

## Monetising Data

### **Where we might not be looking to monetise data how can we quantify the value to the business of collecting it?**

It's definitely easier to get finance to sign off on an explicit promise to improve yields, or reduce labour costs, but sometimes data is key to strengthening operational capabilities in general. On that front, some of the use cases we've seen include:

- Speeding transition from R&D to production at scale – using data to test for performance against specifications that may be evolving as a process/batch recipe is rapidly refined; or analysing event patterns on a line as new form factors for product or package size/shape are tested.
- Similarly, using data from some existing processes or activities as a proxy for something new but similar can allow a firm to do data experiments that would help them refine asset/process models or material specifications without having to do costly physical tests as early in the innovation process
- Exposing order or process status data across departments to allow for better coordination of preparatory, changeover or material staging activities
- Presenting KPI data that is tailored to operators' staff specific areas of effect, so they can relate to performance measures (simple throughput measures in one auto plant spurred competition between assembly line crews so that target performance of 1800 vehicles/day/line was regularly exceeded).
- Some customers use a mix of machine and genealogy data to enable transparency with their customers that breeds loyalty due to provable quality or material traceability in relation to specific market concerns

Come to think of it – each of these does have a clear path to financial benefit, even if it's less direct than some ROI propositions!

### **Is it possible to monetise manufacturing data while maintaining privacy and security?**

A very broad topic, as this touches on IT infrastructure as well as business processes and rules around who has access to what. That said, we'd highlight a few things:

OT and IT have converged in ways that allow for greater security all along the chain of data custody (if we can put it that way). And it is generally possible to incorporate fairly modern and securable data repositories, applications and transfer mechanisms around legacy equipment where data security was less of a design consideration. So at the rawest level, we believe security can be addressed effectively.

Putting attribute models around the data enables another level of security and privacy – if you're working with tools that allow you to define assets, products, materials and even personnel as belonging to categories/classes, then you can enable analysis of "families" that also allow you to test for the validity of a line of inquiry in relation to individual items. This sort of approach is absolutely critical where manufacturers are looking to deliver value-added personalized services or servitisation-based business models.

Thinking of data distribution within a firm, or with key partners, you'll also need to look at the kind of separation of networks and servers that allows externally facing applications and apps to be run from security zones with limited connectivity to underlying data sources and the broader IT environment. These are areas where best practices are well established, so a firm taking these steps for the first time will find that there is a pool of expertise to draw upon.

## **How to find the highest potential big wins**

We often joke that in plants where finance and operations people have a tense relationship at quarter- or year-end, there must be opportunity to use data to make improvements. Seriously, though, Finance can be the best friend of the CI Manager on a mission. It can take a bit of translation to get everyone seeing how the dots connect, but working backwards from things like excessive material variances, or higher-than planned levels of material and finished inventories (even excessive logistics costs) can be where operations and finance and IT can find common ground on priorities. The low inventory levels Finance and Supply Chain want might be only achievable after deployment of an OEE and root-cause toolkit makes it safe for plant managers to promise predictable throughput...

But keep in mind – you will not deploy a new MES / Historian / Production Scheduler and suddenly see all your key metrics improve... your biggest bang for buck comes from laser focus on your biggest problem statement, and then making sure you take the actions that the data indicates, rather than declaring victory when the data is merely available.

## **How do you build your product portfolio strategically, with an aim to monetise data gathered?**

Whether you're delivering an asset/machine with its own "brains", or manufacturing a product that is not inherently "smart", we think some principles apply. On that asset or on that line, put in more edge computing, communications and connectivity capability than is strictly necessary for the core functions as defined today. Invest in your enabling tech the way you'd buy trousers for your 6 year old kid – leave room to grow and flex, or you'll have to discard all of it for something entirely new much sooner than you'd like to!

An equipment maker might capitalize on that enabling tech with better remote diagnostic capability that allows for better liability/warranty management – or even additional services. A manufacturer might find that easily accessible data smooths many of the processes that surround the production line – or even yields data that helps their customers maximise their use of the manufactured product (think of an ingredient supplier furnishing data to a downstream processor who can adjust their recipes based on what's known about the supplier's process).

Thinking along these lines, and especially focusing on who in my value chain can benefit if data flows more freely can help define the value of creating room for growth and flexibility.

## **What practical ways can you demonstrate the value of data accuracy & data consistency across the organisation to promote data quality?**

Maybe an anecdote illustrates this best. Here in the UK, a power company was running two plants – one significantly more modern than the other – better sensors, more connectivity from the control systems to their data repository. Following a turbine failure at the modern plant, they deployed a predictive analytical toolkit for both that provided great insight into the key equipment and processes. The insights gleaned from the more modern plant were better refined to the point that the fleet operator invested heavily in modernizing the older one, in order to be sure of getting the same level of asset reliability and the knock on benefits for maintenance costs.

In manufacturing, it can be possible to learn something that stands on its own: a tweak to a recipe derived due to detailed insight at one plant may easily be seen to be valid for every plant that makes that product. But factors affecting reliability, energy usage and even quality may be subject to local nuances – so the better equipped a producer is to measure and monitor, the more quickly they can focus remediation or optimization efforts.

## **Where would you start to look for extra value once you have gathered data together from disparate systems?**

A lot of value can be had by looking for patterns of opportunity or risk that are common to products or production lines that are functionally similar, but where the underlying controls or sensors present data structured differently from each other. Once you've been able to establish models for categories, and mapped underlying data, you can start to ask whether something that's true for one member of a family is true for all members. Even without advanced tools, this kind of comparative analysis can unlock some big wins pretty quickly – just being able to ask “Why is the energy consumption per batch different between Toronto and Montreal?” is a good position to be in.

The next is correlative investigation – if I can easily relate a product to the quality characteristics of its materials or parts, and to the health of the assets involved in production, and to the crew, the ambient conditions and other factors that could affect it, the better able I am to find relationships that are worth trying to control for. Machine data in isolation is far less useful than machine data that can be linked to all these other data types.

## **What analytics assist opportunity identification?**

Analytics is one of those words that can mean so many things that we have to make sure we explain what we mean by it! We generally talk about “discovery tools” – software that can let you quickly look for the kinds of relationships described in the answer above, and define those relationships in terms of their impact on outcomes and in terms of their sensitivity and controllability. We deploy tools that combine easy mapping of potentially related data elements into a workspace where machine learning engines can help cope with a broad set of inputs across many sources, and by doing so, reduce the odds that we introduce too much prejudice into the hunt for insight. This sort of tool would be very distinct from BI – which tends to be very good at allowing people to follow a stream of consciousness through already-understood relationships, or programmatic tools – which can be powerful, but not easy for non-programmers and non-mathematicians to use.

Once a discovery toolkit exposes a signature that represents a risk mitigation or optimization opportunity, you can deploy streaming analytic engines that can work alongside SCADA, Historian, quality/LIMS and MES systems to look for that signature developing in real-time, and then have that analytic engine flag the developing signature in some manner, or even integrate revised setpoints back into the equipment or process.

Another good example of a different type of analytic is one that isn't necessarily underpinned by advanced algorithms and maths, but is able to apply simple calculations that drive better planning and reaction. Key capabilities of that regimen would enable you to:

- Identify constraints in your process and where queues are forming
- Perform what if analysis on resourcing (i.e. if I add a nightshift 4 nights per week, can I potentially hit the commit date for x contract)
- Understand direct cost and how to flex it (i.e. what's the real cost of running 4 machines when all of them are giving me a 5-10% scrappage rate)
- Understand where are operators spending the majority of their time – what's the transit time between operations. (Could I re-organize my facility to reduce transit time?)
- Evaluate whether MRP runs are being fed with accurate standard times (can I potentially delay ordering certain materials and still hit commits, thus improving inventory turns)



### Contact details

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