Amid the hype surrounding Industry 4.0, IIOT, and digital transformation, the introduction of Industry 4.0 has caused a bit of a culture shock for manufacturers. The benefits of data-driven manufacturing are far too significant to ignore and will enable many to deliver competitive advantages in an ever-competitive landscape. Digital transformation is about changing business models and about companies not just taking advantage of the huge opportunities created by these latest technologies but also preparing for their constant evolution.

These new models for technology-enabled manufacturing have already moved into the implementation phase by many of the world’s top manufacturers. However, a great deal of hesitancy exists for many manufacturers to embrace the technology and modernization that solves these new challenges. This hesitancy is a product of a few specific factors:

> **LACK OF CLEAR VISION AND STRATEGY**
Roughly 50% of US companies admit to not having a systematic roadmap or toolbox for easy rollout of digital manufacturing solutions. Because no standard roadmap for digital manufacturing exists, companies are often uncertain around where to start and what foundational capabilities are required to succeed.

> **LACK OF COMPETENT TECH PARTNERS**
15% of all US companies identify lack of knowledge about suitable providers as their biggest obstacle. Business leaders need to understand which technology solutions address their core business problems as well as the right criteria for evaluating solution providers.

> **DIFFICULTY MANAGING AND ATTRACTING DIGITAL TALENT**
21% of all US companies are facing a talent war as their biggest obstacle in transformation - companies need to build capabilities in-house in order to implement new strategies and tactics; experiential learning is the most effective way to build capabilities quickly.
Most manufacturers are caught in a state of reactivity.

Despite producing the most data, manufacturing is ranked last in digital transformation efforts. Compared to all other global industries, manufacturing is still caught in a state of reactivity. While some analytics companies have attempted to develop various solutions to address this problem, it has yet to be truly solved. There is no silver bullet. There is, however, a starting point.

MachineMetrics was designed to help companies overcome the challenges along the digital transformation journey and to advance them forward from reactivity, to proactivity, and to predictivity. We are dedicated to empowering our customers to not just employ the latest technology but to achieve success along their individual journeys. How do we do this where so many other companies have failed? It’s all about knowing where you stand and planning for the road ahead.
You can’t know where you’re going without knowing where you are.

To build a roadmap to digital transformation, most companies are looking into the future, attempting to visualize where they want or need to be in twenty years, and planning backwards. We often talk to companies who have predictive and preventative aspirations but who still don’t have machines networked, the necessary IT infrastructure to capture and aggregate machine data, or the internal organizational resources required to decipher the data and implement continuous process changes.

For many however, a more proactive approach to planning would be to accept that “You can’t know where you’re going without knowing where you are now.”
It's all about preparation.

Here are a few areas of focus for any company to consider when building out their roadmap:

**Organization**
To understand what you are solving for, it’s essential firstly to be aware of what the problems are, and then to become capable of not just solving those problems but to ready ourselves for the greater problems in the journey ahead. Transformation requires buy-in at all levels, from the front office and on the shop floor, but it also requires internal leadership. It’s critical for manufacturers to recognize the important role organizational attributes play in long-term project success and begin discussions about how the odds of project success can be increased by evaluating organizational gaps. Ask yourself: Where do we stand now? Does your team have the right people in place to implement new technology? Are there project leaders capable of owning this project?

**Communication**
The information we need is available, but the hard part is actually applying it. Avoiding an “us vs. them” mentality is critical in this transition stage. It is vital to build trust between everyone involved in the manufacturing process so problems can be quickly identified, and new solutions can be effectively implemented as a team. Don’t let a lack of communication stand in the way of change. Ask yourself: Does your team have an environment capable of communication and applying process changes not just from the top down but from the bottom up?

**Waste Reduction**
Before you embark on our digital transformation journey, it’s important to get as lean as possible with your current capabilities. The goal of lean manufacturing is continuous improvement of production processes, while eliminating waste and cutting costs. However, setting the stage for a lean process is just the first step; implementing a system that allows you to maximize your manufacturing productivity results will take your lean model to the next level. Ask yourself: Are we lean? Do we know what our top areas of waste are? Have we embraced lean manufacturing principles?

**Key Performance Indicators**
Depending on the systems and processes you have in place on your factory floor, you may face one of two problems; either you don’t know which key performance indicators (KPIs) you should track to enable you to improve your factory performance, or you are unable to collect sufficient data to accurately measure the KPIs you want to track. Having specific KPI’s will allow you to assess, analyze and track our manufacturing processes, as well as to evaluate success in relation to goals and objectives. Ask yourself: What are our key perfor-
Optimize your capabilities for the greater journey ahead.
performance indicators that we want to measure as a benchmark for our improvement? Do we have any information now that we can use for this benchmarking? Some of our top suggestions to get started? OEE, Machine Utilization, Set Up Time, Cycle Time, and Scrap Rate.

→ **TOOLS**
Digital manufacturing will transform every link in the manufacturing value chain, from research and development, supply chain, and factory operations to marketing, sales, and service. Having tools to measure your efforts, for designers, managers, workers, consumers, and physical industrial assets will unlock enormous value and change the manufacturing landscape forever.

Of course, every company will need tools to help them optimize their capabilities, but for this job some tools will make more sense than others. Your KPI's will help you assess which tool will allow you to capture the information you are looking for that best fit your company’s needs. Ask yourself: What tools do we want to use to measure our efforts? What tools are we already using that we can leverage now?

→ **DIGITAL CONNECTIVITY**
In 2018, the cloud can be your best friend, and with security being better than most on-site solutions systems, the benefits are tremendous. Increasingly more companies are developing or moving their workloads to the cloud by the day, aiming to migrate everything onto the cloud over the next few years. This digitization of data will enable you to deliver competitive advantages in an ever-competitive landscape. Networking your machines and ensuring that all production data can be captured is one of the most essential capabilities for real-time analytics. Ask yourself: Are you ready to digitize our assets? Do you have the technical assets in place to capture and store the data?
Define Your Roadmap to Industry 4.0:

Once you’ve completed your capabilities reality check, it’s time to begin building your roadmap. Using our areas of focus, your roadmap should actually be quite logical at its core.

 ➔ **STEP 1: GET CAPABLE**
   Let’s become as capable as we can and have all our ducks in a row to ready ourselves for the greater journey ahead.

 ➔ **STEP 2: DIGITIZE**
   Once we’ve optimized capability, it’s time to digitize our assets, visualize our manufacturing data in real-time, and measure the success of our KPI’s using our tools.

 ➔ **STEP 3: ANALYZE**
   We can then advance our use of this data to begin applying predictive and preventative models to our processes with the hopes of furthering our optimization efforts.

 ➔ **STEP 4: VIRTUALIZE**
   We can then virtualize these efforts into an integrated manufacturing system framework to support the interoperability between our digital factory tools to solve any real time problems as they arise.

 ➔ **STEP 5: AUTOMATE**
   Link design, engineering, manufacturing, supply chain, distribution and services into one intelligent (smart) automated system that can be used to self-improve both products and processes within the system.
It's time to shift the focus from the future to the now.

Ask yourself these three critical questions:

→ WHAT STEPS YOU CAN TAKE TO CREATE IMMEDIATE VALUE?

→ WHERE AND WHEN TO INVEST TIME AND RESOURCES?

→ HOW TO ADVANCE TO THE NEXT STAGES?

It’s time to shift the focus from the future to the now.

Ask yourself: how do we know where we are now so we can know what the next step is? Do you have the technical assets in place to take that next step? Do you have the assets and buy-in necessary for that step to succeed? Does your organization have the necessary institutional support?

Visualizing your roadmap and where your organization lands within it will help define what steps you can take to create immediate value, where/when to invest time and resources, and most importantly how to advance forward to the next stages of your company’s evolution.
Factory Floor Monitoring & Analytics
MachineMetrics’ production analytics platform is simple, easy to integrate, and the most comprehensive on the market.

HERE IS HOW MACHINEMETRICS REVOLUTIONIZES INDUSTRIAL IOT:

THE PROBLEM:
- Poor production visibility
- Lack of communication
- Shop-floor data isolated in silos
- Underutilized equipment
- Process inefficiency

THE CHALLENGE:
- Roughly 50% of US companies admit they lack a systematic roadmap to digital manufacturing solutions and automation.
- Over 90% of companies have yet to attempt to integrate solutions.
We gathered feedback from 100+ manufacturers on why current solutions did not fit their needs—and how they could be designed better.

**Industrial IoT, Simplified**

MachineMetrics has revolutionized Industrial IoT for the manufacturing sector. Despite producing the greatest amount of data, manufacturing is the furthest behind any other global industry in their digital transformation efforts. With simple “self-install” IIoT connectivity, MachineMetrics predictive analytics and machine learning platform allows manufacturers to harness, structure, and take action on this data, driving manufacturing efficiency by more than 20% on average for customers.

Our fully automated machine monitoring solution provides visualizations of real-time manufacturing production data, notifications, as well as historical analytics, allowing factory workers to make faster, smarter, more confident decisions based on real-time data.

**How MachineMetrics Stands Out**

- We collect data from machine controls and machine operators for the entire production floor and use this data to monitor machine conditions (faults, status, tool utilization), production (OEE & Machine Utilization), work-order status, quality tracking and downtime reasons that can be auto classified or indicated by the operator with touch screen tablet interfaces mounted at the machine tool.

- Real-Time Dashboards are mounted on the production floor to provide an at-a-glance indication if jobs are performing at or below expectations (against Parts Goal or OEE metrics).

- MachineMetrics provides robust and superior reporting features including OEE reports, job reports, downtime and quality pareto reports. All reports can be compared by shift, machine, and individual job/part reports. Utilization, TEEP and OOE are also measured and visible in historical reports.

- The real-time and historical data collected allows managers to track efficiency and quickly identify production bottlenecks that are related to specific machining operations and helps measure the effect of process improvements.

- MachineMetrics’ mobile friendly, secure cloud application allows you to access this data from anywhere and updates automatically with minimal IT expense. All that’s required is that machines are networked and accessible from our gateway device.
Harness the power of machine learning and predictive analytics.
**Product Description**

**THE OPERATOR VIEW**

Our touchscreen interface allows for operators to add human-context to machine data with touch screen tablet interfaces mounted right at the machine tool. Having a touchscreen at each machine with an intuitive interface that asks the operator to categorize downtime as it’s happening allows this information to be made available in real-time to managers in downtime pareto charts. Operators can also reject a part using the Operator View to manage and record quality data. Quality managers are able to view the quality pareto in real-time and when there are new rejects, head to the machine in question, re-inspect the parts and re-allocate as necessary.

**SUPERIOR USABILITY**

From the performance dashboard to the operator workcenter to our reporting features, the MachineMetrics interface is designed to be user-friendly for operators, managers, and upper-management. Our customers agree is that our aesthetic is both visually appealing and intuitive. Because of the platform’s simplicity, minimal training is required to get your team using the system and confident interfacing with the product.

**EASY INSTALLATION/SET-UP**

MachineMetrics is incredibly easy to integrate and requires far less time for setup than most other machine analytics and monitoring platforms. We allow for the option of self-integration or to work with our on-site integration team. With MachineMetrics, manufacturers can start collecting data in minutes from networked machines. As MachineMetrics is a cloud application, there are no servers to manage, and no applications to update. All that’s required is available internet and that your machines are on your network and accessible from our gateway.

**POWERFUL, ACTIONABLE REPORTING**

MachineMetrics provides robust and superior reporting features including better OEE reports, job reports, downtime and quality pareto reports. Real-time OEE is available in various reports including the real-time dashboard, historical reports that can be compared by shift, and when viewing individual job/part reports. Utilization, TEEP and OOE are also measured and visible in historical reports. Information such as cycle times, performance, number of parts produced, rejects, downtime reasons, and reject reasons can be reported on for each part operation. This information is presented in eminently understandable form, allowing managers to quickly identify issues that are related to a specific machining operation and help measure the effect of process improvements.
MachineMetrics has the unique capability to connect to other types of software, including the ability to tie into a manufacturer’s production goals / ERP to give real-time feedback on a job’s performance, and a comparison with previous job runs. To date we have released deep integrations with Epicor and Infor Visual and our open API will allow MachineMetrics to directly integrate with any ERP. By partnering with other best in class manufacturing software, we provide seamless connectivity of information silos via our digital threading.

MachineMetrics is dynamic; we have a team of developers that are adding new features weekly including ideas brought to us by our current customers. We understand that every manufacturer is unique and we don’t want to shoe-horn them into a profile to sell them our software. Rather, we offer a set of tools to our customers and support them to use the tools for whatever fits them best.

Because MachineMetrics is cloud-based, there’s minimal IT infrastructure required. Our mobile friendly software allows you to access your data from anywhere with a secure connection from your mobile phone or home PC without IT support or complicated firewalls and VPNs. We can also roll out new features instantly upon approval. MachineMetrics also provides Full-Time unlimited support forever, with absolutely no hidden costs.

MachineMetrics provides all customers with a customer success manager (CSM) that, through routine meetings, helps train their team on our software and meeting their performance goals. Customers often make feature suggestions, and CSMs are dedicated to making those requests a reality. CSMs are there to not only ensure success using MachineMetrics, but to know the right questions to ask and to make sure that our users are happy with their product experience.
MACHINEMETRICS CUSTOMERS INCLUDE:

- Fastenal
- Shiloh
- SECO
- Whelen
- Turbocam International
- Snap-on
- Benchmade
- Epic
- SilencerCo
- Omni
- Praxair
- Gardner Denver

ESTABLISHED PARTNERSHIPS INCLUDE:

- UJ Labs
- McKinsey & Company
- Morris The Robert D. Morris Company
- Tsugami
- Wipfli CPAs and Consultants
- Mastercam

AWARDS:

TECH-ECOSYSTEM PARTNER
MachineMetrics was chosen by McKinsey & Company as one of only twenty companies out of 600 to become a Tech-Ecosystem Partner for the new Digital Capability Center (DCC) in Chicago.

SMART MANUFACTURING PRODUCT OF THE YEAR, 2018
IoT Breakthrough Committee

TOP 10 MANUFACTURING INTELLIGENCE SOLUTION PROVIDER, 2017
Manufacturing Technology Insights

MASSACHUSETTS TECHHUB’S NEXTGEN TECHNOLOGY AWARD

NEW ENGLAND INNOVATION AWARDS NOMINEED, 2018
New England Business Association
THE FIRST AND MOST IMPORTANT STEP TOWARD DATA-DRIVEN MANUFACTURING AND INDUSTRIAL IoT/INDUSTRY 4.0 IS TO INSTALL WEB-ENABLED SHOP-WIDE MACHINE MONITORING SYSTEMS.

MachineMetrics is ready and eager to help manufacturers develop their roadmap to digital success. What are you waiting for? Get started today!

Learn how MachineMetrics helped these manufacturers navigate their own digital transformations:

- CAROLINA PRECISION MANUFACTURING
  - Swiss CNC
  - Read the Case Study

- FASTENAL
  - Precision Metalworking
  - Read the Case Study

- CARLSON PRODUCTS
  - Metal Stamping and Fabrication
  - Read the Case Study