

Asset information management

Cracking the code

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A changing environment

Large-scale infrastructure networks, such as electricity, gas, water and telco, are the cornerstone of economic and social development. On the one hand, these networks are becoming more and more connected and digital (e.g. smart grids, IoT), and on the other, they are increasingly multifunctional (e.g. hydrogen transport over gas networks). This introduces technical complexities and new challenges with respect to integration and reliability, along with a new approach, a transformation in the way of thinking and working.

At the same time, infrastructure companies need to invest significantly in replacing ageing assets and building new infrastructure to satisfy future needs, whilst accounting for new energy policy objectives and related trends such as decreasing greenhouse gas (GHG) emissions - the turnaround in the classic value chain caused by decentralised production of renewable energy - and increasing energy efficiency.

In addition, the customer is also starting to play a more central role in this infrastructure, requiring the facilitation of increased customer participation, new operating models and potentially new business models. Finally, regulatory scrutiny related to reliability, cost levels, cyber security and environmental compliance is becoming more intense.

Critical to performing well in this environment is access to the right information at the right time. But, infrastructure companies have been frustrated by limited knowledge of the all-important component of their business: their assets.



The data up their sleeve



Since their existence, the way infrastructure companies have managed their assets has largely been driven by engineering expertise and regulatory requirements. However, arising challenges (e.g. ageing assets) and a rapidly changing technology landscape are pushing infrastructure companies to tackle their core activity - asset management - differently.

To manage the transition towards becoming an Insight Driven Organisation (IDO), infrastructure companies can use the vast amounts of data they have collected throughout their history (old data) as an enabler. This mainly concerns data gathered and used for operational purposes, which can now also be used for decision making in the asset life cycle. Moreover, infrastructure companies generate and capture vast amounts of new data on a daily basis (e.g. smart meter data, data from condition monitoring devices, data generated by call centre operators, etc.) (see exhibit 1). With this new data, the main challenge lies in managing the abundance of it efficiently, and combining historical and newly generated data wisely.

1

Exhibit 1: New sources and new ways of capturing data

Future-focused initiatives often involve the generation and processing of data, leveraging technology innovations. Emerging technologies, such as the Internet of Things (IoT) and machine learning, can yield tremendous gains in efficiency, cost reductions and new opportunities. One example is the case where relatively inexpensive IoT and ditto devices, are used to capture data from cathodic protection installations, which prevent corrosion of subterranean pipelines. By equipping a number of measurement points with IoT devices that send out data multiple times per day (in contrast to the existing annual measurements), manual processes are then digitised and better insight is gained on how the

grid can be better protected. Corrosion is also a concern for gas connections which are constantly being exposed to suboptimal conditions in the homes of the end-consumer (for example in humid cellars). Based on photos taken of the gas connection and by applying image recognition techniques, different degrees of corrosion can be diagnosed in a consistent, structured and less time consuming manner. At the same time, the different components of the gas connection (among other meters, regulators, connection points and service lines) can be identified, improving overall data quality by completing and updating these historical records.

Tapping into old data – how infrastructure companies are underexploiting their current asset data.

A. Re-use operational data for decision support purposes.

Despite the large amounts of asset data collected in the past, most of it has been left unused or solely used for operational purposes. It is true that capturing and storing data has typically been done from an operational point of view, instead of from an asset management standpoint. Despite this, a large chunk of this operational data can be re-used to support asset management decision making, even though it is difficult to know whether all the necessary data is readily available to reach its full potential. Other sources of data have been available for years but not been applied on a decision making level. GIS (Geographic Information System) data is mainly used for geo-positioning of works to be performed, but is rarely used to assess the impact of environmental factors (e.g. soil type, ground water acidity) on the condition and lifetime of the assets.

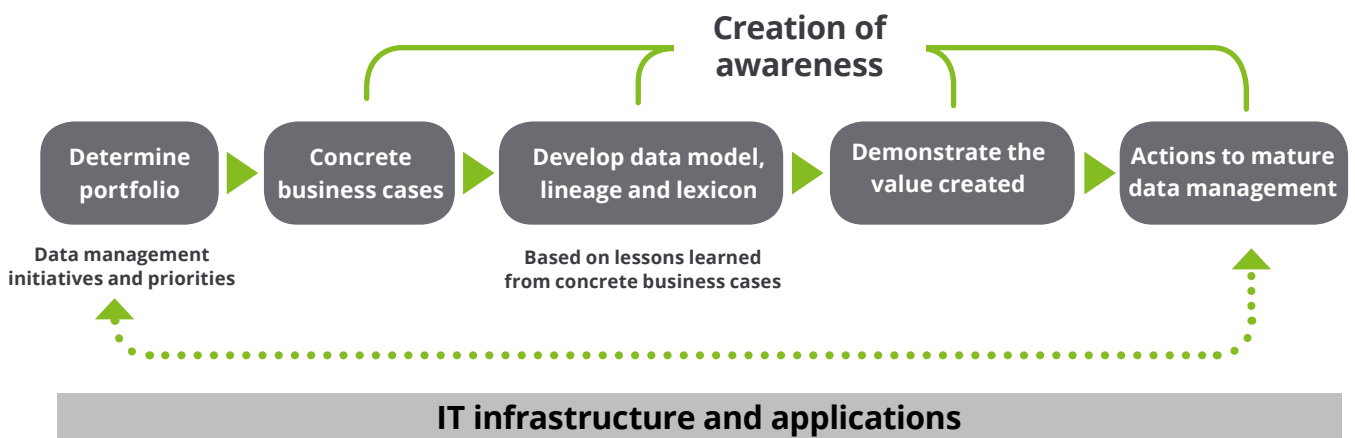
B. Perceived level of data quality as a blocking factor.

There are several reasons why data has been underused historically. One aspect of particular interest from a data management point of view is, the uncertainty about data quality levels. It is often the case that throughout the organisation the perceived quality of asset data is low, preventing the company from using it effectively.

This leads to a catch-22 situation where no objective view is obtained on the actual data quality levels, which may be different from the perceived ones. Another common misunderstanding is that high data quality levels are required before the data can actually be used. This is not always the case, it largely depends on what the data is being used for. For deriving insights into asset behaviour, 100% data quality is not required, as may be the case for regulatory reporting.

In summary, **having high data quality levels is not always crucial, having insight into the actual data quality levels and their impact is** (see exhibit 2). Small scale initiatives might help improve to break the vicious circle and create necessary transparency on the actual data quality, as well as, demonstrate that more value can be derived from the data than sometimes expected. In addition, initiatives which demonstrate value quickly will enhance awareness of the importance of data quality, to those who are at the source and need to create that data. The active involvement of the field in the development of these initiatives is a must in order to, ensure the acceptance and improvement of data quality at the input stage (see exhibit 3).

The picture below demonstrates how a continuous improvement cycle can be put into place.



2

Exhibit 2: Gain insights into current data quality levels

Measuring data quality in an objective way is not an easy task. It is best practice to base the definition of data quality dimensions within the scope of international standards (such as DAMA – the Data Management Association) to achieve a common language. As a next step, a set of business rules is necessary in order to quantify the different quality levels.

Comparing data quality assessments at 12 grid operator companies has shown that, typically, the construction date of their linear assets is one of the major pain points. For this asset attribute, the time between the registration of the data and the benefits realised by correct registration often spans more than one generation. As a result, historically speaking, little attention has been paid to data registration, whilst today it proves to be a critical element in the determination of the remaining lifetime. Therefore, data enrichment programmes are often aimed at completing it or increasing its quality, as well as making sure it is correctly registered for future use.

3

Exhibit 3: Behaviour - the most underestimated challenge?

Field workers are a crucial link to capture critical data from the field. However, in-field experience and interviews have shown that this is by far the most challenging way to capture correct data. Without proper change management and awareness, data quality initiatives will not pay off. An example of a strong awareness initiative is to make data consumers go back to field workers (those responsible for data input) to ask for the missing data and explain why it is necessary. Given that in most cases the person responsible for data input and the individual consuming the data are not the same, this feedback loop (data input – data consumption) is of utmost importance.

Technology should support ergonomic data input, hence the behavioural change. This is understandable, since filling in forms whilst, for instance, being exposed to harsh weather conditions is neither a pleasant nor an easy task. Acknowledging this challenge, companies are shifting towards a more digital data registration process (by means of e.g. smart devices). However, what many forget to consider is the ergonomic

aspect of applications. For example, in-field discussions have revealed that certain workers are using screwdrivers because they are locked out of their laptop every time they close it and it is not always straight forward to log in again. Therefore cases can be made for workshops in the field to identify needs and concerns.

A successful example at a Belgian gas distribution company included information which was, in the first place, not intended for further analysis, but purely as contextual information for technicians. A free text data field in the source application allowed technicians to register background information on certain issues. In the context of improved maintenance procedures, this text field was analysed by means of text mining and found to be extremely useful. The results were looped back to the field and reactions were positive. These surprisingly good results motivated field workers to keep on capturing the data, with even better quality than before.

Looking for the sweet spots

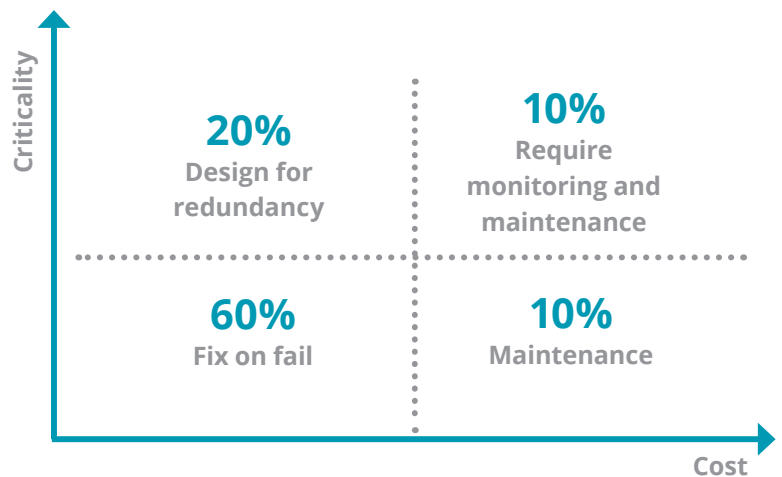
Data may hold the answers, it's up to you to ask the right questions.

Traditional paradigms tend to focus data initiatives on highly critical, highly cost assets. Within these paradigms, highly valued and highly critical assets (e.g. high voltage transformers) are typically monitored using expensive sensor equipment whilst, less critical and low cost assets (e.g. linear assets such as low-pressure gas pipes and low voltage wires) are managed by a "fix on fail" approach.

However, given the quantity of these critically low and low cost assets in the portfolios, the aggregated values at stake are high. By intelligently exploiting available but often unused data, less critical and low cost assets can be managed far more efficiently. This way business value can be created from data, with business cases showing capital expenditures (CAPEX) savings of more than 8%, and operational expenditures (OPEX) savings of more than 15%, with increased asset performance and a reduced risk level.

Challenges ahead – how infrastructure companies can deal with new data.

The old paradigm of ensuring "controlled demand for data" is not valid anymore. New technologies have enabled automated capturing of data and analytical capabilities, moreover, they have been driving the cost of data storage and data processing down considerably. As a result, one can afford to capture data today without yet knowing its future application, to be ready to solve the problems of tomorrow. However, given the vast amounts of data, building analytics capability is a must to treat it in a smart way. Without the right competences, the overload of the imminent dataflow is a big threat for every organisation. Moreover, organisations should only start exploring the abundance of information they collected when there is a specific business question to answer. Only by looking at the data through a particular lens and by describing and modelling it correctly, can you discover the impact of data that adds value to the business. **The more data you have, the higher the chance that relevant data is in there.**



Start small, learn fast, prove the value.

Typically, every company which has started its transition towards becoming an IDO faces a number of challenges and barriers to overcome. Infrastructure companies are no exception.

Often, they seem to be unsure whether the amount and quality of their data, which was collected in the past and typically went through mergers, system migrations etc., is sufficient to be transformed into business value. **It has been demonstrated that the best way to prove the value of data is by engaging in small initiatives and focusing on concrete business questions to derive business value quickly**, also known as 'quick wins'. This allows for the identification of the main data quality pain points from a business and end-user perspective, given the fact that these initiatives arise from concrete business needs. In many cases, the information expert - typically in a formal role as Asset Information Manager - is highly involved but not actively steering this process. However, these small bottom-up initiatives should go hand in hand with existing top-down data governance programmes (e.g. related to data model design, data quality, data stewardship, etc.) in order to be able to scale them up and make sure these initiatives mature to a level they can be embedded into the organisation's regular way of working and lead to an industrialised solution.

The case for asset information managers.

Infrastructure companies are currently developing a new vision for their asset data. Today, **data itself is seen as an asset which can generate value**, just like any other asset they manage in their portfolio. Instead of being considered as a cost required to meet regulatory or legal requirements, data management is now considered an investment with an expected return. The asset information manager serves as the enabler of this new strategy. He/she can assist in prioritising the data initiatives based on business needs and help to distill the necessary information blocks for these initiatives. Also, the asset information manager can be a sounding board for business users during their data journeys to derive relevant information. He/she can serve as an innovator, coming up with initiatives to optimise asset usage which can impact the general asset management strategy. Together, the business and the asset information manager can develop concrete and feasible applications to turn around ways of doing business, moving towards becoming an IDO. Exhibit 4 includes a number of challenges asset information managers might face and some tips and tricks on how to tackle them.



Case study: European water distribution

A major European water distribution company had doubts whether the quality and quantity of its data was sufficient in order to retrieve valuable insights. With the help of Deloitte, they started performing a detailed quantitative data quality assessment. The results of the assessment clearly showed that the quality of the data was better than perceived by the company, hence its ability to capture insights. This initiative allowed them to identify the main data quality pain points (from the perspective of concrete applications) and formulate relevant mitigating actions. The quantitative assessment was complemented with a qualitative assessment to identify improvement opportunities in the organisation's, processes, systems and culture with respect to data management.

Surprisingly for the client, based on their data the team was able to reach very insightful results, which led them to improve the decision making around their pipeline replacement programme. This was also fed back to the staff in the field, making them aware of the fact that data is used for asset management policy making, and hence they are eager to further improve data quality from an input side perspective.



Challenge

Tips & tricks

The company is committed to the strategy, but poor in its execution.

If your company takes the data strategy seriously, resources should be made available. This is not a job which can be done in between others.

Prioritising small scale initiatives in the organisation's portfolio might be challenging.

Take the potential financial gains into account when prioritising. Track results and prove return on investment.

Measuring data quality across the whole organisation is an ambitious task.

Start small, scale iteratively. Experience has shown that starting by monitoring completeness can be more challenging than expected at first sight.

Defining a set of business rules and quality checks is not an easy job.

Many business rules are implicitly present amongst business experts, making these explicit requires an exploratory approach. Profiling the data based on the captured input and feeding back (for example with simple graphs), might reveal unexpected results and lead to refining the business rules.

Asset information management is a perceived cost for the organisation.

Asset information management is not a cost, but an investment. Demonstrate the value it can generate through concrete projects triggered by business needs. Transfer it into economical terms to make the business case.

The data quality in the organisation is too low to derive business value from.

Break the vicious circle - start with what is available. Based on small-scale initiatives, assess what is important and derive improvement opportunities from there. It is more important to have insight into your current data quality levels, than to get them to 100%. The required level of quality depends on the business problem you want to solve.

There are problems with scaling up small initiatives.

Make sure small bottom-up initiatives fit into a broader top-down data governance programmes. This allows the initiative to be scaled up and its maturity assessed, with the aim to embed into the organisation's regular way of working.

Data is not well captured in the organisation.

Capture data at the source. For example, technical characteristics about an asset can already be registered in the supply chain with present-day technologies such as bar code scanning.

How to define the role of IT in the asset information programme.

The role of IT cannot be overlooked. Typically, budget for data driven initiatives comes from the IT side. IT is the facilitator to move from a "sandbox" environment to an industrialised solution and is therefore an important stakeholder crucial in your story.

Data initiatives are not sufficiently derived from business questions.

Often, data driven initiatives arise from the following question: "What can we get from our data?" In order to assure the business, it is crucially important that the solution provides the answer to a business question. Hence, the first important step is getting this need crystal clear.

Deloitte's Next Generation Infrastructure team has worked with a very large number of companies in different asset intensive sectors. As a result, we understand the challenges you face, and can help you address the strategic, operational and cultural transformations you may need to make.

We recognise that asset management is not just about fixing an immediate problem, it's about driving long-term value for customers, shareholders and society. To that end, we help our clients to approach asset management from a holistic perspective, delivering the value required.

Want to perform a scan of your organisation's asset information management maturity?

Participate in our Asset Information Management Maturity assessment.



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