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Capturing the power of data assets

See the forest for the trees

How to unlock and organize valuable data assets across the manufacturing enterprise

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Executive summary

A well-managed forest is regenerative and provides clean air and water, as well as a variety of valuable wood products. But it requires close attention and skilled care. In many ways, the same principle applies when trying to capitalize on the value of business data in manufacturing.

Data assets are like forests of valuable wood and they need to be understood and managed in order to capture the potential of the data trees. Industries such as finance and retail are perfecting these skills – and it's now time for manufacturers to get on board and harvest the rewards.

While the scale of the opportunities that data can unleash are unprecedented, for the first time the people who currently manage data – in this case IT experts – sometimes lack the business experience and the power to execute change by themselves. Understanding how data flows through manufacturing and sales processes is paramount for competitiveness in the new era. And this requires seamless collaboration between people with business know-how as well as technology expertise.

This white paper aims to help decision makers in manufacturing "see the forest for the trees" and start their journey adopt data management methodology in every facet of their operations. As more manufacturers go digital, the flawed assumption that more technology equals more business value is rapidly being exposed. Although business leaders have a bigger toolbox than ever at their disposal, spanning everything from intelligent machines and big data analytics to AI, most decision makers are still struggling to make sense of their data assets.

The opportunity cost associated with this failure to harvest data is only getting bigger. Digital projects tend to either fall by the wayside or simply disappoint altogether. It's time to turn things around and apply strategic data management to acquire those gamechanging insights that will put your business at the cutting edge. But where does the journey begin?

The answer is simple: data governance. As a recent Gartner study from 2019 pointed out, manufacturing organizations still lack the fundamental structure and dedicated teams for turning data into business value. The study concluded that no more than 20% of analytics insights will deliver tangible business outcomes through 2022. It also emphasized that AI projects will "remain alchemy, run by wizards", which effectively discounts any mainstream breakthroughs for the foreseeable future.

On the positive side, manufacturers seem to have recognized that technology can't create business value on its own. They will need to reframe their mindset and adopt new practices in order to capture transformational data and improve customer experience. By following the steps presented in this paper, you will improve your chance of joining the 20% club of industrial innovators whose data driven projects are unlocking business value and paving the way for growth.

Peeking beyond the forest:

why everyone has valuable data?

The symptoms are all too familiar – “we still lack data” is a typical remark in boardroom meetings. But this is more a question of perception than reality. The reason is often simpler than you think: valuable legacy information ranging from customer insights to machine data is often locked or hidden from view in modern IT environments.

To add further complexity to the issue, mergers and acquisitions have multiplied in global manufacturing over the past two decades. This surge in M&A has helped manufacturers to expand their geographical footprint while providing a fast track to increase production capacity and obtain new expertise. As a result, the layers of operational data have increased significantly.

It is no surprise then that data paralysis has become one of the most common problems for manufacturers today. In many ways, it is an unavoidable outcome of good intentions.

When machines, production processes and inventories are connected, decision makers tend to struggle to make sense of “new data” flowing across the enterprise. A case, as it were, of failing to see the forest for the trees.

Regardless of which investments have been undertaken or planned, all organizations have high-value data that can be pooled, analyzed and cataloged right away. All you need to do is look under the hood of old business tools and capture the gold. Data is no longer just for analytics – data is everything. It moves between systems, machines, people and organizations. Data drives the performance of apps, automation systems and services you provide.

New roles, new ways of working

By assigning new roles and implementing data governance right from the start, you can turn the tables and position your business for growth. Nonetheless, this requires a united front. CIOs and other IT experts can open the door, but business managers in sales, services, finance, SCM and production need to get on board with new ways of working.

In addition, managers have to come to terms with the fact that data quality issues need to be addressed before costs can start to decrease and algorithms become truly valuable. That means digging into legacy data. Who is buying your products? How are customers using them? Are you achieving all of your environmental goals? Many of these questions still remain unanswered.

By making legacy data easy to interpret you will have taken the first critical step toward smart utilization of data assets. Adopting a holistic strategy for data governance and a mindset focused on data assets is not an option, but instead it is an imperative for competitiveness.

Finding the trees to harvest:

why data cataloging is key

How do you use data as an asset? There are as many manufacturing scenarios as there are companies, but exploring a few typical cases may be helpful for grasping what data means for your organization. For example, if you are making customized products in small batches, understanding customer preferences and demand in real-time will be essential.

Similarly, if your product-niche involves aftermarket services then legacy data – just like a doctor keeping medical records – will make all the difference to your performance and client satisfaction. And the same goes for understanding your installed base data in a clear way. One of the biggest obstacles is that common standards and practices are not yet in place.

While many companies use machine data to build insights and make continuous adjustments on the factory floor, this data is typically not integrated with business data. This is just one reason why manufacturers tend to have a bumpy road ahead when it comes to implementing data governance models. Another reason is the great disparity of data that large manufacturers need to cope with, especially following a merger or acquisition. Different cultures, mindsets and independent business divisions under one umbrella creates, in a sense, the perfect storm.

This results in a series of knock-on effects and the most severe, perhaps, is that co-workers lose trust in the data that is available to them.

Why creating a Business Data Catalogue is key

The first critical step for rebuilding trust is to invest in a Business Data Catalogue (BDC) which serves as an organization-wide blueprint for how to identify and retrieve specific data at any given moment. Think of it as a menu in a restaurant. Instead of comtemplating the food and drinks on offer, you are evaluating all potential data sets in the organization which come individually with a quality ranking and description of availability. Furthermore, data owners can be assigned to each cluster of data sets.

There are three basic steps for getting started with data governance:

Start by mapping the priorities and development needs of each business area or department against the portfolio and corporate strategy. Set up workshops with experts and stakeholders within each BA/ department and make a draft list of key data assets for further iteration.

Select appropriate use cases and evaluate the compatibility of the defined data assets. Assess to which extent the data is trusted by all stakeholders.
Are sales teams on board with the mapped information? Will end customers trust the data?

Adopt a design thinking process (non-linear and iterative approach) and create an attack plan for improving data quality and addressing trust issues, related both to business processes and systems data. This will result in a common business glossary and create a pathfinder for identifying future roles and responsibilities.

When these tasks have been successfully completed each BA/division should build a roadmap and development portfolio that is linked to the agreed data assets. This method and iterative process has been tried and tested by Tietoevry's manufacturing experts in a wide range of projects.

By validating the data assets with use cases, teams can move forward with activities and establish a common handbook for data governance, based on new roles and new ways of working. Data literacy will then gradually improve as people learn the ropes of handling, analyzing and communicating data.

Manufactured products typically have long lifecycles which means that complex and fragmented data sets need to be connected. By setting up data governance including a data catalogue, data-related challenges can be tackled in a methodical way, one by one, simply by following the agreed framework.

This makes operations more nimble and, by definition, more competitive and agile in the marketplace. A number of benefits should become recognizable almost instantly as you will:

- Get a holistic overview of all your data. Both legacy system architecture and IoT worlds will become one.
- Improve your odds of capturing new business value while measuring the performance of data assets.
- Improve the quality of data on a running basis in order to match development portfolio needs and rapidly develop use cases with trusted data.

This is not a marathon to be run without proper training of course. You need to build your strength – walk, jog and sprint – and focus on continuous learning. By starting with Tietoevry's Business Data Catalogue (BDC) approach you can easily move on the next level and use proven frameworks such as DCAM by EDM or DAMA DMBOK to establish agile and iterative ways of working.

If your CIO office is running Scrum agile processes, consider using the SAFe methodology when developing your portfolio. This fully integrated package will tie all the steps together in a way that is easy to grasp.

The power of use cases

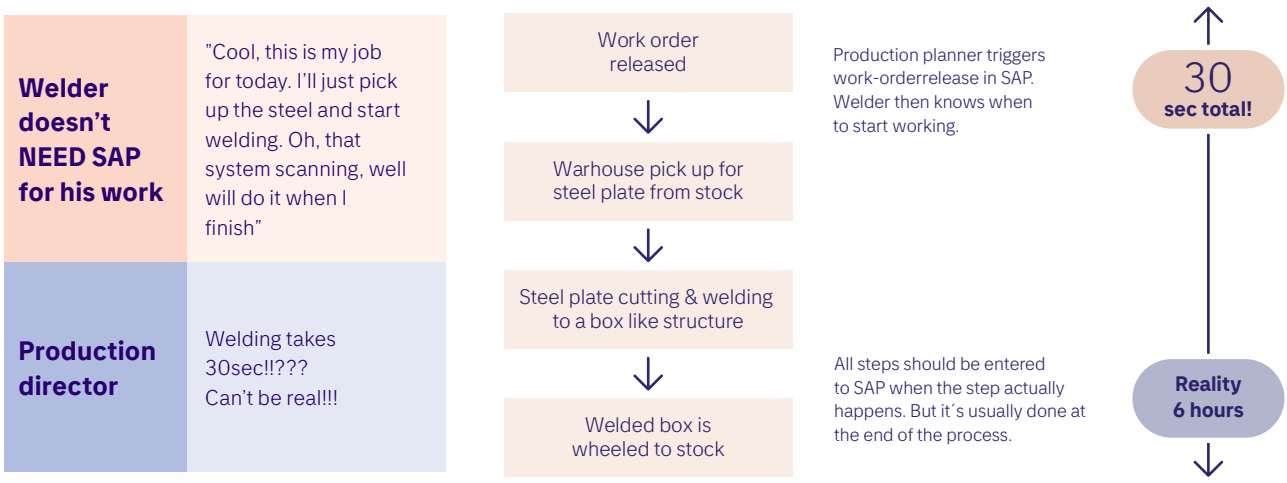
Data quality issues are a part of everyday operations in manufacturing. However, when you have a framework for data governance in place, use cases can point you in the right direction for validating data usability that enables you to tackle all identified issues in a structured way.

Let's consider two typical manufacturing scenarios:

Case A: The human factor

A welder picks up steel and moves it to the work station, performs the welding job and then goes to scan the item. The data will show warehouse picking, workorder in progress, completed workorder followed by component in warehouse with a total lead time of 30 seconds. This naturally is not reflective of the actual lead time for the work thus leading to false production time measurement.

Production lead time example

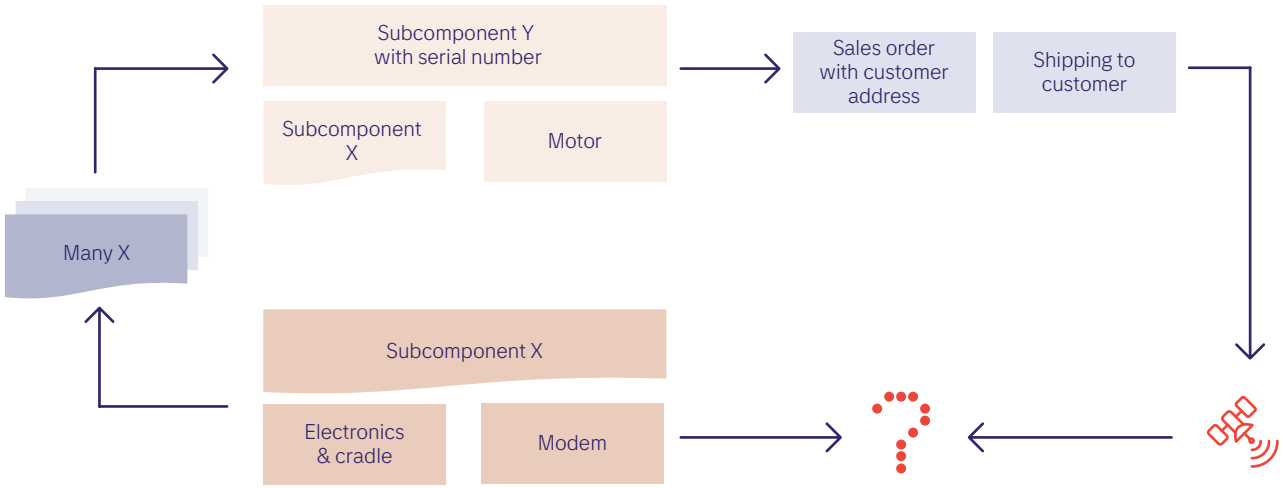


Case B: System design

In a factory where components are assembled for modems, first level subcomponents lack a serial number, unlike second level components which make up the final product that is shipped to customers. As the initial components are stock components, traceability is lost.

In case A, the plant manager needs to improve process control and in case B, ERP concept owners need to make design changes to the system. Neither issue would be known if it wasn't for the need consult the system data provided by users.

Hoist lost modem in Indonesia example



Grow the right forest:

develop a collaborative data platform and governance capabilities

As a result of merger and acquisitions, manufacturers operate with distributed and heterogeneous data assets. Their business silos make it challenging for them to find the data they need, and difficult to understand the data they find. Overlapping data assets lead to different versions of the truth that not only are ineffective from a cost perspective, but also create mistrust in the data.

Against the background of high volumes of machine data and limited resources, manufacturers cannot take an exhaustive approach to improve data quality. Instead, they need to focus on the data elements that are critical for day-to-day operations. Documenting each piece of information from thousands of databases, let alone maintaining them all, is not just a tall order but impossible to accomplish manually.

This is where so-called metadata management plays a key role in facilitating greater understanding of data both at the enterprise level and contextual level. The objective should be to create:

- An enterprise glossary outlining the common business language to be used
- An enterprise glossary outlining the common business language to be used.
- A data catalogue that describes data content from a business as well as a technical perspective where automated functionality is built in

Collaborative platform for data management

In addition to creating a business glossary, technical documentation must be linked seamlessly to the glossary so that users can understand what the data refers to and where it is physically located. Data cataloguing tools create a common platform and enable users to automatically scan through data content, and thereby manage metadata in a more efficient way. Sample data and machine learning are used to match the data with correct business application.

In order to address lacking data quality, users need to be able to analyse and trace data flows in any given scenario. This root cause analysis involves documenting vertical lineages, i.e. the link between data in a business context, the user interface Grow the right forest: develop a collaborative data platform and governance capabilities language and database names. This principle applies regardless if you are taking a top down approach to create new data or bottom up to understand existing data.

Even the best data cataloguing tool cannot replace people. However, the catalogue can be used as a shared workspace for anyone who is using or managing data. This prevents the negative effects of silos and working in isolation. With a collaboration platform, the metadata that is collected automatically can be enhanced by information stored exclusively in people's minds from experience. Crucially, this means that information is never lost during offboarding when personnel decide to leave the organization.

How to get started

The maturity level for metadata management is still low in the Nordics. Banks and fincancial institutions are a typical exception, but overall businesses do not fully understand the transformational impact of metadata in terms of cost efficiency, speed and agility.

At the same time, metadata management and data cataloguing tools are developing rapidly and making the job infinitely easier. There is often more than one factor triggering the decision to adopt these measures ranging from regulatory requirements and data quality issues to analytics (AI/ML). But in all cases, the process of describing data in ways that make it understandable will allow companies to step up their game and achieve competitive advantages.

The importance of data owners and stewards

All too often, data is manually identified according to projects and specific needs, not least before and after mergers or acquisitions. This means that data owners, stewards and architects are needed to describe data and model it. But automaton tools are equally important to speed up the process.

A good way to start is by identifying the data you need for prioritized use cases. Metadata should be defined around the company's main KPIs, which in turn will provide an overview of the new roles, competencies and, not least, training sessions and upskilling measures that will be needed.

Conclusion: Start to manage the forest

and reap the harvest rewards

Managing the avalanche of data that is emerging in manufacturing is no easy task. Nonetheless, your performance in this area is essential in order to keep pace with change and empower the organization with new revenue streams. The importance of harvesting data cannot be overstated, but who will fund the approach you might ask?

This is a fair question and perhaps the best way to address it is by considering the current opportunity cost of substandard data management. Research shows that the costs of neglecting data governance, or taking a 'wait and see' approach, is far greater than the investments required in order to become a data-driven organization.

What are the costs incurred today by failing IT projects, lost business opportunities and the surging risk of being overtaken by competitors? History is full of lessons to be learned and, just a couple of decades ago, no one at companies such as Kodak or Blockbusters saw a revolution coming down the road.

For manufacturers, data governance is now becoming just as important as preventative machine maintenance – you will not be able to operate without it. Failing to capture data and insights is the same as production downtime. Fortunately, you don't need to reinvent the wheel to get started, but by the same token there is no margin for taking a back seat. The time for action is now.

Set up a data management office

IStandard data management frameworks have now reached a promising level of maturity which means that separating the forest from the trees, in the context of data, is easier than ever for customers and consultants. There is no need to start with a blank sheet of paper.

For example, the standard content of the Enterprise Data Management (EDM) Council is improving continuously. The EDM Council is on the pulse of data management and analytics, and now encompasses AI and ML initiatives as well as data ethics. This framework was originally created by banks to help industrial customers understand where they are, where they want to be in the future and to jumpstart their growth journey.

Other examples support this optimistic outlook for data management. Agile business transformation frameworks such as Scalable Agile Framework (SAFe) are widely used by industrial customers. This knowledge base facilitates and structures the discussion necessary in order to truly understand the data component of each prioritized business requirement. Many industrial customers have also started to read the new DAMA Body of Knowledge (DMBoK2) book. The Data Management Association (DAMA) framework has progressed significantly, and in its latest release, is very relevant to today's most important data management issues and can also act as an accelerator.

Regardless of which framework you choose, the Data Glossary and Business Data Catalogue outlined in this paper are the stepping stones to transformation as digitalisation gathers pace.

Data platforms: the smart way to go

In the age of cloud computing, many of our manufacturing customers establish cloud platforms as a central hub for managing and using data. A cloud platform can to help kick-off data cataloguing and create a pathfinder for managing data assets.

It is no coincidence that artificial intelligence specialists spend the vast majority of their time identifying and analyzing the data they need. A well-managed data platform can significantly speed-up that time, help you add exponential new value on top of products and harvest the rewards of the new manufacturing paradigm.

Manufacturing on the move is a white paper series which is provided for you by Tietoevry. The authors of this whitepaper are:

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Tietoevry creates purposeful technology that reinvents the world for good. We are a leading technology company with a strong Nordic heritage and global capabilities. Based on our core values of openness, trust and diversity, we work with our customers to develop digital futures where businesses, societies, and humanity thrive.

Our 24 000 experts globally specialize in cloud, data, and software, serving thousands of enterprise and public-sector customers in more than 90 countries. Tietoevry's annual turnover is approximately EUR 3 billion and the company's shares are listed on the NASDAQ exchange in Helsinki and Stockholm, as well as on Oslo Børs.

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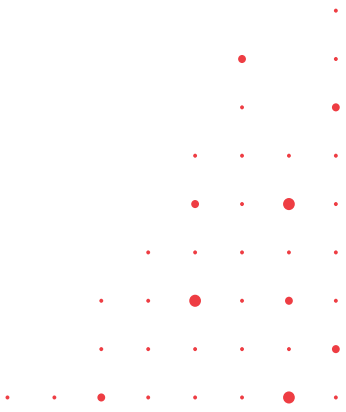

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