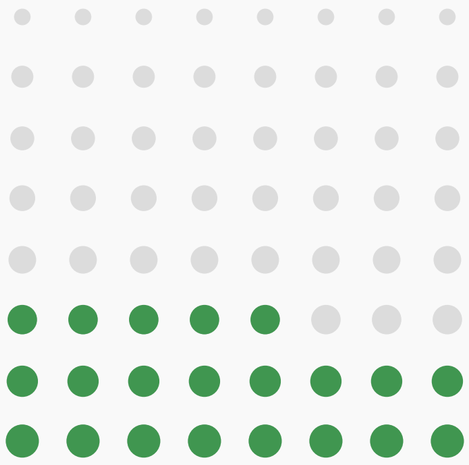
42% report longer resolution times.

Aside from inconsistent documentation, respondents cite the following issues as the biggest barriers to turning data into action in their plants:



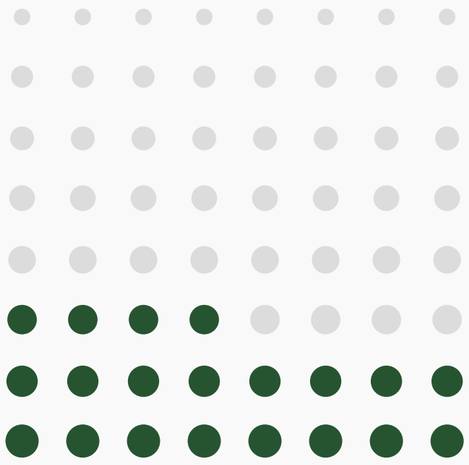
Inconsistent processes - cited by:

32%



Manual data collection - cited by:

32%



Data quality issues - cited by:

31%

The prevalence of data challenges in modern facilities brings up an important question: If data is primarily handled by software, how much of the problem is technological?

Siloed data isn't just a headache for IT teams. It's a productivity killer that has long-term consequences for industrial organizations. Yet, teams are still expected to produce while tackling new manufacturing challenges, all with old and inefficient data gathering methods.

In the next section, we'll delve into the effectiveness of advanced technologies, like artificial intelligence (AI), and how they affect the actionability of data.

PART 4:

Does modern industrial technology help or hurt?

Today’s plants rely on multiple software systems to keep operations running. But when these systems exist in silos, teams have a difficult time piecing together a complete, real-time view of plant performance. Many manufacturers add new tools and solutions to their tech stacks to alleviate this issue. However, the result is often tech fatigue: more layers for frontlines to manage.

Our respondents’ feedback underscores this problem. **Three-quarters** report relying on multiple systems to perform their daily work, creating an environment that’s disjointed and overly complicated:

65% say their operational tools are redundant.

64% have a fragmented tech stack.

53% say their tech stack is too complex.

58% report that some of their tools create more friction than clarity.

Advanced data collection and analytics solutions are designed to streamline reporting and decision-making. However, they tend to produce the opposite effect if they don’t accurately reflect plant floor activities or provide a holistic picture of operations.

And it’s impossible to talk about industrial technology without mentioning AI, a highly promising innovation when applied to manufacturing environments. But to deliver actionable insights that drive tangible outcomes, AI tools must be combined with unified shop floor workflows.

88% of site-level leaders say their teams use AI tools, with the most-reported use cases being:

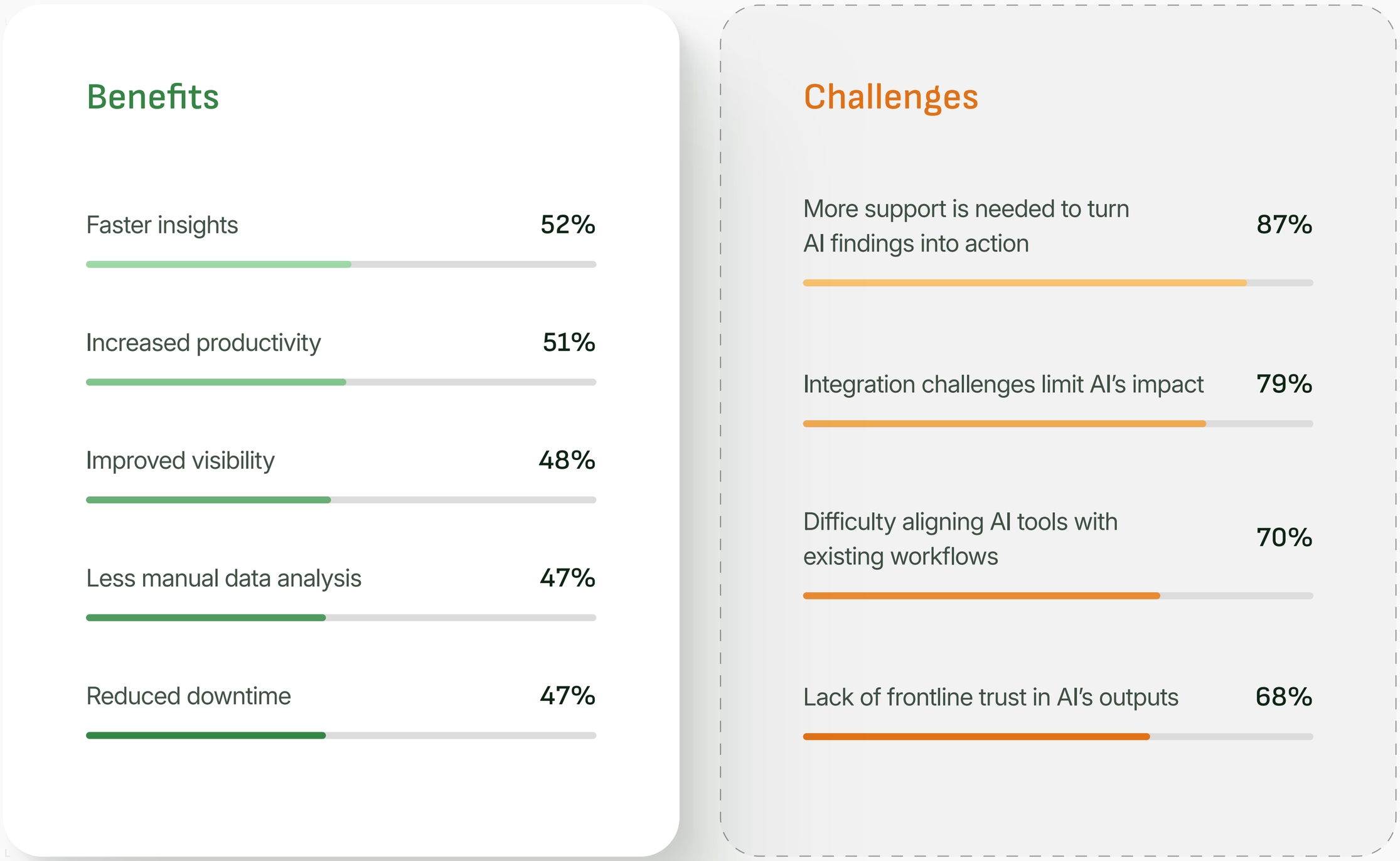
- Data analysis 65%
- Automated dashboards 68%
- Predictive insights 41%

PART 4:

Does modern industrial technology help or hurt?

Most manufacturers (**87%**) believe AI has the potential to significantly improve shop floor productivity, even if turning AI's outputs into action remains a challenge. Here's a quick breakdown of our respondents' AI-related observations:

Top-cited benefits and challenges of industrial AI



It's clear that the usefulness of AI applications on the shop floor depends on the quality, integration, and organization of a plant's data. But without a foundation of unified, accurate, and up-to-date datasets, AI applications become extra tools that add complexity instead of clarity to manufacturing processes.

Industrial software should make data more actionable, helping plants unlock operational insights that drive efficiency and productivity. Without a live and complete view of operations, manufacturers will continue to deal with bottlenecks, excessive downtime, reporting delays, and other barriers to operational efficiency and productivity.

CONCLUSION

Better, more connected data = better outcomes

So, what can better operational insights do for manufacturers?

According to our respondents, the biggest benefits of better operational insights include:



Knowing exactly what’s occurring and when is critical not only for creating better products with greater speed and efficiency but also for enabling long-term process improvements. As one manufacturing leader states:

> *Better operational insight would let us move from reactive firefighting to proactive decision making. We could identify patterns earlier, assign clear ownership faster, and prioritize improvements based on real impact instead of assumptions. That would improve uptime, reduce waste, and help frontline leaders spend more time improving processes instead of chasing data.*

OPERATIONS MANAGER, AUTO PARTS

CONCLUSION

Better, more connected data = better outcomes

The path forward: Recommendations for manufacturing leaders

The "manufacturing paradox" of being data-rich but insight-poor is not a failure of effort, but a failure of architecture. To break the cycle of declining productivity and digital fatigue, leaders must shift their focus from simply collecting data to orchestrating action.

Today, most plants are still focused on building and maintaining a system of record instead of one that enables proactive action. Data is only the fuel for change on the plant floor. Instead of simply collecting data, manufacturing leaders need to focus on better ways to drive productivity and efficiency.

To make the shift from a system of record to a system of action, leaders can start with these four strategic pillars:

1. Centralize data for a single source of truth.

Operational data is only an asset when it is centralized and reflects the shop floor in real time. Currently, only 21% of leaders find it very easy to access the data they need. By moving away from fragmented spreadsheets and manual logs, which 50% of plants still rely on, teams can eliminate the "information chase" and focus on execution.

2. Transition from systems of record to systems of action.

Traditional software like ERP, MES, and CMMS often acts as a digital filing cabinet, merely recording what went wrong yesterday. To drive true OEE gains, plants need an action-based system that unifies disparate data and instantly notifies the right person to solve the right problem at the right time.

3. Systematize tacit knowledge digitally.

With most leaders reporting that critical operational knowledge disappears when experienced employees leave, the resulting information gaps pose a significant business risk. Leaders should implement digital platforms that capture and standardize best practices, making this tacit knowledge a permanent part of the plant's "digital DNA."

4. Reduce complexity to empower AI.

The potential for AI to improve productivity is often throttled by fragmented technology stacks. By reducing technological complexity and unifying workflows into a single interface, teams provide AI with the clean, high-velocity data it needs to move beyond simple reporting and start providing prescriptive guidance for the shop floor.

Turn data chaos into clear, actionable insights

L2L's Connected Manufacturing Operations Platform is a system of action that replaces fragmented silos with operational clarity. By unifying maintenance, production, and skills into one interface, we eliminate the "information chase," helping the world's leading manufacturers move from post-mortems to real-time execution with measurable ROI in as little as 16 weeks.

Ready to discover how our system of action can transform your operations?

Get in touch with one of
our manufacturing experts today!

START THE CONVERSATION ↗

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