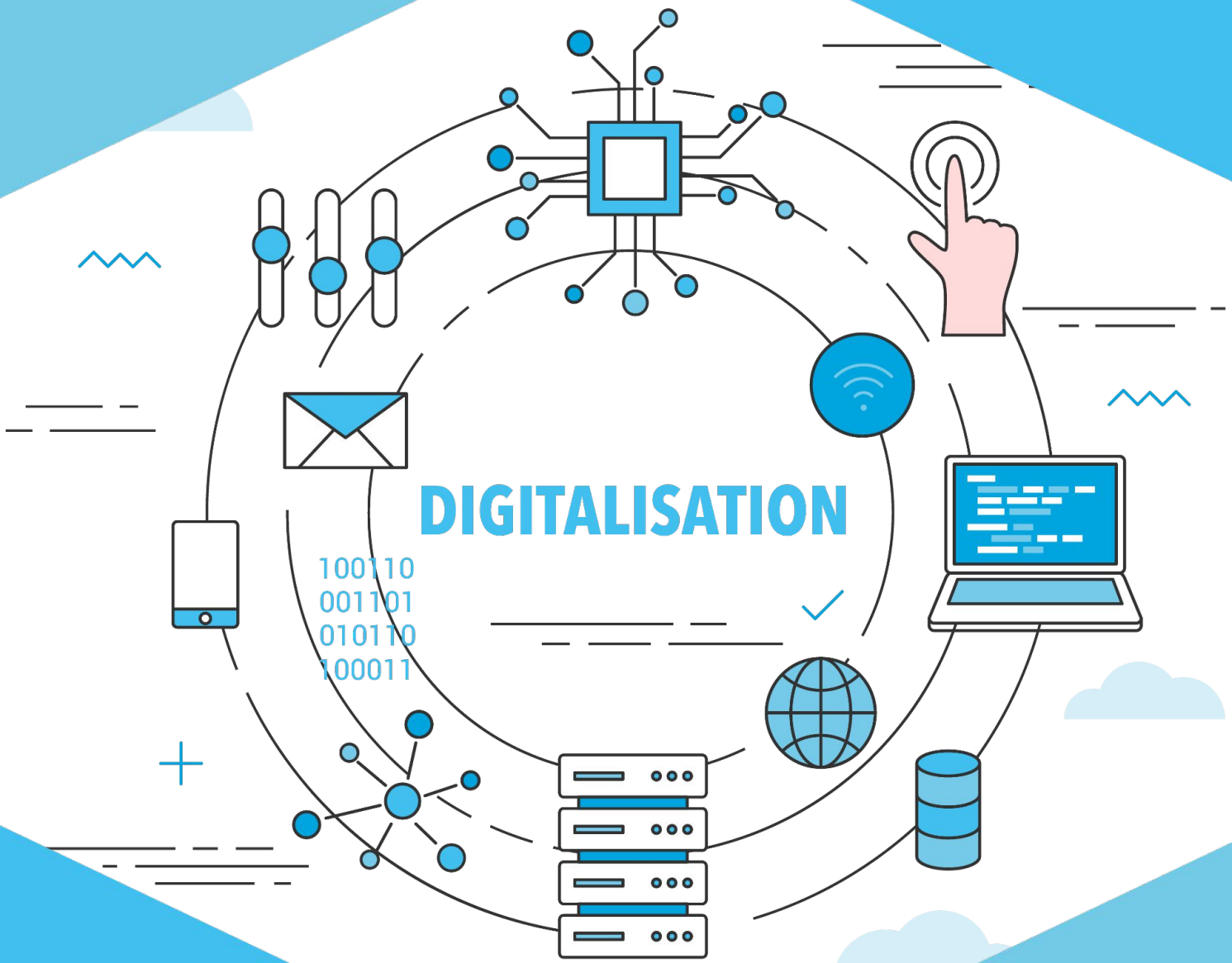
The low hanging fruit: 3 digital transformation projects to start with



SMARTIA

By Darius Foster

The low hanging fruit: 3 digital transformation projects to start with

What's the recipe for the perfect digital transformation project?

How about taking a planet-sized amount of data, stuff it into the latest machine learning algorithm, cook for three weeks in a GPU cloud-cluster, trim off the excess (aka the bits that don't quite work), and finally serve it in a pair of virtual reality goggles?

Cordon bleu digital fare, right?

Or is it just empty calories that will ultimately leave you unfulfilled?

Don't get us wrong, these things are super cool and have a lot of potential. Because of this it's easy to get carried away by the technology and lose sight of what's actually useful. This is particularly true when you are early in your digital transformation journey.

This article then is not about trying to make you jump straight to a virtual reality robo-batcave or a local blockchain server that no one in your organisation will be able to access much less use. When you're early in your journey, those things are good for VIP sightseers and little else!

What we have in this article are three ideas that we believe will get you some real wins in *your* digital program. We have deliberately kept things general to be relevant to as many industrial companies as possible.

1. Zero Impact

Let’s start as we mean to go on; with energy!

Or more specifically, electricity.

1. Zero Impact

Think about all the assets in your factory. From heavy-duty gantries to pillar drills and lathes, they all quietly (or not so quietly) consume electricity. But do you know how much they consume?

You might know how much electricity your facility uses overall, but do you know how much each CNC in the workshop uses? Or each robot in your painting cells? Or any other piece of equipment that you have?

It would not surprise us if your answer is “no”. In many organisations, this fundamental data is often missing or incomplete. What’s more, it’s only when someone asks that question that they realise there’s a blindspot!

Your response might be, well, if no-one notices then what’s the problem?

That’s fine but ignoring your electricity use profile across your assets is almost certainly ignoring the opportunity for some serious savings.

Electricity consumption might not be the most exciting thing compared to all that Industry 4.0 buzz, but it can end up being one of the most impactful to your organisation’s bottom line.

Step 1: Data Acquisition

So how can you start getting some electricity awareness?

The first thing you need to do is start capturing data.

If you're lucky, this data will be available on your machines as standard. In that case you can get going right away and record the data manually (e.g. downloading and compiling spreadsheets).

While manual data collection can be okay to start with, we'd recommend skipping it and moving straight to an automatic way. Usually this means hooking up some kind of data acquisition platform to your assets which reads the data for you at a rate you specify. The platform will need to support connections to your asset types and store your data to be easily accessible.

Gathering data in an automatic way will give you traceability (know exactly where your data has come from, and when) and data integrity (make sure no one can tamper with it accidentally). Also, as you collect more data you'll be very glad to avoid a mess of loose spreadsheets cluttering up your hard drive.

So far so good.

But what if your electricity guzzlers don't have inbuilt data feeds? In this case you will need a preliminary step to somehow get that important information.

One of the easiest ways to measure electricity consumption is by using a current transformer (CT) clamp. These sensors clip around the power cable and use the magic of electromagnetic induction to measure the current passing through. The sensor readings are sent, via a gateway, to your data store in the cloud or somewhere on your local network.

This approach is perfect for most use cases; it's noninvasive and won't impact the running of the machine in any way (no concerns about voiding your warranty).

Step 2: Do more with the data

Right, you now know how much electricity your assets are using. Now what?

Well, how about we take a look at all that lovely data? Graphs and plots can do a lot of heavy lifting; pictures tell a thousand words after all.

It's here that your decision to use a data platform will pay off again. Modern platforms will almost certainly have dashboarding capabilities. This means you can quickly and easily visualise electricity usage across machine types, cells, production lines and any other level of detail you care about. What's more, those visualisations will be head and shoulders above the standard Excel plots we all know and love.

Be warned though, when electricity use is displayed asset-by-asset like this it can be a massive shock! Looking at that data will very quickly alert you to any overly greedy machines (maybe misconfigured from installation) or production cells left switched on when they should be off. You should only do this if you're ready to make quick savings!

Step 2.5: Do something with the data

If you want more than simple visualisations can give you then we won't disappoint.

Whether it's good old-fashioned statistics or something more exotic (did anyone say "machine learning"?), analysing your electricity data can bring out insights that evade even the most experienced eye. One example is predicting maintenance needs before they become big problems.

As machines wear and degrade they often start to consume more electricity for the same operation. Predictive maintenance models can take electricity consumption as an input and recognise changes that indicate degradation. In this way you'll be able to keep a closer eye on performance and schedule maintenance to a time that suits you, rather than have it forced on you when something breaks!

Do your bit for the planet

If cost savings and predictive maintenance weren't reasons enough to care about electricity consumption, then have you considered the environmental aspect?

With the drive towards net zero, your organisation is probably just as keen as any other to do their bit by working towards more sustainable operations.

Knowing how much electricity you use and identifying how much is wasted (and then doing something about it) is one of the first things an organisation can do to contribute to the global effort.

What's more, this is fast becoming an expectation with eco-conscious customers, end users and investors (just look at the growth of ethical investing).

Applying digital tools to your electricity usage is truly one of the simplest and juiciest low-hanging fruits!

2. How useful is this?

For this next idea, let's start with a simple question: do you know how busy your assets are?

2. How useful is this?

Are your CNC machines rammed to bursting with shiny metal widgets? Or are they more often dozing in their cosy workshop dens? While you might know the headlines (number of parts you produce, how many machines you have and so on), do you have detailed (and up-to-date) data on availability, uptime, downtime, including comparisons across machines?

Gaining a picture of machine utilisation can be as big a revelation as electricity consumption; another case of seemingly boring data transforming your business!

Before we go much further we should say that utilisation is a complex topic and we could spend a long time talking about the different measures and KPIs. In this article we will use 'utilisation' quite broadly as a coverall term for these different approaches. In any case, once you start collecting and storing data it becomes very easy to start switching things up and calculating whatever you need.

Step 1: Get the data

To start building up a utilisation picture we need to start capturing the data (there seems to be a theme building up here).

Many machines will have some kind of uptime monitoring built in. Tapping into this and piping it straight to your data platform (via a gateway) for storage is the simplest option.

However, in cases where this data is unavailable, don't worry. We have a suggestion that can get you pretty close.

Assuming you've managed to get electricity measurements up and running, you can calculate utilisation from that. All you need to do is work out how much power your machines consume in their idle and operational states and then put thresholds for calculating periods of activity (uptime) and periods of inactivity (downtime).

This is not going to be perfectly accurate because a machine can be consuming electricity but be unproductive (e.g. performing a calibration sequence). However, you can address this by supplementing the raw electricity data with contextual information like machine status at specific times (e.g. "between 13:00 and 14:00 the palletising robot was being calibrated").

Step 2: Do something with the data

Like with electricity usage, visualising your utilisation data can be a shock!

With your data laid out in front of you it will be easy to spot production bottlenecks and areas of spare capacity. What's more, with automatic ingestion and real time data, your picture will be as current as it gets. Your decisions will be based on the best possible data. No more guesswork.

3. Going Paperless

Even these days, with a computer in every pocket, many manufacturers still use paper for documenting production activities. We've found that even many larger companies still cling to paper!

3. Going paperless

Your facility might be using paper forms to record things like production parameters, quality inspections, defect reports, timesheets, material consumption and much, much more. Just think about the reams of paper each part amasses as it goes through the production process.

Aside from sheer bulk, paper can also be easily damaged and lost. Sheets can detach from folders, slip under machines and be lost for decades!

But the worst thing about paper is that it is slow.

By the time those production notes or quality inspection records get to the right people it can be too late. Basing your decisions on “old” information can mean that the wrong decisions get made. Furthermore, you won’t know those decisions were wrong until they filter through and you wonder why production is down this quarter or scrappage rates are creeping higher.

In the good old days this was the best system simply because there was no alternative. However, using paper to track production in this day and age is like reading a newspaper for up-to-date current affairs when the internet is a click away.

There it is then. Just replace your paper system with a nice software system and some tablets and everything will be fine!

Except, it won't. As usual things are not quite as easy as that.

Replacing paper completely in one go is not exactly a low-hanging fruit; the whole point of this article. This is why we would recommend a more phased and considered approach.

We always advocate small steps as the best way to succeed in digital transformation. Please feel free to head over to our previous article on ***the steps towards a successful digital pilot*** for more details.

But even small steps have dangers you should be aware of.

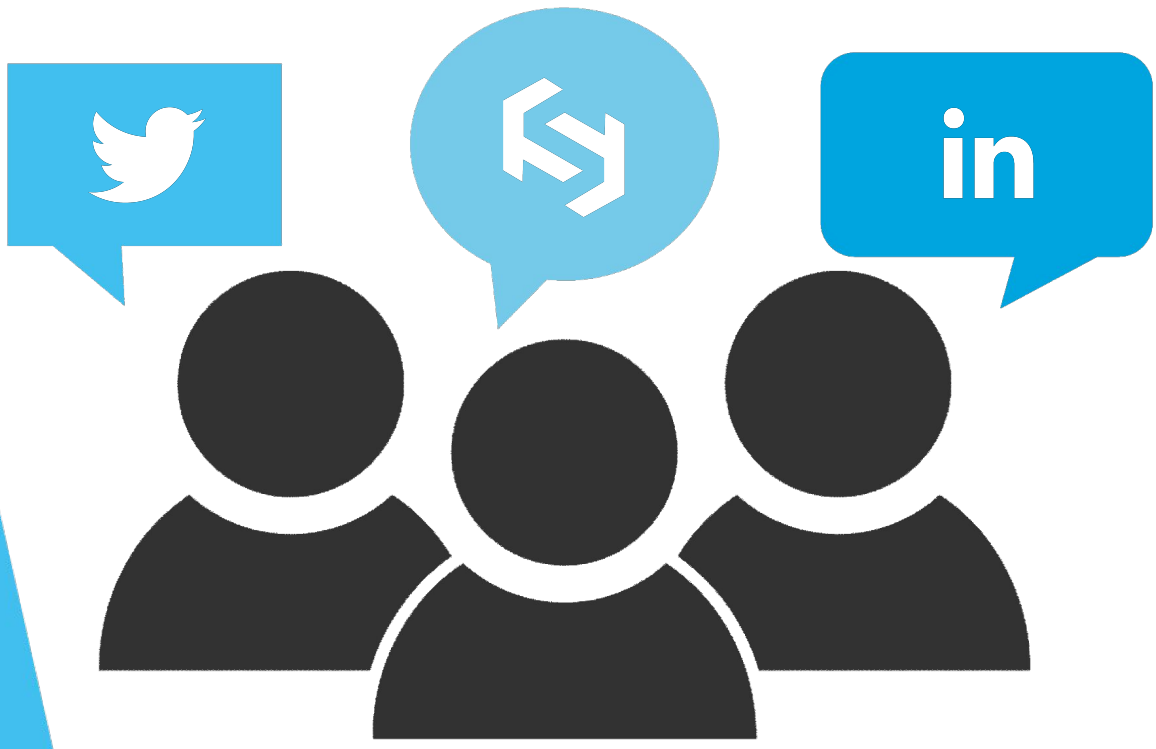
The first thing to keep in mind is the inertia effect. Your paper-based systems have been in place for a long time and are well established. People need to be supported and helped to use the new system. In this way everyone will be able to appreciate the benefits.

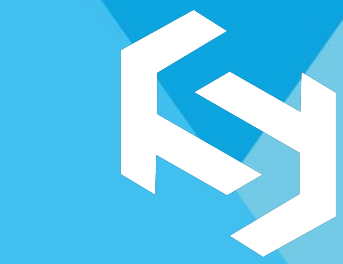
Another thing to watch out for is how your digital record system integrates with the rest of your operations. We have seen well-intentioned "go paperless" pilot projects come to nothing because the new system has been too isolated from other workflows. It is imperative that your new digital system is actually visible and accessible to the right people. An excel file somewhere on the drive simply won't cut it; it won't get updated and will very quickly become obsolete while the paper continues to roll!

Summary

Digital transformation is not all AI singularities and whole-factory refits. It is a process, and like all processes it needs to start somewhere. We hope that the three ideas discussed here are some food for thought to help you begin your digital transformation journey.

If you have any suggestions for other simple digital pilot projects we'd love to hear them and share them with the community. In this way we can all push forward digital transformation for everyone!





SMARTIA

A new dimension in industrial intelligence

Smartia Ltd, The Innovation Centre,
Bristol and Bath Science Park, Bristol, BS16 7FR

t: +44 (0) 117 403 0631
e: info@smartia.tech
www.smartia.tech