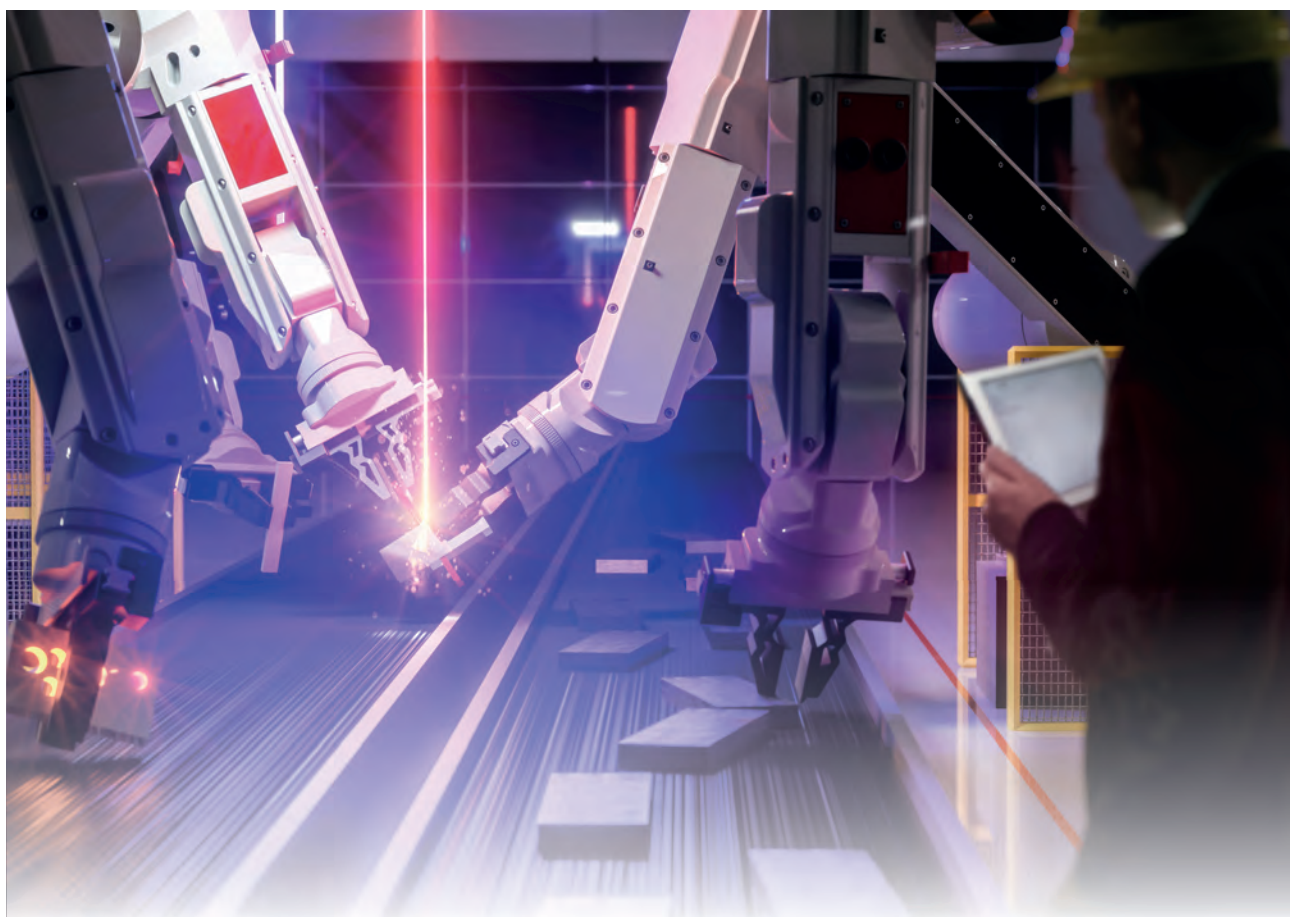# A practical journey to a digital future – part one

**Victoria Montag – sector head for Industrial Automation, GAMBICA, begins the special three-part GAMBICA serialisation of the King Power Stadium discussions on digitalisation.**



"Imagine I'm a manufacturer", I told the group, "how do I start my Smart Manufacturing journey?" I ask, naively premature, as it turned out,

"Are you actually ready to start?" Chris Evans, Mitsubishi Electric's marketing and operations group manager asked immediately exposing the complexity of the issue. While there has been a lot of chatter about smart manufacturing, many people still don't understand what they need from a practical point of view.

And that is just people who want to implement IIOT (Industrial Internet of Things) within their processes – which is not by any means everyone. There is a widely held view that the UK is a low and slow adopter of technology into its manufacturing sector. Though it is difficult to quantify how 'tech savvy' a manufacturer is, the robot index (number of industrial robots per

10,000 manufacturing workers) is a useful metric, with the UK consistently ranking below other developed nations. This reticence is a challenge in itself. David Randall, Business Development Manager from Lenze commented that as the concept of Industry 4.0 hasn't reached some factories yet, "what is [going to] hold them back is that Industry 3 [automation technology] hasn't been installed.".

So, for those just starting out, looking at the 'pre-beginning' of the Smart Manufacturing journey, you may ask yourself: what does "Smart manufacturing" mean? Where are you now? Where do you want to go? Who do you need to convince to come with you? Do you have the skills to do it? This all seems like a logical progression, but it isn't. You may find the process iterative, it's very hard to take someone on a journey when they don't agree on the destination, or don't want to go at all. And, knowing where you are helps you understand if your destination is achievable and how you need to get there.

At its most basic, smart manufacturing is the use of data to improve business and production processes. Data as always been created by processes, machines, factories, offices and even people. It's just that now we have the capability to do something useful with that data. Plugging condition monitoring data into AI helps predict failures, measure energy usage to optimise processes and data can allocate stock and human resource automatically. The potential is incredible. We haven't even begun to realise what can be achieved.

But AI and machine learning etc. are the 'hows' and once again I am getting ahead of myself.

So, as Andy Mills, sales and marketing manager from Phoenix Contact put it, the first step for any manufacturer is "communication within themselves". Alan Conn, B&R Industrial Automation's managing director agrees: "There is a big element of winning hearts and minds, from people operating machine to management level. To give that clarity of thought and understanding on what it actually means. How is it relevant to

my machine or my production line?".

However, given that Smart Manufacturing is expressed through the convergence of OT (operational technology) and IT (information technology), it is not just the shop floor that needs to buy-in. If the IT department is not also brought on board at consultation stage, you are creating an insurmountable hurdle for yourself.
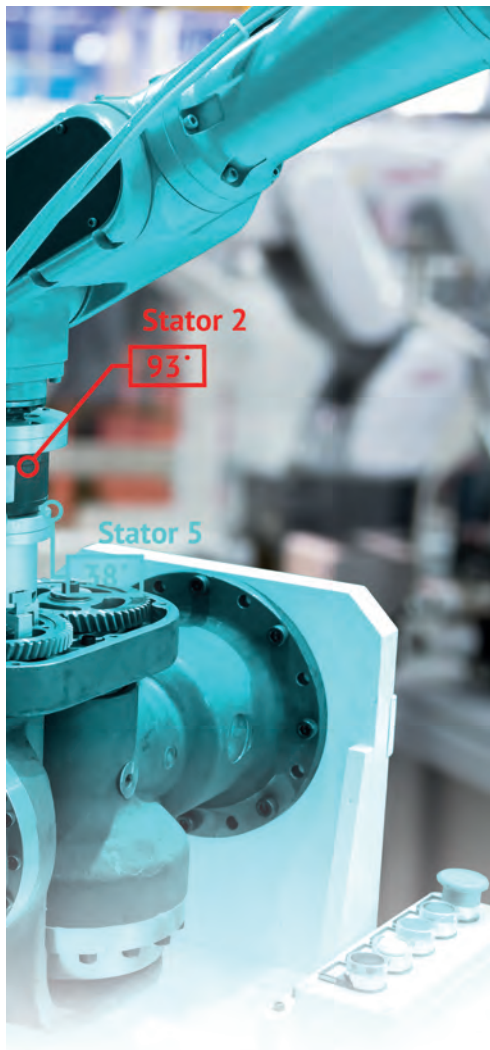
This is true for skills sets within manufacturing site too. Alan Conn believes that to get the full ROI (return on investment) from any investment in smart technologies or infrastructure is when you have the blended automation and IT skill set. Andy Mills takes it one further and thinks it is beyond automation and IT departments working together, soon there will be IT-Automation specialists "This is very much something no one

will have ever heard of before [but] I believe everyone will end up with one.".

Changes to technology is if anything is encouraging this collaboration between departments. The traditional divide between the IT level and the Engineering level made it very difficult to make a connection between the MES (Machine Execution Systems) where SCADA system sat and the business system levels. Technology "edge" technology is making that connection easier and increasingly, it is the IT folk who understand how the machines tick.

What is clear is that in the smart manufacturing world, when it comes to your industrial and IT departments, there will no more silos.

With your house in order, and open conversation taking place between stakeholders, there needs to be a

Stator 2

93°

Stator 5

unified vision of "why?". What would you like to achieve? Many staff members will think, well, I'm making my product just fine, hitting production targets. So why the extra cost to make things Smart?

"IIOT is a means to an end, it's a mechanism to achieve what you want to achieve." Andrew Hodgson, strategic sales lead – Digital, for Siemens points out. This should be obvious. But I fear, with the hype around Smart Manufacturing, it may not be. You can have all the smart technologies you want, but if they do not solve a problem or improve a system, then it's a waste of time and money. Sadly, in my role as sector head for Industrial Automation, I have come across stories of companies buying technology for the sake of it, without thought of the problem they are trying to solve. This often leads

then to drop the tech and lose the confidence to implement any further technology updates – I even know someone who manage to get a robotic arm for next to nothing, from one such company. Hodgson asks; "What is your 1-, 3- and 5-year plan? What are your obstacles and how can technology solve them?".

In short, we are talking about Smart Manufacturing, but once you've put this publication down, or left a smart manufacturing seminar, you might have a strong desire to make something "smart", but the fundamental consideration must be, what are you trying to achieve?

Sometimes you don't know what is possible until you've talked to your stakeholders – often the answer to what you have to do is sitting in the shop floor. Sometimes the problem you need to solve isn't obvious. For example, Chris Evans noted that he had seen examples of the "soft benefits" of digitisation (i.e. the non-production benefits) being more remarkable than the technological benefits – for example the solution to a technical problem, high product failure rate, also dramatically reduced the number of sick days taken by the operators, because their stress was reduced.

This all comes back to internal communication. And of course, it's not enough to know what you want to do, you need to know where you are currently in order to understand what you can do. We could go out and design and build a factory from a smart manufacturing perspective tomorrow. But most UK manufacturing plants aren't like that, they've been around for decades. Data collection was never part of the brief.

Chris Evans explains that: "The first thing you've got to do is create an infrastructure which allows you to gather data in the first place. It's all OK talking about pushing everything to the cloud and the rest of it, but actually if you haven't got the means to gather the data, you have to start at the bottom."

Andy Graham, Wonderware product manager at Solutions PT agrees that you can quickly and easily get more out of a system by means of just low-cost sensors, however "before doing

any of this, I think there is a step before. You need to do a maturity model. We're talking about a "journey" here, you have to understand where people [already] are in that journey. We still come across a lot of people who aren't even connected in any way".

The group all agreed that the industry still talks about "islands of automation" (i.e. automation systems that don't communicate with each other), and the British custom of sweating the assents means there is a lot of legacy machinery and products that don't talk to each other. With legacy equipment.  baggage IT systems, MES systems, MOM (Machine Operation Management) systems that are just sitting there, Andrew Hodgson says some manufacturers don't know which way to turn.

And the problem is perhaps that there is often some grand idea that "infrastructure" means a complete factory refit, but it doesn't need to be so. The consensus advice within the group for my automation novice manufacturer is just this. Start small. In fact, often a stand-alone IIOT system equipment (though this sounds like an oxymoron) on legacy is the best way to start down the IIOT journey. For Mark Butters, general manager for Omron this is not only a low risk way of getting started, but also a good way to get reluctant adopters on board. "[The key is] to go in and identify the quick, relatively easy wins that can be demonstrated across the business and then you get the snowball effect. People then buy in to the technology".

As Andy Graham's said, a lot can be achieved with very little. And even complete analogue machinery can be made "smart" (an excellent example of this is the 1950's Colchester Bantam lathe the AMRC digitalised for under £500).

And there you go. My manufacturer, now having considered where she is, where she wants to go and who she needs in order to get there, can now ask "OK, where do I start?"

**In the next issue of Smart Machines & Factories, GAMBICA's members discuss the practicalities behind implementing IIOT within your machine, process or plant.**