How Artificial Intelligence and the Internet of Things (IoT) Can Enhance Enterprise Asset Management

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Work Smarter, Not Harder

The old adage, "You only move as fast as your slowest person," could apply to a team executing a single project or to an entire company. It is not limited to people; it also can relate to processes and physical assets like equipment. In today's business environment, slowing or stopping work isn't an option—this hurts a company's bottom line and drives customers away. Today's businesses can't afford to operate at anything less than optimal efficiency. To avoid the threat of a slowdown, companies with processes that are heavily asset driven must think about enterprise asset management (EAM) in new ways.

While the idea of the Industrial Revolution conjures images of 19th-century factories, the reality is that industrial business has experienced several revolutions. The first was classic mechanization, and the second turned those mechanics into mass-production assembly lines. The third revolution, which occurred more recently, was the use of computers and automation to optimize equipment and simplify processes. As technology takes another exponential leap, the Fourth Industrial Revolution is emerging.

Industry 4.0: The Rise of Cyber-Physical Systems

Beyond the physical assets of a company, automating how employees work provides a competitive advantage for businesses that want to boost returns. A company that has the best combination of machines and people is well positioned to produce at a consistent level. In fact, an alignment of both of those assets allows a business to focus its resources on improving itself without having to worry about equipment failure during a critical time.

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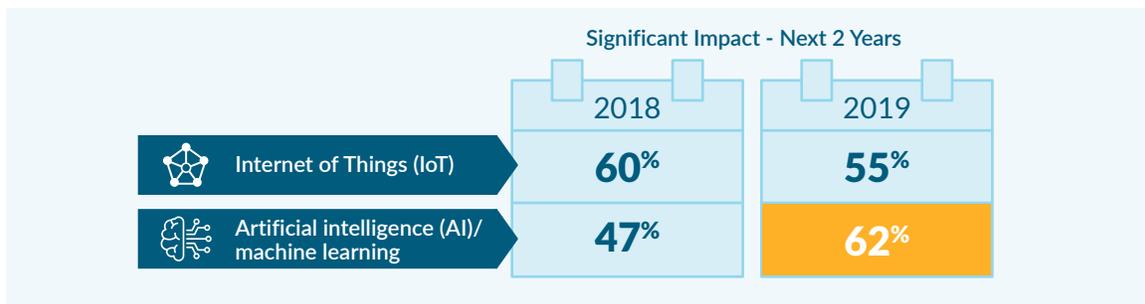
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Industry 4.0 and the Connected Plant

This cyber-physical approach to EAM has been dubbed Industry 4.0. It has given rise to the idea of a connected plant, which Germany Trade & Invest defined in 2011 as "a paradigm shift ... connecting embedded production technologies and smart production processes."[1] Not surprisingly, Industry 4.0 has flourished at industrial companies. It is based on four design principles:

Interconnection: The ability of machines, devices, sensors, and people to connect and communicate with each other via the Internet of Things (IoT).

Information transparency: The transparency that comes from Industry 4.0 technology allows organizations to collect immense amounts of data and information. This can enhance functionality and identify key areas that would benefit from innovation and improvement.

Technical assistance: Assistance systems can support humans by helping them visualize information for making informed decisions on short notice. Cyber-physical systems are available to complete tasks that are unpleasant, too exhausting, or unsafe for humans to do.

Decentralized decisions: Cyber-physical systems can make decisions on their own and perform tasks autonomously. Only in the case of exceptions, interferences, or conflicting goals are tasks delegated to a higher level.[2]

Artificial intelligence (AI) and the Internet of Things (IoT) are key players in Industry 4.0, which is why use cases are in high demand. In a recent study conducted by ASUG, we discovered that 62 percent of SAP customers believe AI will have a significant impact on their business within the next two years (Figure 1). IoT is not far behind, with 55 percent believing that technology will bring a similar, significant impact.

Figure 1: The Expected Impact of Emerging Technologies on SAP-Run Businesses

Significant Impact - Next 2 Years

	2018	2019
Internet of Things (IoT)	60%	55%
Artificial intelligence (AI)/ machine learning	47%	62%

Source: ASUG 2019 State of the Community, December 2018

ASUG's research aligns with a 2018 report from the analysts at the Market Research Engine, which projects that the IoT market for industrial businesses will exceed $176 billion by 2022.[3] According to ASUG's 2019 State of the Community study, industrial companies are significantly more likely (68 percent versus 58 percent) than those in other fields to see AI as having a near-term impact. This means the forecast for use of AI will likely be similar or higher than the use of IoT.

1 https://www.gtai.de/GTAI/Navigation/EN/Invest/Industries/Industrie-4-0/Industrie-4-0/industrie-4-0-what-is-it.html
2 https://en.wikipedia.org/wiki/Industry_4.0
3 https://www.marketwatch.com/press-release/industrial-internet-of-things-market-is-expected-to-exceed-us-176-billion-by-2022-2018-07-31

EAM = IoT + AI

IoT and AI go hand in hand because IoT allows a company to create sensors that can collect data about a piece of equipment. And data is what's needed to run effective AI-driven processes. David Widegren, head of asset and maintenance management at CERN, says, "This combination of asset management with connected equipment and the data we capture from the assets is really the way forward. We call this the intersection of industrial IoT and EAM. This is the sweet spot for the future."[4]

There are plenty of challenges within EAM that IoT and AI can help solve. These can be at the functional level, such as signaling equipment failure or notifying a department about low use of a certain technology that could lead to a low ROI. Or they could be at the strategic business level, such as dealing with ad-hoc EAM demands or simulating potential changes to a plant's environment based on evolving business needs. Ultimately, these challenges are more easily solved when a company has access to data and can do something intelligent with it.

Big companies running large volumes of IoT-driven equipment generate massive amounts of data that must be processed, standardized, and turned into useful information. Big data and analytics can fill that gap, automating and streamlining the complex processes that would take an IT administrator days or weeks to tackle. This is the technical assistance principle of Industry 4.0 in action. Companies can gain greater insight into what is going on with their equipment in real time. This allows them to make well-informed decisions about where to redesign, update, or repair their systems.

AI Speaks Our Language

AI can make analytics more user-friendly for employees. For example, a plant manager can use a virtual assistant like an Amazon Echo to ask, "How many work orders do we have in the assembly line queue?" and get an instant picture of the short-term plan for their plant. A system like this would set up workers to spend more time contributing to strategic business decisions instead of gathering data and running the reports that inform those decisions, a prime example of the decentralized decisions principle of Industry 4.0. AI and IoT might not necessarily make a machine run faster, but they can make a team work smarter.

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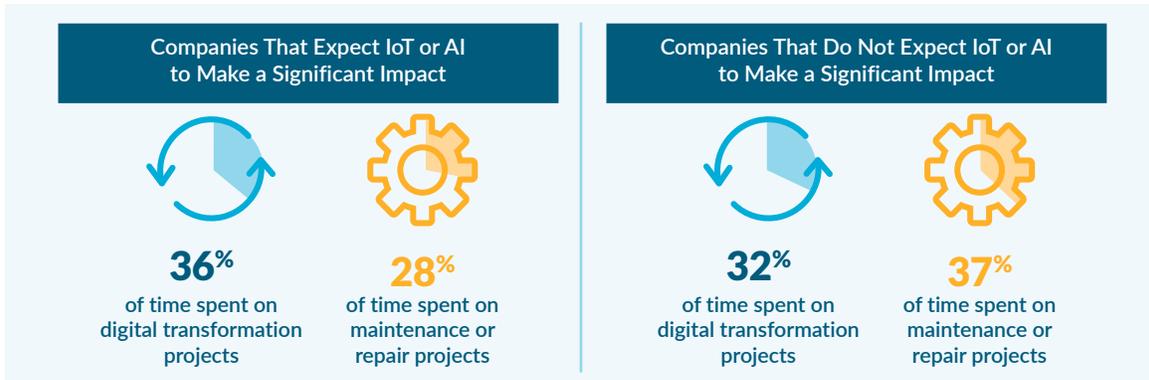
In fact, IoT and AI can affect the type of work companies are doing. Recent ASUG research shows that, on average, SAP customers spend the same amount of time on three types of projects: design and updates, maintenance and repairs, and digital transformations. As Figure 2 shows, those who expect IoT and AI to affect their business through 2020 are spending more time on innovative work related to digital transformation and less time on maintenance or repairs. Spending less time looking around for breakdowns and more time looking ahead can lead businesses to new opportunities.

Still, with all of this talk about AI as a problem solver for systems driven by EAM, there is an equally important asset within a company that also can benefit from AI—the employees.

4 https://visualk.com/en/index.php/company/news/item/1242-iot,-ai-and-drones-in-the-future-of-enterprise-asset-management.html

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Figure 2: Where IoT- and AI-Focused Companies Expect to Spend Time

Companies That Expect IoT or AI to Make a Significant Impact		Companies That Do Not Expect IoT or AI to Make a Significant Impact	
36% of time spent on digital transformation projects	**28%** of time spent on maintenance or repair projects	**32%** of time spent on digital transformation projects	**37%** of time spent on maintenance or repair projects

Source: ASUG 2019 State of the Community, December 2018

AI as a People Mover

Equipment availability is one piece of the puzzle for those companies that are heavily invested in EAM to manage. Though automation has made huge strides, most of the tasks at industrial companies largely involve manual components. This is particularly true when maintenance is needed, either for scheduled repairs or emergency patches. Planned maintenance needs to account for production schedules so that most of the work can be done when a system is scheduled to be down.

One example of Industry 4.0's design principles in practice could look something like this: AI could be designed to read IoT data and determine when service is needed, then assign the necessary workers to complete the repairs. In an ideal world, an IoT sensor would alert an AI-driven system to a particular issue. It would then identify the type of maintenance required and search the human resources database for a list of qualified technicians to handle the repair or upgrade. It would house a production schedule, so the system could schedule nonemergency repairs during planned downtime for minimal system disruption.

Right Person, Right Job, Right Time

The system also could prioritize repairs. For instance, if the most qualified technician is scheduled elsewhere and there is a pressing issue, the AI algorithm could prioritize the issues that are the most sensitive and adjust repair schedules to send the most qualified technicians to tackle the problems that need the most attention. It could then assign other technicians able to work on the job vacated by the highly qualified technician. An AI-driven system could do the heavy lifting by helping plant managers avoid potential scheduling headaches automatically with a few well-defined rules about how to prioritize workloads.

IoT data then completes the process by logging the issues and producing a report of the most common occurrences over time. This would allow a company to train its technicians so that enough are qualified to repair the most frequent problems. The entire procedure takes the guesswork out of maintenance planning and encourages the workers at each level to focus on acquiring the skills that are most needed.

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Start Creating Your Own Connected Plant

If your company is heavily dependent on EAM, you can start to get your systems in order. Here are four tips to get you ready to make IoT and AI work for you.

Tip 1: Clean up your data. Applying the information transparency principle of Industry 4.0 to the vast quantities of data you receive from IoT sensors is meaningless if there is not a plan in place for how to organize, archive, and interpret it. It will only give you a snapshot of the current state of affairs if you cannot analyze your legacy data to spot trends and inefficiencies that could have existed within your systems for years.

Tip 2: Start the conversation with human resources and procurement now. In order for an AI algorithm to assign the best workers where they are needed most, it is crucial that the system accurately reflects the qualifications, certifications, and workloads of its technicians. It does no good if an AI algorithm finds the best employee to handle a maintenance job, only to have the plant manager learn they are on vacation for the next two weeks or have let a required certification lapse. Working with HR and procurement to keep employee profiles current will set the algorithm up for success when assigning specialists in real time.

Tip 3: Create defined rules for prioritizing work orders. Production runs most efficiently when there is a standard set of rules governing which projects take precedence over others. An AI program can execute these rules, but it needs help from the IT professionals in your department to address unusual cases like simultaneous orders or whether production should override downtime if a particular system is necessary for an urgent customer order.

Tip 4: Begin the search for third-party support to connect AI and IoT to your processes. You shouldn't have to navigate Industry 4.0 on your own. Qualified third-party support can help you analyze your business and determine how much AI assistance you need to optimize your production cycle. You need to find a solution provider that understands the nuances of AI and how it applies to your specific use case.

AI and IoT Accelerating Your Business

Using the information and tips above, you can plug AI and IoT into your process, moving your people around to keep your connected plant humming along. The slowest person or machine on your team has the potential to move significantly faster. This improvement could propel you across the finish line with your customers and move you ahead of your competition. And that is what it takes to make Industry 4.0 work for you.

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ABOUT ASUG

Founded in 1991, Americas' SAP Users' Group (ASUG) is the world's largest SAP user group, serving 2,300-plus businesses via company-wide memberships. ASUG's mission is to help people and organizations get the most value from their investments in SAP technology. The Chicago-based organization accomplishes this by connecting and educating people through in-person and virtual events, delivering customer feedback to SAP, and advocating for its members. Find additional information at https://www.asug.com/about

ABOUT SIGGA

Sigga Workforce Technologies is an SAP-centric technology company developing innovative SAP-integrated platforms and solutions to help organizations across multiple industries around the globe increase efficiency, safety, and a better ROI. It is the leader in providing solutions looking to the future, including using IoT and AI in its constantly evolving solutions. Founded by seasoned EAM insiders who experienced the challenges and difficulties in asset management firsthand, Sigga is committed to the pioneering game-changing management, maintenance, and inspection technologies.