The future of manufacturing

A roadmap for digital transformation

STIBO SYSTEMS
MASTER DATA MANAGEMENT

Executive summary

Ready or not, the future of manufacturing is here

Executive summary

For years, Industry 4.0 innovations have promised manufacturers the world. Operational excellence, supply chain agility, improved flexibility and optimized processes are just a few of the benefits manufacturers have come to expect from smart manufacturing investments.[1] In fact, the potential value created by Industry 4.0 for manufacturers and suppliers is expected to reach $3.7 trillion by 2025.[2]

Despite these projections, manufacturers have been slow to invest. Full order logs and healthy bottom lines masked the need for innovation. This has since changed. With ongoing macroeconomic pressures, geopolitical instability and supply chain disruptions continuing to disrupt markets, manufacturers can no longer rely on price markups or cheaper material sourcing to ensure growth.

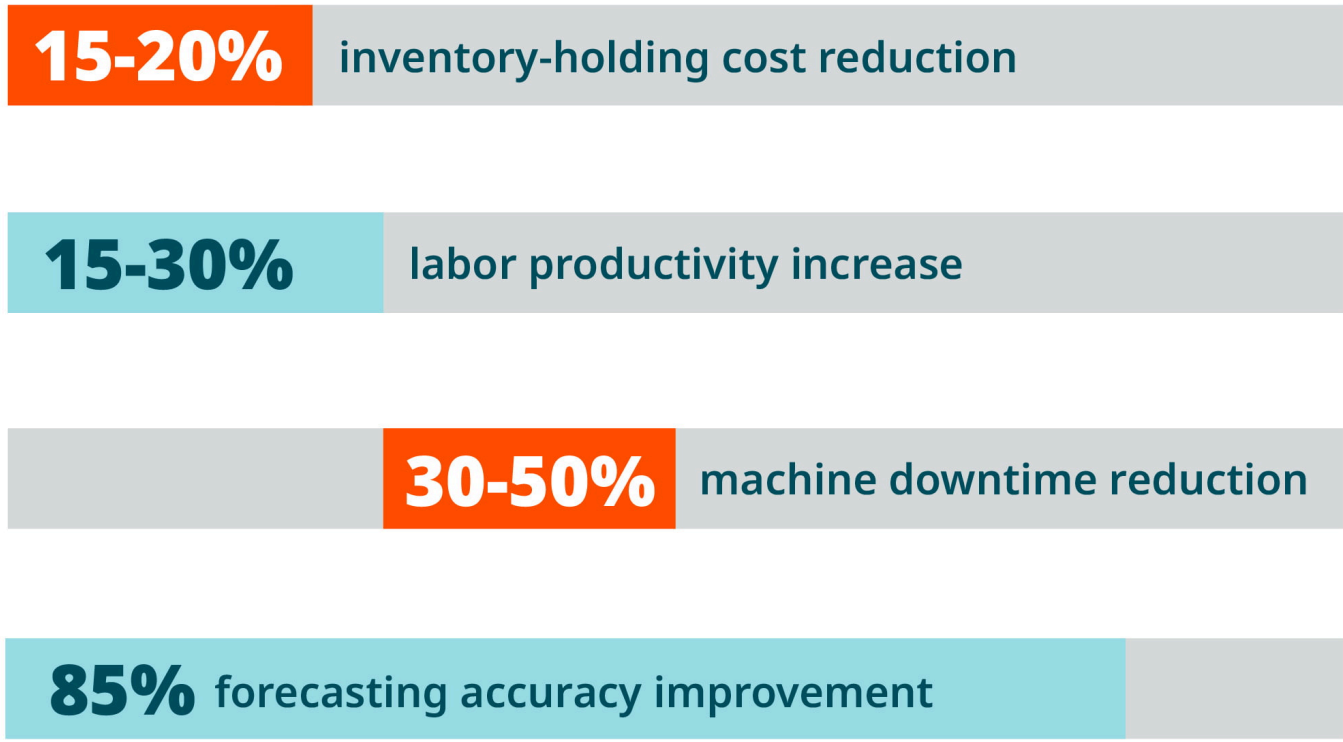
Achieving long-term profitability will require a new approach. As manufacturers look to innovative technology to increase operational efficiency, it's equally important for them to consider the data foundation that underpins those investments. Without a centralized data foundation in place, manufacturers will never achieve the full value that Industry 4.0 promises.

$3.7 trillion

Potential value of Industry 4.0 by 2025

Chasing operational efficiency through innovation

While initiating a digital transformation project can seem daunting, the benefits can be considerable. According to McKinsey & Company[3], Industry 4.0 offers significant value potential across multiple areas of the factory network such as:



Explore the stages of digital transformation

Whether your company is just getting started or well on the way to operational excellence, you're likely to be somewhere along this path. Discover the common challenges of each stage and the data best practices to be mindful of throughout your journey.

Phase 1:

Just getting started

- **Avoidance**
- **Assessment & Research**
- **Planning**
- **Testing**

Phase 2

On the road to transformation

- **Implementation**
- **Evaluation**
- **Automation & Skill Development**
- **Security & Scalability**

Phase 3

Optimized for success

- **Adaptability**
- **Ecosystem**
- **ESG**
- **New Ideas**

Phase 1:

Just getting started

Just getting started

1

THE AVOIDANCE STAGE

There are many reasons why you may be struggling to move past this initial stage. For some, this is because there's no need for Industry 4.0 investments; you're confident in your products, processes and the stability of the market. For others, you've started down this path before, but your prior investments have not shown ROI, so you do not have the internal support you need to move forward.

At this stage, it's common to have concerns that the required equipment, systems or workforce changes are too costly. This can be especially troubling if you have limited knowledge about what's possible in terms of potential innovation investments – or limited resources to guide and support the process.

There are several challenges with staying in the avoidance stage:

- The cost of inaction will grow
- Your competition will eventually evolve
- Your customers and suppliers will seek out more innovative partners
- This will negatively impact talent recruitment and retention

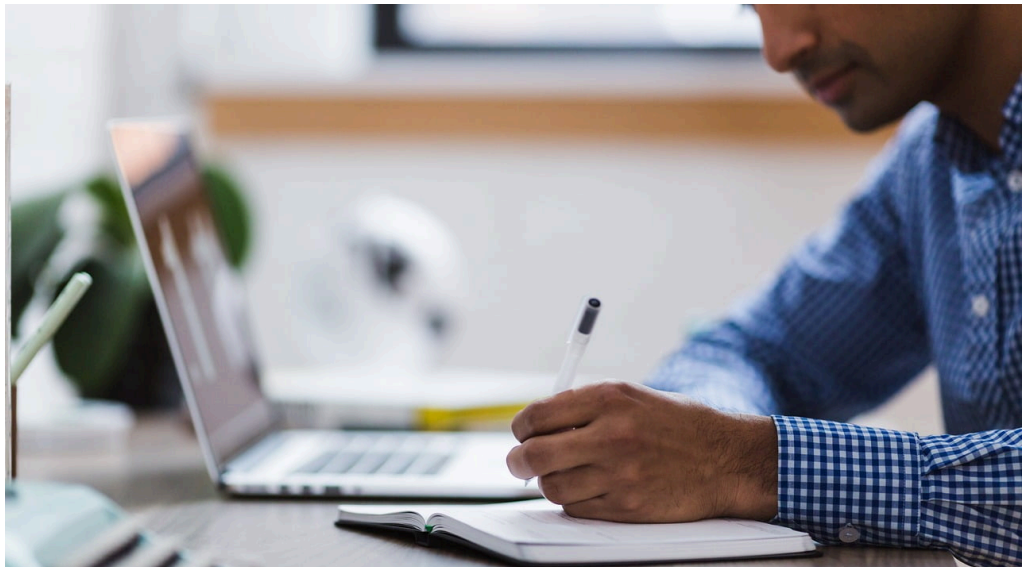
2

THE ASSESSMENT & RESEARCH STAGE

At this point, you've either determined you need to invest in digital transformation initiatives or you've been forced to revisit your innovation strategy. This reevaluation often occurs for two main reasons:

- Increased competitive pressure is impacting profitability. Solving operational inefficiencies will have a significant impact on margins.
- Recruiting talent is becoming harder. Automation is being prioritized to solve potential talent shortages.

Some manufacturers have a hard time moving to the next stage due to a lack of best practices, clear vision of the areas to implement first or projected ROI. Internal pushback – due to fear of change, job losses, new training, etc. – is also a common concern.



3

THE PLANNING STAGE

You're developing an innovation strategy during this stage and need insight into:

- How the new technology aligns with overall business objectives
- Which operational pain points will be addressed first
- ROI projections related to efficiencies, cost reductions, or revenue increases due to delivery time improvements

Lack of internal expertise and uncertainty about how to align today's operations with future needs are common challenges during this stage.

4

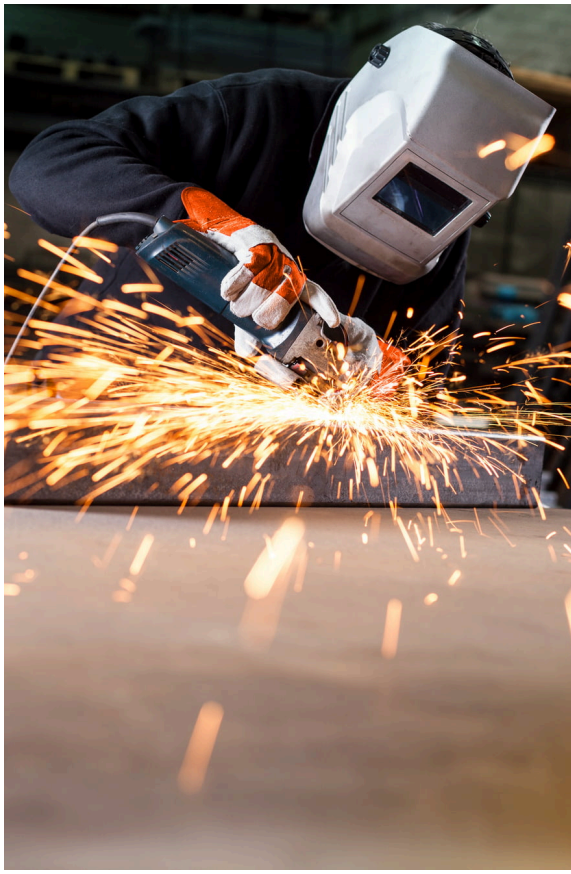
THE TESTING STAGE

The testing stage is when you choose to test the innovation in a smaller area of the company first. This step is often taken to:

- Validate the solution with a proof of concept
- Avoid workforce disruption or misunderstandings
- Gather more information to support further investment

Most of the challenges during the testing stage are internal. IT is not prepared to implement the technology. Employees have not bought into the new processes and are resistant to change. Leadership is concerned about unknown costs.

Additionally, data silos can be an impediment, as they limit visibility, connectivity and can negatively impact results.



STIBO SYSTEMS
MASTER DATA MANAGEMENT

Tips for managing change

Managing change across the manufacturing ecosystem

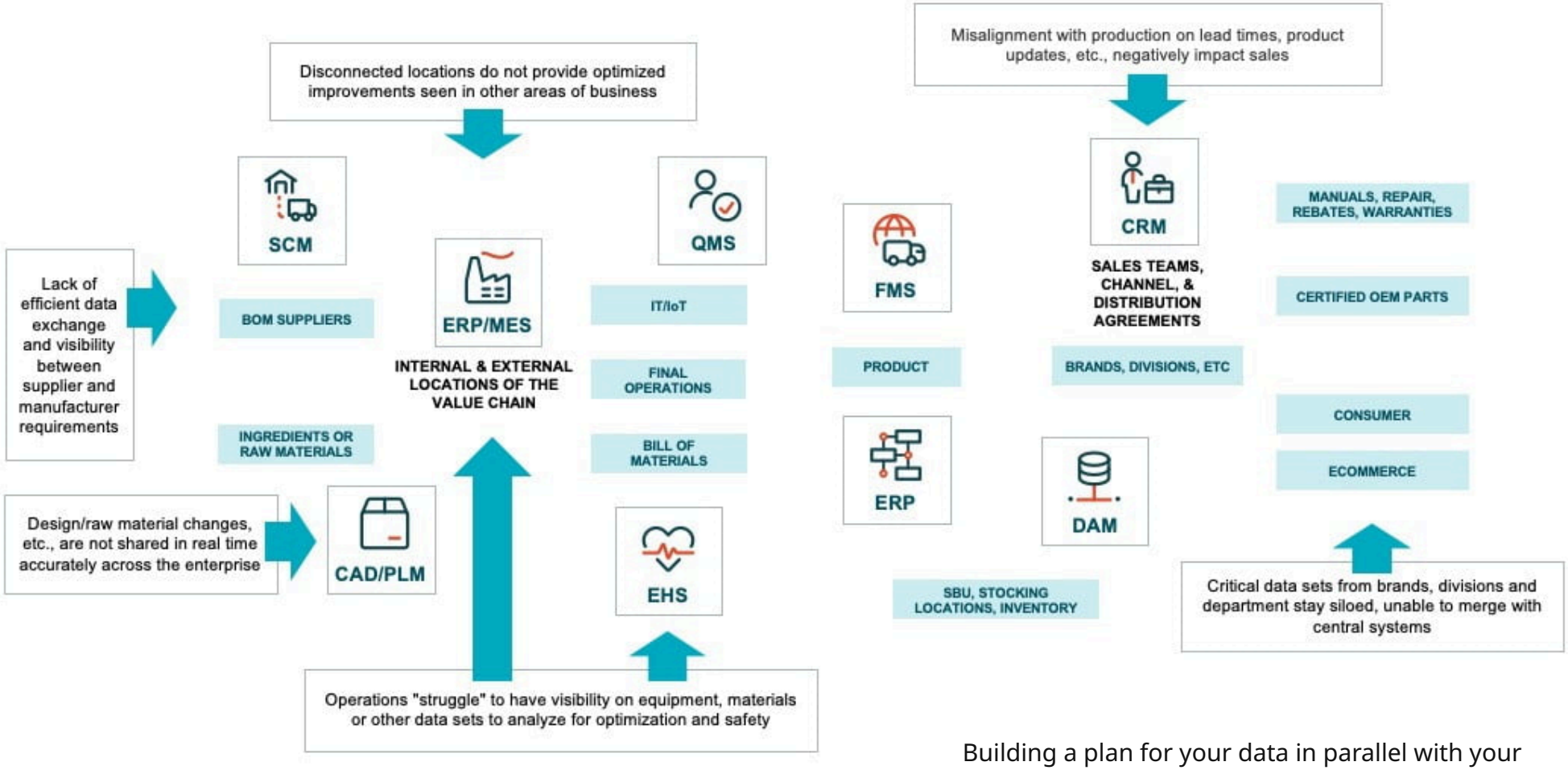
Starting an innovation project can be overwhelming, but it doesn't have to be. Rely on your innovation partner for guidance on key steps such as strategy development, implementation planning, best practices, ROI projections and change management.

At the same time, make sure to evaluate the data foundation you have in place to ensure you get maximum value from your investment. Without a centralized data foundation, your benefits will be limited.

68%

of CEOs of some of the largest global industrial products companies are increasing digital/technology investments.[4]

As you progress through this stage of digital transformation, be on the lookout for some of these common data challenges that impede ROI:



Building a plan for your data in parallel with your innovation strategy will help alleviate organizational concerns about ROI.

Phase 2:

On the road to transformation

On the road to transformation

1

THE IMPLEMENTATION STAGE

When you reach the implementation stage, you've decided what technology you want to put in place and whether its deployment will impact an isolated department or location, or if it will be used across the enterprise. As part of this process, you may need to make decisions about:

- Sensors for IoT relays on cycle counts or other conditional measuring
- Data collection terminals
- RFID, 5G or other networks to handle transmissions

At this point, you're also trying to figure out how to harness the data from Industry 4.0 equipment innovations for analytics, automations, monitoring and optimization. This will allow you to drive further benefits such as:

- Adding predictive maintenance on machines
- Identifying production bottlenecks
- Accessing real-time production information
- Adapting and optimizing processes
- Sharing data points or other process information to related departments such as customer service, procurement, sales or scheduling

There are several technical and data challenges at this stage. On the technical side, this could include indecision about selecting a broadband provider, a lack of knowledge about how to align technology solutions or the need for additional workforce training.

On the data side, you could have difficulty normalizing data formats for use by other departments or be unable to integrate with other internal or external systems for selective data consumption.

2

THE EVALUATION STAGE

It is quite common for manufacturers to get stuck in this phase. This can happen for various reasons:

- The implementation was not seamless
- You've encountered additional complexities
- More investment is needed
- You aren't seeing the returns that were anticipated

Project abandonment often occurs at this point, sending you back to phase one or to develop costly workarounds to justify the cost and effort to date.

Critical questions to ask about your processes and workflows

- Can you access real-time data?
- Does it show you what you need?
- Are there any gaps in the data?
- Can you exchange data with other departments, systems or external parties?
- Have you improved your workflows?
- Do you have control over your data?

It's important to be mindful of common challenges during the evaluation stage: a data foundation that does not support data sharing across the

enterprise; continued use of manual processes; and a lack of central governance that assesses data quality.

3

THE AUTOMATION & SKILL DEVELOPMENT STAGE

One of the benefits of Industry 4.0 is the ability to automate. Not only does this enable you to streamline production and decrease dangerous, error-prone or repetitive tasks, but it also allows you to shift workforce responsibilities to focus on monitoring and other value-added activities. As a result of automation, you'll see an increased consistency and quality of your operations.

Common challenges with this stage include:

- Concerns about the lack of control and transparency that automation brings
- Distrust about data quality and the analytics being performed using that data
- Role permissions are not yet established or enforced
- Additional employee training is needed
- There's no alert system to catch errors
- Concerns about employee morale

With digital transformation comes more pressure on your IT infrastructure. At this stage, you need to appropriate additional resources to ensure compliance on data privacy and system security. Once you start to see ROI, you will want to expand the technology to ensure the full benefits of your investment are being realized.

4

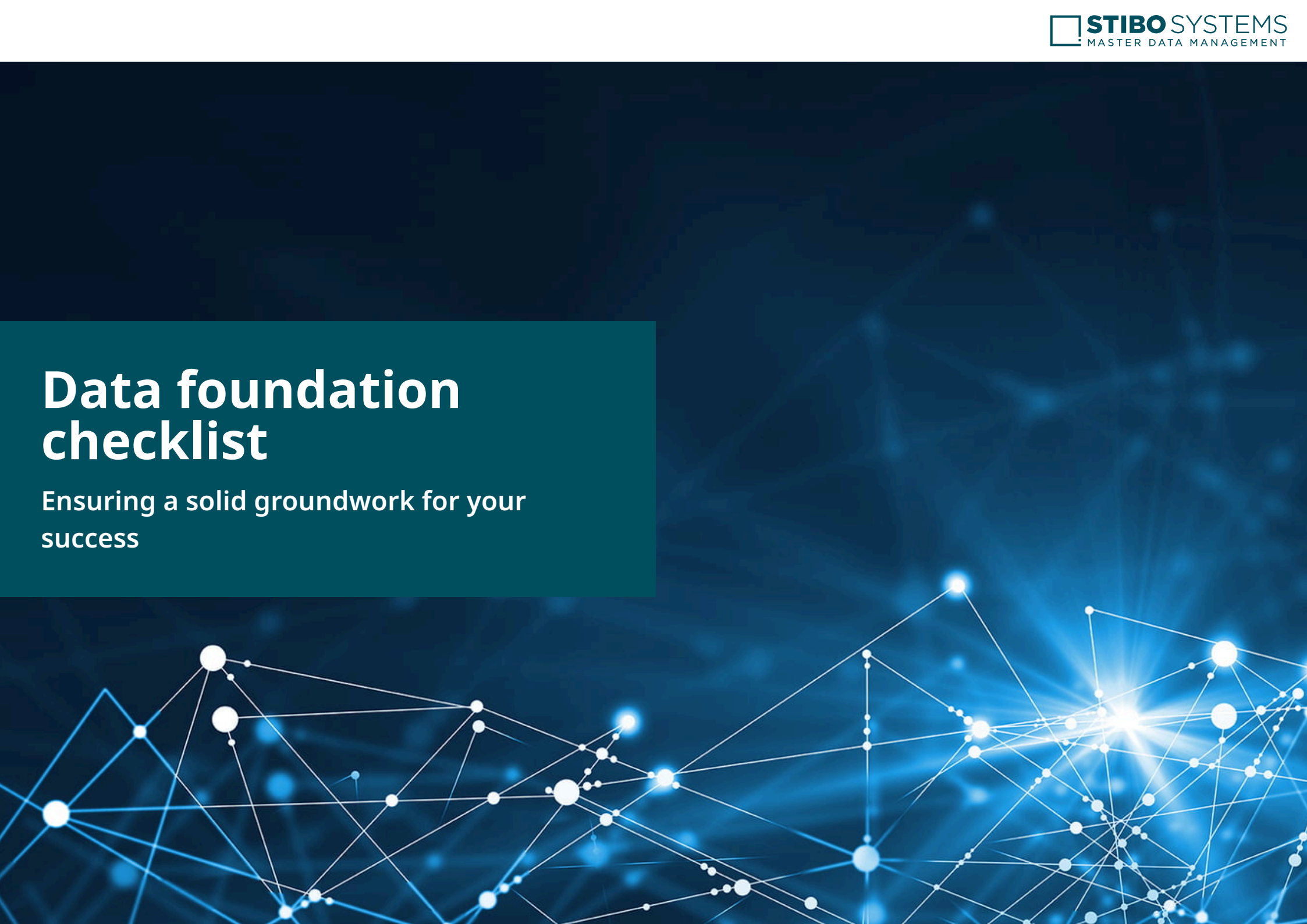
THE SECURITY & SCALABILITY STAGE

At this point, many manual, offline processes are now online and reliant on digital capabilities. Incompatibility with legacy systems and other technology solutions across the enterprise are a common problem, making it difficult to create seamless workflows.

STIBO SYSTEMS
MASTER DATA MANAGEMENT

Data foundation checklist

Ensuring a solid groundwork for your success



Data foundation checklist for digital transformation success

When evaluating your data foundation, the key is to have a non-pervasive solution in place. This allows you to keep your technology systems where they are – with their current processes and permissions – while providing a data management overlay that can:

Establish centralized governance

Standardize formats across systems

Acquire/map to various data sets

Enable data sharing across the manufacturing enterprise

Deliver accurate data on digital/physical equipment

Provide scalability and agility needed for new acquisitions

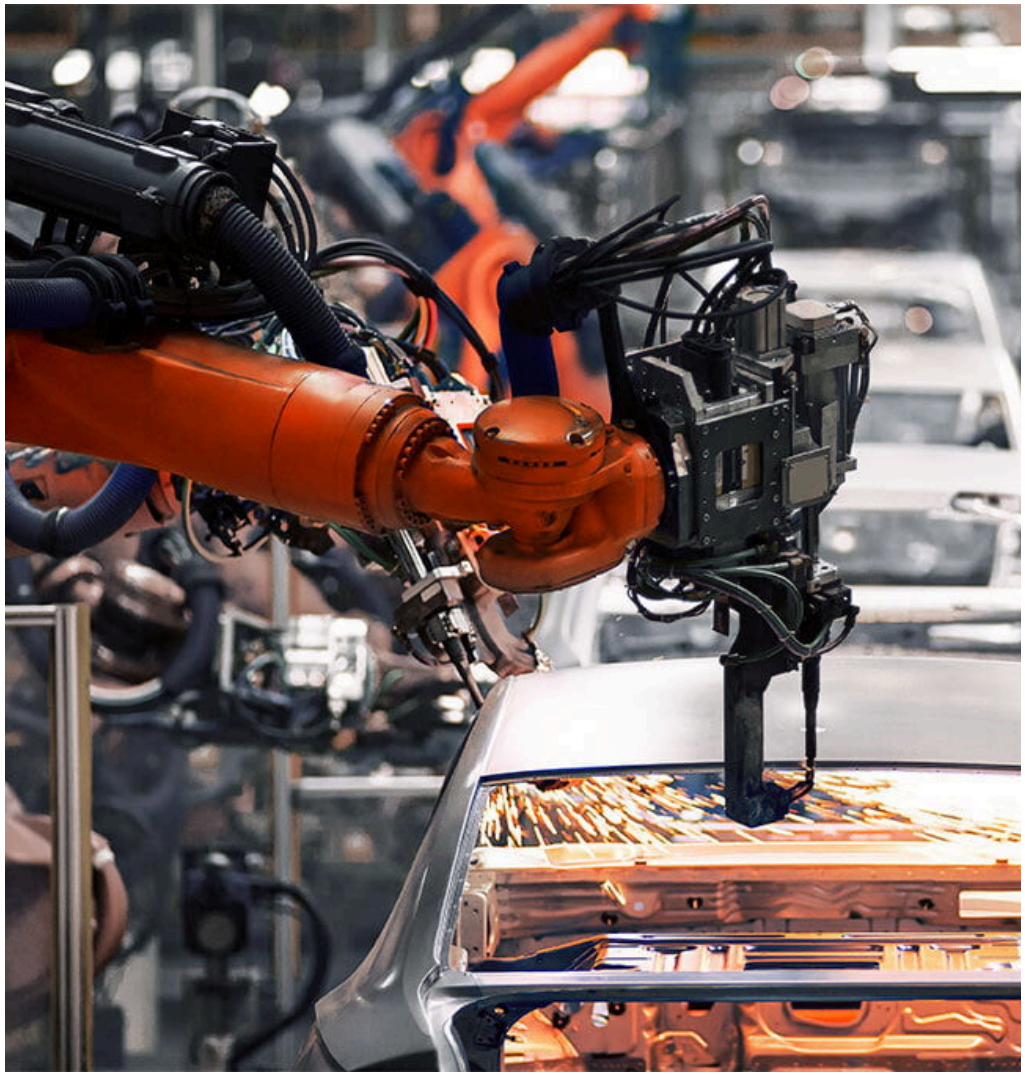
Phase 3:
Optimized for success

Optimized for success

1

THE ADAPTABILITY STAGE

If market conditions have changed since your innovation rollout, you likely have new business needs that require adjustments to your systems, processes and data foundation. A common challenge at this stage is not knowing how to adapt the technology to address new business needs. You may also lack flexibility in the workflows or IT infrastructure.



2

THE ECOSYSTEM STAGE

During this part of the digital transformation process, your goal is to optimize your operations across the enterprise, extending workflows to external points of contact outside your company. Doing so allows you to support initiatives such as:

- Customer portals or self-service interfaces
- Supplier integration
- Direct feeds to internal production machines/schedules from customers or sales
- Data as a service and other automations for tasks such as ERP inventory replacement
- Third-party enrichments

With this level of optimization, a centralized data foundation is essential. Without one, you are likely to run into data issues such as difficulty when importing new data sets, validating data before it is allowed into the ecosystem, or matching, linking and merging data sets. You may also have concerns about trusting automation that's using outside data.

3

THE ESG STAGE

Like many manufacturers, you're increasingly under pressure to meet your partners' and stakeholders' sustainability and Environmental, Social and Governance (ESG) requirements. To make sustainability and ESG work for your company, you'll want to avoid any misalignment between your internal business goals and the company's ideal ESG goals. It's also important to ensure you have data capabilities in place that will enable you to track and prove your ESG score.

Interactive poll not supported

View online version

4

THE NEW IDEAS STAGE

You have become aware of innovative technology that offers new opportunities for your products and services. While the potential value of the initiative is significant, you're concerned about scalability and whether you can support a seamless inflow/outflow of data to suppliers, customers, online content, etc.

A limited data foundation, workarounds, or postponed upgrades that have put you behind on functionality can fuel these concerns. Depending on your data capabilities, you may also have problems measuring the metrics you want to track.

STIBO SYSTEMS
MASTER DATA MANAGEMENT

A critical success factor

The data side of digital transformation

The following use cases are just some of the many ways Industry 4.0 can improve your operational efficiency. But to get the most value from these initiatives, you need to be sure you have the necessary data foundation and capabilities in place.

Share new, optimized product/ process designs to workstations

Technology needed:

- Digital infrastructure
- Digital twins
- Machine learning

Data capabilities needed:
Ability to govern, enrich and syndicate product data

Receive alerts on assets that need maintenance

Technology needed:

- IIoT
- Predictive maintenance

Data capabilities needed:
Ability to govern sensor data sets on assets and integrate with event management and analytics for accurate decision making

Track real-time emission data from assets or locations

Technology needed:

- Automation
- Digital infrastructure
- IIoT

Data capabilities needed:
Ability to centralize asset and location data to syndicate emission data reports using analytics and accurate event reporting

Improve inventory management by receiving real-time updates from suppliers

Technology needed:

- AI/Machine learning
- Automation
- Digital infrastructure
- Intelligent supply chain
- IIoT

Data capabilities needed:
Ability to automate business rules that trigger real-time data updates based on governed ERP and supplier integrations

Receive safety alerts for specific assets or locations

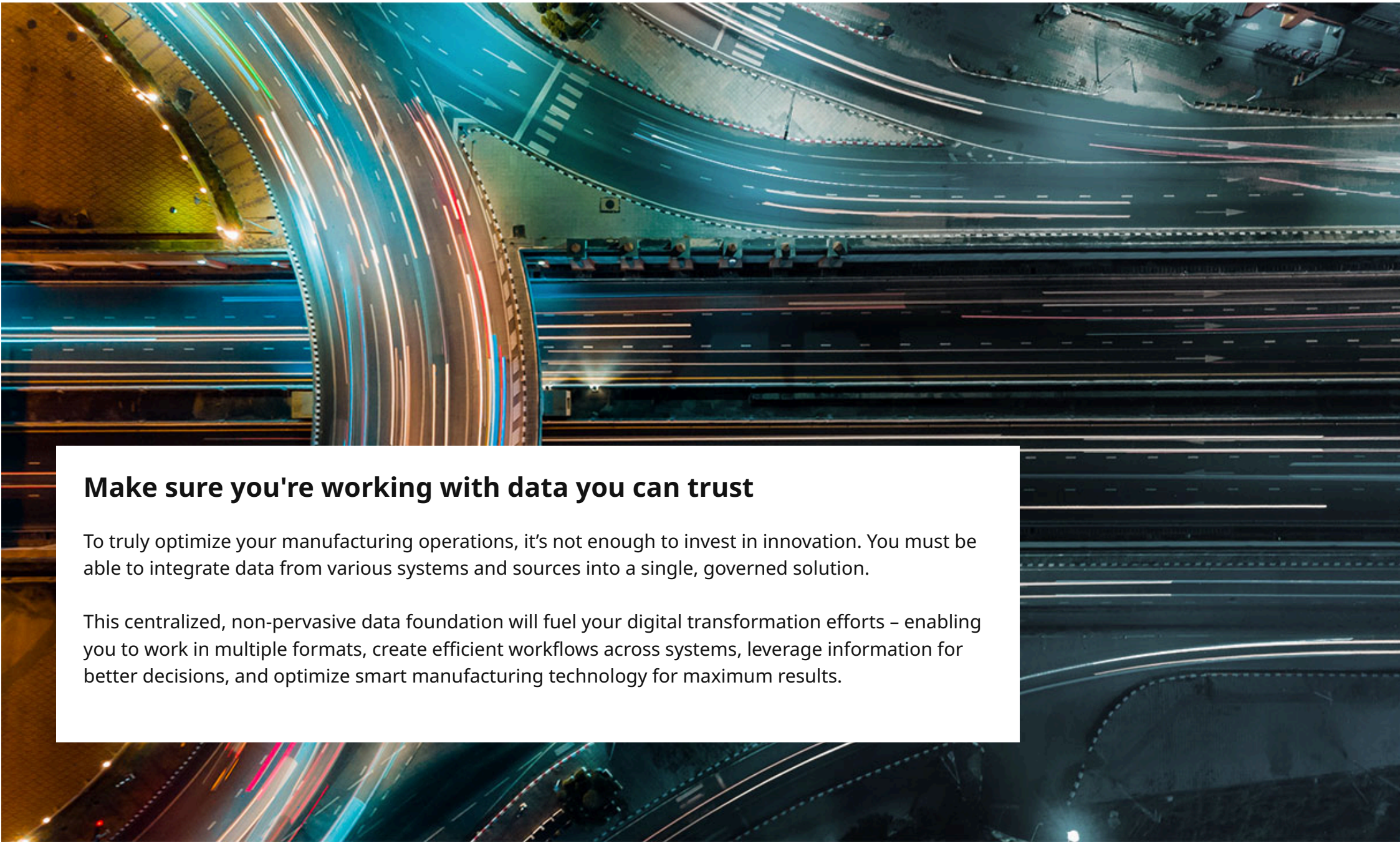
Technology needed:

- Automation
- Digital infrastructure
- IIoT
- Machine learning

Data capabilities needed:
Ability to centralize asset and location data to govern event management and analytics integrations for accurate decision making

Conclusion

The key to digital transformation success



Make sure you're working with data you can trust

To truly optimize your manufacturing operations, it’s not enough to invest in innovation. You must be able to integrate data from various systems and sources into a single, governed solution.

This centralized, non-pervasive data foundation will fuel your digital transformation efforts – enabling you to work in multiple formats, create efficient workflows across systems, leverage information for better decisions, and optimize smart manufacturing technology for maximum results.

Sources: 1 https://www.gartner.com/smarterwithgartner/6-key-actions-for-a-successful-smart-manufacturing-strategy; 2 https://www.mckinsey.com/industries/industrials-and-electronics/our-insights/capturing-value-at-scale-in-discrete-manufacturing-with-industry-4-0; 3 https://www.mckinsey.com/capabilities/operations/our-insights/capturing-the-true-value-of-industry-four-point-zero; 4 https://www.ey.com/en_us/advanced-manufacturing/is-your-digital-strategy-fit-for-the-manufacturing-future

STIBO SYSTEMS
MASTER DATA MANAGEMENT

Discover how Stibo Systems data management solutions drive digital transformation

How MDM helps you

Explore the solution