NEXT-LEVEL TECHNOLOGY FOR YOUR MANUFACTURING OPERATION

The future of manufacturing tech is here today—is your company ready?

Stoneridge
software

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THE FUTURE OF MANUFACTURING TECH

As a leader in a discrete manufacturing business, you may find it's practically impossible these days to read anything about Artificial Intelligence in discrete manufacturing without encountering headlines screaming all kinds of promises. The bottom line is: "The future is here!"

It may be a little overwhelming, but the truth is…*the future actually IS here*. The trick is to determine which innovations your organization is ready for, which ones are going to make your organization more competitive, and which are worth waiting on for the time being.

The right investments in the right technology can give your organization the cutting edge, and can make you more productive and competitive. While some promises are still further out, we are in a genuinely exciting time when it comes to technological advancements in the manufacturing field.

WHAT IF YOU COULD ASSESS INNOVATIONS THAT ARE AVAILABLE FOR YOUR BUSINESS AND DETERMINE:

1
If an advancement is really available and applicable to your business

2
How that solution will set you apart from your competition

3
How to incorporate it into your business

4
Whether this is the right time to make an investment, or if it's wise to wait for future iterations?

Use this eBook as a guide to understand what manufacturing innovations are available to your business, how they can improve your manufacturing operations, how to assess if they are right for your business today, and how to determine if you have the right technology partner for your needs.

ARTIFICIAL INTELLIGENCE

Without question, any discussion about advanced manufacturing technology needs to start with AI. Because there are many ways to define AI for the manufacturing industry, let's start with the basics. The term and idea of AI has been around for more than 60 years at this point, but things are only getting real, as in applicable to mainstream manufacturing, in the past decade. AI for manufacturing, in a nutshell, is the ability of any machine to imitate human behavior in an agile or intelligent way. In this context, it's often classified into two types: Applied AI & General AI.

➔ Applied AI

Is a collection of technologies that rely on algorithms and programmatic responses to simulate intelligence, generally with a focus on a specific task. Weak AI lacks advanced understanding of language and can't determine the meaning behind the words you speak. The program simply listens for key sounds in your speech and, when it detects them, follows its programming to execute certain actions. To users, this can seem surprisingly intelligent— and voice recognition is far from a simple computing task — but in reality, there is no actual "thinking" or learning going on behind the scenes.

➔ General AI

Is intended to think on its own. These are systems built with the human brain as their archetype. Strong AI is designed to be cognitive, to be aware of context and nuance, and to make decisions that are not programmatic in nature but rather the result of a reasoned analysis. Strong AI learns and adapts, to make a decision tomorrow that is better than the one it made today.
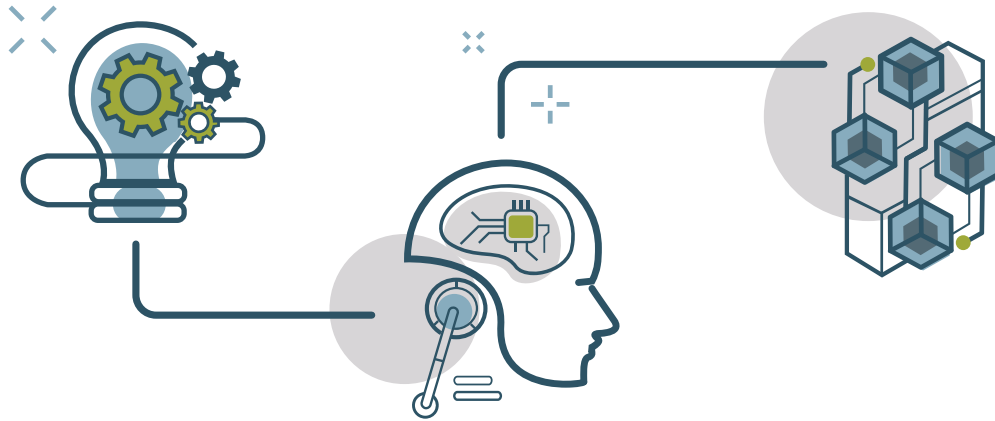
ARTIFICIAL INTELLIGENCE CONTINUED...

Venture capital investment in AI now tops $3 billion annually, and the number of active startups in the U.S. that are developing AI technologies has gone up by a factor of 14 since 2000*— and that number is constantly expanding. So, depending on your organization's tolerance for change and innovation, opportunities are readily available now to power up AI solutions in your manufacturing business.

Current AI innovations for manufacturing are mostly designed for use in business: developing powerful tools that leverage cutting-edge cognitive technologies can give your business decision-making processes a game-changing upgrade. AI-based technology is getting easier to use and integrate, too, so incorporating these solutions into your company's systems is easier than you might imagine. And the truth is, these innovations are here to stay. So, whether you

integrate them now or do it later, successful manufacturing businesses will eventually embrace the advancements and efficiencies that come with integrated AI solutions.

Ultimately, AI can be applied to manufacturing-specific actions such as IIoT, Machine Learning, Equipment Asset Management, and business intelligence tools like Supply Chain Visibility and Manufacturer Empowerment. In this eBook, we'll explore each of these operations in turn.

$3B Venture capital investment in AI now tops $3 billion annually

*https://www.itproportal.com/features/2019-the-year-ai-and-machine-learning-transform-businesses-with-new-data-interaction/
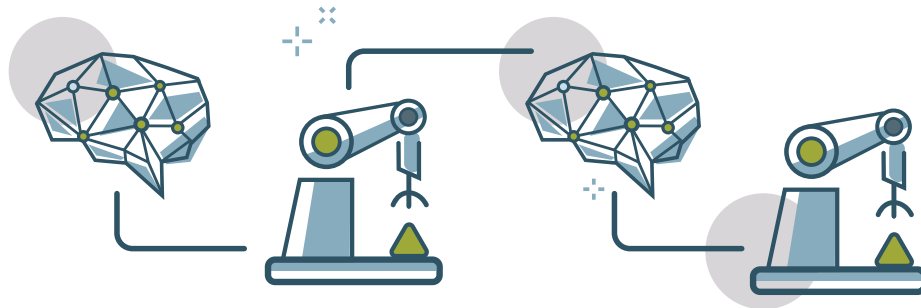
MACHINE LEARNING: A SUBSET OF AI

Machine learning is a distinct concept from AI, and if you're contemplating investing in AI solutions, this guide will help you understand these distinctions. Think of Machine Learning as a subset of Artificial Intelligence. This technology uses algorithms to resolve and sort data. Machine Learning can go on to learn about the type of data it's sorting, and then come up with a prediction or recommendation regarding whatever the data was about.

Optimized Machine Learning allows for demand planning within an efficient manufacturing operation. For example, a Machine Learning system can assess a data feed—temperature and tolerance information from sensors on a piece of manufacturing equipment, for example—and be asked to draw conclusions about it. This can mean searching that data for trends, patterns, and anomalies. It can assess information that may or, importantly, may not be obvious to a human observer. Ultimately, a Machine Learning system might conclude that a machine needs to be repaired because it is about to fail, or that it needs to be run at a lower speed to prevent inefficiencies or, worse, failures. As the machine learning algorithm continues to learn from this data, it becomes progressively smarter and easier for it to generate additional insights down the line, and as those insights become more accurate, your operations naturally become more productive.

Is Machine Learning an investment?

The short answer is: Yes. Just like any advancement that puts your business at a competitive advantage, ML is an investment up front.

Can Machine Learning make your organization more competitive, efficient, and profitable?

This is important, and obviously the answer is **YES**, making the investment worthwhile.

Is your competition assessing Machine Learning systems for their business?

Definitely yes. If it makes an operation more efficient, it makes it more competitive. You bet your competition is looking into making an investment here, and they are worried you are, too.
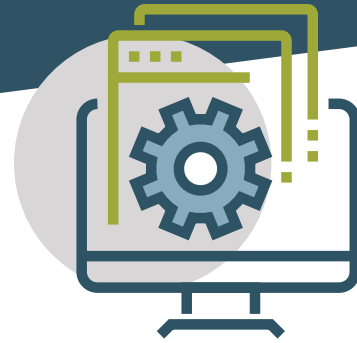
INDUSTRIAL INTERNET OF THINGS (IIoT)

Just as Machine Learning is a subset of AI, so is the Internet of Things (IIoT). Simply put, IIoT deals with connecting any device with an on and off switch to a network. Broadly speaking, the Internet of things is defined as being a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

Applying LLoT to manufacturing, the Industrial Internet of Things (IIoT) takes networked sensors and intelligent devices and puts those technologies to use directly on the manufacturing floor, collecting data to drive artificial intelligence and predictive analytics. The IIoT can transform traditional, linear manufacturing supply chains into dynamic, interconnected systems—a digital supply network (DSN)—that can more readily incorporate ecosystem partners. As key enablers of DSNs, IIoT technologies help to change the way that products are made and delivered, making factories more efficient, ensuring better safety for human operators, and, in some cases, saving millions of dollars.

One of the greatest benefits of the IIoT is how it can dramatically improve operating efficiencies.

A well executed ML and IIoT solution reduces time for your business to get to market with a new product. And if, in the manufacturing process for that item a machine goes down, connected sensors can automatically pinpoint where the issue is occurring and trigger a service request. Just as importantly, the a well-designed IIoT system can help your team predict when a machine will likely breakdown or enter a dangerous operating condition before it ever happens.

IIoT solutions are available for your manufacturing business, and they are being assessed (if not actively implemented) by your competition. The improved operational efficiencies brought about by a well-implemented IIoT alone are a compelling reason to embrace IIoT advancements for your business.

...a well-designed IIoT system can help your team predict when a machine will likely breakdown...

EXAMPLE 1 | IIoT And ML

COMPANY A: SODA BOTTLING COMPANY

1

THE SITUATION

Company A was falling behind their competition with time to market, and operational inefficiencies, specifically bottle leakage, were cutting into profit margins. Management was under pressure to implement improvements, and was been given the go-ahead to make a major investment in integrated Machine Learning and IIoT solutions in order to catch up. Leadership also put pressure on the CTO and her team to show fast ROI. Investment decisions were made and IIoT/ML solutions were implemented in a 3-phased approach.

2

THE SOLUTION

Using IIoT, the company was able to gather statistical information revolving around flow control, amount of sugared water, batching mechanisms, filter wear and more. With real-time data, the team was able to identify maintenance specific events as they were occurring and address issues immediately. This data was then leveraged to predict maintenance events before they happened and implement a production rerouting solution to maintain productivity when lines are under maintenance. Management can now be proactive to issues instead of reactive.

3

THE OUTCOME

The office of the CTO worked to manage the expectations of the management team, a certain amount of education was needed to help them embrace the multi-phased outcomes that should be expected with this complex solution. But ultimately, the leadership team was thrilled with the decisions that were made. After implementation, the line started realizing efficiencies around lid and wrapping materials, eliminating the leakage problem, and Company A was able to report that they had closed the time-to-market gap between them and their closest competitor.

4

THE STONERIDGE DIFFERENCE

Machine Learning and IIoT have significantly impacted manufacturing generally and the entire consumer packaging industry particularly. At Stoneridge Software, we have a unique view into the industry, and we can report that companies that aren't on the board yet with ML and IIoT solutions are falling behind their competition. With an unrelenting focus on technical excellence, when you hire Stoneridge, you get a team that has made it their very essence to keep up with the most recent AI, Machine Learning, and IIoT solutions in order to deliver the best solutions for your business.

PREVENTIVE MAINTENANCE

Preventative maintenance is an AI-based function that collects, analyzes, and utilizes data from various manufacturing sources like machines, sensors, or switches. By applying intelligent algorithms to the data, solutions anticipate equipment failure before it happens. Manufacturing companies that implement cutting-edge preventative maintenance solutions are able to keep machinery working efficiently and reduce maintenance and repair costs. AI-based preventative maintenance models identify anomalous behavior and turns equipment sensor data into meaningful, actionable insights that allow your team to administer proactive asset maintenance – preventing downtime, accidents, and failures.

In 2017 the International Society of Automation estimated that $647 billion[1] was lost globally on inefficient equipment asset management annually. Research from Gartner indicated that the cost of downtime can skyrocket as high as $540,000 for every hour assets, workers, infrastructure, systems or networks are unavailable[2]. Every minute a machine is down or inefficient means very real cost impacts to your business, regardless of your size or market share. For any serious manufacturing company, maintenance and optimization of equipment assets and efficient production schedules means better market position, higher profits, and overall success.

[1]https://www.isa.org/intech-home
[2]https://blogs.gartner.com/andrew-lerner/2014/07/16/the-cost-of-downtime/

Research from Gartner indicated that the cost of downtime can skyrocket as high as $540,000 for every hour assets, workers, infrastructure, systems or networks are unavailable.

EXAMPLE 2 | Preventive Maintenance

COMPANY B: SHEET METAL STAMPING

1
THE SITUATION

Company B is a machine metal stamping company for an OEM that had engaged them exclusively for all of their metal stamping needs. This at the time was the only contract Company B had, and they were in jeopardy of losing its exclusive contract with the OEM because of a reduction in quality and delivery times. Specifically, they were running three machines on three separate lines, and each line was occasionally reducing output or outright failing without notice despite aggressive in-person monitoring efforts by the line team.

2
THE SOLUTION

The Company B executive team partnered to invest in and implement an AI-based equipment asset management solution. They needed the solution to be comprehensive, but had to address the failing lines immediately.

The 2-phased approach included implementing preventative maintenance solution in phase one and a Power BI solution in phase two. With Enterprise Asset Management, they are able to keep track of all assets and machines on the floor. Now when a machine has a fault or failure, the system automatically generates the appropriate work orders for the repair and reassigns the work to a different production line during the maintenance down time.

3
THE OUTCOME

This occurs before issues can be observed by the humans on the line, due to the solution showing when components are wearing unevenly or otherwise failing. The engineers on the line have the information they need to respond – to predict and prevent - long before an event actually happens.

Company B remains the exclusive provider to their OEM. Their new solution allowed for expansion of the line by adding two additional lines and machines, and increasing deliveries and profits.

4
THE STONERIDGE DIFFERENCE

At Stoneridge, we make it our business to maintain our deep technical expertise on manufacturing-related innovations and have earned our reputation as the right partner for helping companies solve complex business issues.

SUPPLY CHAIN VISUALIZATION/ BUSINESS INTELLIGENCE

The actual manufacturing process is just one element of a healthy, profitable manufacturing business. Regardless of what it produces, or how efficiently it produces it, a company needs to be able to view data from every angle of the business and to be armed to make informed decisions, keep stakeholders and customers happy, and stay competitive in an increasingly competitive environment.

This is where supply chain visualization and business intelligence solutions come in—providing real time feedback, interactive visualization, and deep business intelligence capabilities with an interface simple enough for end users to create their own reports and relevant dashboards across every element of the business. Not incidentally, this is also where your investment in integrated solutions really starts paying off. By bringing together formerly disparate systems that talk to each other across the entire manufacturing operation, significant efficiencies can be realized.

A comprehensive BI solution for your manufacturing business should consider a reliable view of suppliers and logistics, products, parts, shipping, and all data needed to define strategy and make critical business decisions. It also needs to capture detail around interdependencies up and downstream, allowing for a 360-degree view of your business.

> **...deep business intelligence capabilities with an interface simple enough for end users to create their own reports and relevant dashboards...**

EXAMPLE 3 | Supply Chain Visualization/Business Intelligence

COMPANY C: HEAVY MACHINERY MANUFACTURING FOR EQUIPMENT USED IN THE SHIPPING INDUSTRY

1

THE SITUATION

At Company C, the warehouse processes were falling behind and it was impacting fulfilling orders. Employees, customers, and suppliers were frustrated. Information resided in siloes and there was no integrated line of sight for the information employees needed to respond to inquiries and get their jobs done effectively.

Company C needed a holistic and detailed view of the entire supply chain, including per business units, products, pricing, warranties, and specific bills of material. They wanted a way to identify specific choke points, clustering, inventory, loss, spoilage, and all other data that drove decisions and outcomes. They even wanted to be able to assess factors like how weather impacted the delivery times. And they wanted it all in one unified solution.

2

THE SOLUTION

Company C implemented a complete end-to-end solution that centered around real-time data, giving users insights into the supply chain, including inventory and production levels. By analyzing the data, Machine Learning capabilities give managers recommendations on projected sales and required purchases to keep up with demand during different points of the year.

3

THE OUTCOME

By addressing both the manufacturing issues with AI solutions and the data issues with a business intelligence implementation, Company C improved the entire business from initiation to delivery. Employees only have to learn one tool, can access one unified set of data, and are empowered to access the information they need in real time to answer questions, generate reports, and make decisions. Company C realized significant process improvements and increased time to market and profitability.

4

THE STONERIDGE DIFFERENCE

Integrating BI and AI solutions is what we do, and our deep technical expertise in these solutions and the manufacturing industry place us in a unique position for tackling your complex business issues. Whatever business issues you are faced with, we've built an organization that's experienced and ready to solve it.

MANUFACTURE EMPOWERMENT TOOLS

Today's manufacturing companies are in the middle of a true industrial revolution, as technology moving from mass production to customized production, and it's happening fast. And most leadership teams still have some catching up to do. Yes, even in 2020:

"Consumer expectations and the advent of connected devices and platforms are driving the persistent digitization of the manufacturing (industry). While the majority of manufacturing executives acknowledge the importance of this transformation, only 5% of them are satisfied with their current digital strategies. The industry continues to evolve in response to the challenge of ensuring the right products are delivered at the right price to the right person through a process of improved sophistication.

—Forbes, Top 5 Digital Trends in Manufacturing, August 8, 2017*

Complementing today's rapidly evolving technology, discussed at length in this eBook, the workforce is getting younger and exponentially more tech savvy, and smart manufacturing company leadership is harnessing that expertise. Workers want access to tools that don't require code, that allow them to build and control solutions within the scope of their job roles. And, by the way, it's not just the company leadership and company workers. Manufacturing business suppliers, vendors, and customers expect their manufacturer partners to be innovative and able to keep up with their expectations and evolving developments. All of this, all of it, is now a reality. People in a manufacturing business today can sit down and build an app without writing a single line of code or hiring a vendor.

Manufacturer enablement tools can be implemented in any business where leadership wants their workers to be able to innovate on the fly, and successful companies are embracing this approach.

* https://www.forbes.com/sites/danielnewman/2017/08/08/top-5-digital-transformation-trends-in-manufacturing/#5a7a0e90249f

EXAMPLE 4 | MANUFACTURER EMPOWERMENT TOOLS

COMPANY D: MAJOR AIRLINE

1

THE SITUATION

COMPANY D – MAJOR AIRLINE

Company D wanted insights into their luggage storage capacity for each aircraft during specific time frames or seasons. However, they didn't have a way to effectively capture that data for analysis and there were no out of the box tools available for end users.

2

THE SOLUTION

Using Power Apps, an employee of Company D was able to create an app that luggage handlers could use to capture information on luggage sizes and quantities for each flight. The system then compiled that data to identify patterns and predict luggage space requirements for each flight moving forward.

3

THE OUTCOME

Company D was able to utilize an employee with no previous development or coding skills to develop a solution to help them easily collect data in the field. This gave management insights to luggage handling data they did not previous have.

4

THE STONERIDGE DIFFERENCE

We empower your employees to be "new thinkers" and create apps to extend your core ERP solution and gather data at the points that make the most sense for your business. Our team works with you to empower your employees to help drive business forward.

EMPOWERING EMPLOYEES TO CREATE NEW BUSINESS OPPORTUNITIES

Well-implemented AI and BI solutions augment the operations in any successful manufacturing business. Ultimately, these brilliant tools are only as good as the people who run them and derive information from them. Technology empowers employees and opens up new opportunities and positions in business analysis, data engineering, app development, and more. AI is shifting the ways we can use data and arm our employees with intelligence and business insights to become more strategic and productive.

Technology-centric AI solutions for manufacturers provide workers and leadership with better insight and agility, helping companies increase profitability, improve efficiencies, reduce operational costs, and decrease their time to market. Smart, thoughtful solutions optimize the flow of information across the entire manufacturing value chain and increase uptime. Innovative manufacturing businesses can count on having consistent, auditable, and defensible information governance protocols. Extending ERP solutions to include Business Intelligence allows manufacturers to go from good to great with collaboration, information line of sight, reporting, and the data required to make advised decisions. Tech-savvy businesses are better positioned to attract and retain talent of all ages, and lead or displace their competition by being better, faster, and smarter.

And all of that depends on having smart people working with the technology.

Tech-savvy businesses are better positioned to attract and retain talent...

PICK THE RIGHT PARTNER

You can have the best intentions and the most tech-savvy employees ever assembled, but if you don't have the right plan and the right integration partner, you run the very real risk of making big, expensive mistakes. At Stoneridge, we often find ourselves coming in after an integration has gone sideways. While we can handle any situation and are happy to help no matter where you are (and we promise, we've seen it all) we want to help you make the right decisions the first time around.

Partner Selection Checklist— does your partner have:

- Experience with complex business integrations?

- Discrete manufacturing-specific expertise?

- Deep AI and BI technical expertise and unrelenting focus on excellence in both solutions and people?

- An undaunted approach to solving your business problems?

- A tried and true community for you to join and learn from?

That's just the beginning, but if your partner can demonstrate that they have the right expertise and will stop at nothing to solve your business challenges, then you're on the right track.

About Stoneridge Software

Stoneridge Software represents the entire suite of Microsoft Dynamics 365 solutions, Power Platform and Modern Workplace, with focused verticals in Agriculture, Manufacturing, Construction and Distribution. There's no one better at ERP + CRM integrations, including unique expertise in configuring dealer portals. The Stoneridge team accomplishes successful projects through brain power, grit and a proven process for implementation. The Stoneridge client community is cared for and supported through thoughtful, intentional outreach and educational opportunities.
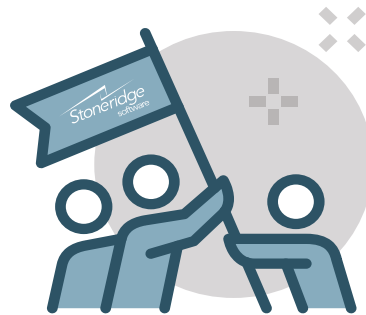
Contact us to learn more about how we can help you with your manufacturing software solutions.

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