Efficiency superpower

How to make better decisions on the factory floor

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Introduction

Every day, operations and management personnel face questions about productivity. Are efficiencies where they'd like them to be? Are production rates where they should be? Is profitability as good as it gets? If the answers to any of these is "no", it could be due to a lack of asset visibility. And the associated issues – from unplanned downtime to contamination – have the potential to cost big money, or risk causing brand damage in an increasingly demanding, always online market. Thankfully, "always online" is also a big part of the solution: improving asset and data visibility through digitalisation.

This white paper will explore how a hassle-free approach to digitalisation using an Industrial Internet of Things (IIoT) platform can empower production and operations managers to make better decisions for their businesses.

It will address the following:

- What can stop a business from reaching its efficiency potential?
- What does digitalisation mean for an industrial business?
- Why is an IIoT platform valuable in the factory architecture?
- What role does AI play in an IIoT platform?
- Where should a business start with an IIoT platform?

Additionally, this white paper will aim to demystify the perceived complexities surrounding the adoption of IIoT platforms, and explore practical steps towards digitalisation without major disruptions to operations.

What's standing between a business and its efficiency potential?

There are countless challenges faced by operational personnel and management teams every day. And many of them, left unaddressed, could inflict serious damage to a brand, and the trust of its customers.

It could be a lack of preventative maintenance to a key piece of equipment such as a vacuum pump or air compressor, leading to unforeseen halts in production. Then there's the risk of untraceable contamination throwing days of food production into peril. Or an untenable quantity of waste material caused by insufficiently monitored cooling, or even something as simple as a training gap.

Whether it's a mining operation, food production line, or distillery – the result of any such compromise to efficiency is likely to be a financial loss.

According to Freddie Coertze, National IoT Business Manager for ifm Australia, IIoT platforms are perfectly suited to addressing what he considers to be the two biggest issues facing operational technology (OT) teams today.

"The biggest issue is a lack of visibility: businesses not understanding how their processes are tracking in real time," he says. "This results in a lagging effect, which can allow issues to escalate into bigger problems before they can be rectified.

"If data can be collected in advance and used to anticipate downward trends before they become a big problem, production can be optimised to compensate. For example, if operations managers can anticipate a blockage in one section of production, they can start sourcing product from elsewhere to cover, or even rethink how things are run in the first place."

The other big issue for businesses, Coertze says, is scrap rate.

"Everyone is looking for ways to minimise waste in their operations," he says. "I've heard from customers that have had to throw away more than a million litres of beer, wine or milk per year because of issues like operator errors and a lack of visibility across their processes. Addressing that waste is a major priority for production and operations managers, and many of them will have targets and KPIs associated with it."

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What does digitalisation mean for an industrial business?

There's no denying it, digitalisation is a big deal – and it's only just getting started. But what does it really mean, and can businesses afford to fall behind?

All operations professionals have heard the buzzwords: Industry 4.0, interconnectivity, AI-powered machine learning. Many may have experienced mixed results from early attempts to streamline operations with technology.

Some statistics even point to an overall downward trend in productivity growth since the advent of the digital age[1]. But that same data also shows a few companies that have harnessed well-integrated technology solutions for substantial gains in productivity, customer satisfaction, employee engagement, among other metrics.

This confusion adds to a long list of excuses standing between some businesses and digitalisation. And while the apparent barriers are wide ranging – from concerns about major financial investment to a lack of information technology (IT) infrastructure or expertise in data analysis[2], these concerns are often grounded in myth[3].

Digital insights, simplified

In essence, digital transformation is about connecting previously fragmented elements of a physical operation in the digital world, and harnessing data to make more informed decisions. An IIoT platform helps facilitate this communication, provides a window into the digital realm, and helps operations and management personnel make sense of what they see.

Whether incorporated into food manufacturing, resources, logistics or waste management operations, an IIoT platform is designed to provide top-to-bottom visibility across assets and processes in real time, generating valuable data and information as it goes.

Algorithms help transform data and information into valuable insights, and can even automate elements of inventory management and equipment maintenance.

Fortunately, taking the first step into digitalisation with an IIoT platform doesn't have to be a complex process. For ifm and its moneo platform, simplicity is the name of the game: it's a scalable, modular plug-and-play platform designed to offer the benefits of digitalisation with minimal hassle, and minimal expertise, required.

How digitalisation can benefit operations

From an OT viewpoint, the benefits of approaching digitalisation with the help of an IIoT platform are clear. Bringing together features such as real-time data, predictive insights, analytics and reporting, remote monitoring and control, and predictive maintenance – just to name a few – these platforms can help enhance operational efficiency and overall performance in a range of industrial settings.

What is moneo, and how can it provide an edge in operational efficiency?

In short, moneo is a IIoT software platform designed to collate and analyse data from a range of ifm sensors, and translate that information into high-level actionable insights to support better operational decision making. Here's how it can help:

- **Improving machine availability:** moneo provides real-time visibility into equipment performance, enabling proactive maintenance scheduling and minimising unplanned downtime. By leveraging live and historical sensor data, moneo can anticipate equipment failures to ensure continuous operation.
- **Maintaining process quality:** moneo offers organisations insights into process deviations and anomalies in real time, helping ensure consistent process quality and adherence to standards.
- **Optimising energy consumption:** By monitoring and analysing patterns of energy consumption, moneo can identify inefficiencies and facilitate targeted energy management strategies.

Additionally, the moneo DataScience Toolbox harnesses the power of AI, swiftly detecting anomalies and predicting issues without the need for data science expertise.

The value of an IIoT platform in a factory architecture

An IIoT platform can bring significant value to a factory architecture by offering an unprecedented level of visibility and control. This can empower operations personnel with:

1. **Real-time monitoring:** An IIoT platform can monitor a factory's equipment, machinery and processes in real time, helping operators identify issues quickly.
2. **Predictive maintenance:** Using live and historical sensor data, an IIoT platform can identify patterns to anticipate maintenance requirements.
3. **Increased efficiency:** An IIoT platform can optimise energy usage by improving or streamlining processes, boosting efficiency and reducing costs.
4. **Data analytics:** By collecting and analysing data from multiple sources, an IIoT platform can help identify trends, patterns and insights.

"If businesses want to be ahead of the pack and ensure their product is of the highest quality, linking all their systems together through an IIoT platform is the best strategy," Coertze says. "That way, it can provide them with the right information at the right time, helping them make the best decision for their operation.

"And getting it in real time is key, because if that information is only available a few hours later, all it's providing is confirmation that an issue has occurred."

Coertze points to an ifm client that had recently been searching for an inventory management solution for an important chemical. These chemicals were central to the client's operation, and being regularly delivered to the factory in large containers.

"The only way they had to measure the levels of these chemicals was to have someone manually check them every few days," Coertze says. "Which meant not only were they lacking any real-time visibility, but that person also had to manually enter these levels into their SAP (Systems Applications and Products) and ERP (Enterprise Resource Planning) systems, or do an audit to find out when levels were getting too low."

Coertze says this is a great example of a situation where moneo can provide a solution. The platform features Shop Floor Integration (SFI), which is what bridges ifm sensors and a user's SAP system.

"This means moneo can automatically create a ticket in the customer's SAP system specifying what needs to be reordered and by when," Coertze says. "It's automating a tedious manual process, and it's also eliminating the potential for human error."

Another crucial element to the success of an IIoT platform is ensuring it caters to a broad range of users. Drag-and-drop interfaces, templates and pre-configured workflows, and automated data processing combine to make using moneo as friction-free for operations teams as it is for business analysts.

"Some managers might be concerned that implementing and maintaining an IIoT platform would monopolise the time of their software engineers," Coertze says. "But with moneo, the platform has been designed for self-service. This means once it's been set up, production managers and maintenance staff can reap the efficiency benefits while software engineers are busy solving problems elsewhere in the organisation."

AI optimised: Machine learning for smarter operations

Artificial intelligence (AI) is an increasingly hot topic, with a growing presence in popular media[4], as well as our homes and offices. Today, it powers everything from chatbots and virtual assistants to detailed image and audio generation. And while the vast potential of AI might only just be starting to creep into the collective consciousness, the writing has been on the walls of the industrial world for some time. For example, from as early as 2014, Google was deploying AI-powered machine learning in its data centres, where it helped reduce the energy usage required for its cooling systems by up to 40%[5].

In this IIoT context, AI is an invaluable tool in the interpretation of various collected data streams, and can provide a depth of insight previously unavailable in real time. Here's how:

Five ways AI can enhance decision making

1. **Process optimisation**: AI-based algorithms can analyse data from a range of inputs to help identify and address issues in any process. These can draw from historical and real-time data to determine optimal operating parameters for a process, helping to boost efficiency.
2. **Resource allocation**: IIoT platforms can harness AI-based algorithms to optimise allocation of resources, factoring in production schedules, demand forecasts, and more.
3. **Quality control**: Machine learning algorithms can analyse images and videos of production processes to help pinpoint issues in real time, enabling operators to take immediate corrective action.
4. **Anomaly detection**: AI-based anomaly detection algorithms can flag atypical behaviour or data patterns to help identify and correct potential problems before they escalate.
5. **Predictive maintenance**: Sensor data from equipment and machinery can be used to inform maintenance teams of potential failures before they occur, reducing the likelihood of down time.

Where should a business start with an IIoT platform?

Picture this: a skilled team operating a high-volume food manufacturing facility has been hitting or exceeding production targets day in, day out. That is, until the sun goes down and the night shift team taps in.

On paper, it's a like-for-like swap: same team size, same equipment, same product. But production output drops significantly, and nobody can pinpoint why.

According to Coertze, this was a conundrum recently presented by a prospective client – one yet to take their first step into the digital age.

"After some initial consultation, we suggested they start with a simple solution," he says. "We recommended installing two sensors to detect both their volume of production, and how many boxes they were getting out of each shift."

This simple measure quickly confirmed the production discrepancy, and gave the management team a starting point for further investigations.

"Soon enough, what they identified was actually a simple training problem," Coertze says. "They figured out that the operator working the day shift knew the machine a little bit better and was operating it in a different way. From there, they were able to train up his night shift counterpart, and quickly get the production rate up."

This, Coertze says, demonstrates the value that even a basic implementation of an IIoT platform can offer any business wanting to optimise operations by improving asset visibility.

No need to spend big

It also dispels the myth that digitalisation requires a massive upfront investment: the scalability and modularity of many IIoT platforms – such as ifm's moneo – means businesses can start off small and expand as required.

"Businesses don't have to invest heavily upfront," he says. "They can start by addressing just one bottleneck in their factory, or by automating one part of their data collection process. Going paperless, for example, is a great way to start."

And for those concerned about rendering their legacy equipment obsolete? Coertze says IIoT platforms are not just equipped to accommodate existing equipment, but can help bridge interoperability gaps.

"We're not building brand-new factories every day," he says. "In reality, all factories use a range of different equipment from various places around the world, and they don't always speak the same language or the same protocols. An IIoT platform solves that problem, because it can collect data from multiple machines and format it into a common protocol that everybody understands."

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In conclusion

Digitalisation and the IIoT: they're here to stay – and for Coertze, that's worth getting excited about.

"We want everybody to know that there's now a better way to do things," he says. "Everybody wants to make their operations more productive. They want to reduce costs, cut their scrap rate, and improve sustainability. And for many, the big struggle is in connecting their operational activities to their strategic decision making.

"A business can't do that if it doesn't have full visibility of all its assets and processes. And IIoT platforms such as moneo are a great way to get started."

Digitalisation and the IIoT: they're here to stay.

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