THE INTERNET OF THINGS, BIG DATA, & PREDICTIVE ANALYTICS

How to navigate the current landscape and prepare for the future so you don't get left behind.

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INTRODUCTION

There’s been a lot in the press in recent times talking about the impact of a whole raft of data and technology trends which is sweeping through various sectors. Buzzwords such as the Internet of Things, big data and predictive analytics or AI (artificial intelligence) get used a lot, but it can often be difficult to understand what the tangible impact of these will be on the sectors that we work in. In this eBook, we’d like to unpick some of this jargon to understand what this means for technology in the real estate sector and, more specifically, how it might help to improve the operational efficiency of existing buildings in the commercial real estate sector. Our aim is to give an overview of some of the challenges and opportunities for using data and some sense of where things are going. Along the way we will provide some examples based on EVORA’s own experience.

WHAT DO THE BUZZWORDS ACTUALLY MEAN?

The Internet of Things (IoT) – At its simplest, this is providing an internet-based connection to a device to enable the sending and receiving of data. IoT simply refers to this increasing network of devices which are becoming more interconnected and pooling more and more data. Perhaps one of the most relevant examples to mention here could be an AMR meter in a building which makes the consumption data available online. One step beyond this might be a property BMS connected to a web-based software system which enables building performance data to be accessed and setpoints to be changed remotely.

Big Data – In reality, most large datasets that are being analysed in real estate today are not technically ‘big data’. Even years’ worth of half hourly interval energy data can fit on the memory of a modern smartphone. However, big data is fundamentally about the potential to bring together otherwise disparate data sets to see if they will tell us anything new, which is something that’s already happening in the real estate world. One notable example, which although not a RE one, is the ‘nappies and beer’ story. A retail chain analysed great swathes of till receipt data and found a correlation when they looked at sales of nappies and beer. They noticed that when people came in to buy nappies they were also buying beer. So, to increase sales potential they put these two products in the store next to each other. This example should get thoughts going of what types of insights could be found if adopted in real estate.

Predictive Analytics – Also known as artificial intelligence (AI), this is essentially the concept of increased automation; computer-based systems collating data to establish patterns which ‘self-learn’ and send information to change a course of action. A good example of the potential in real estate would be the deployment to a BMS so that building controls could be automated to gradually optimise performance over time. There is still a way to go before this is widely adopted across the real estate sector.

WHAT ARE THE BENEFITS?

Whilst we’ve touched on some practical applications for improving the sustainability of real estate, it’s worth recapping on some of the benefits of these emerging technology and data trends.

There’s been a real growth in the availability of data platforms with these technology trends. The essential aim of these platforms is to offer transparency and accessibility to make the process of data collection and analysis more efficient and cost effective. One of our SIERA software lead developers described it well: ‘a good platform effectively brokers the relationship between data and its client, an intermediary to make sense of it all.’

In its application to making real estate more efficient, the emerging technology platforms provide many benefits:

- Simplifying otherwise complex analyses. For example, energy intensity calculations and aggregating copious quantities of data reduces the chance for human error and the time required.
- Draw together disparate sources of data. For example, by acquiring tenancy information from a property management system alongside energy data you can provide context to performance trends.
- Providing efficiency through the automation and standardisation of reporting. This means you can ensure consistency of an approach across different funds and portfolios.
- Offers transparency and audit trails. It’s often useful to know when data has been updated, by whom, and what changes were made.
- Acts as a catalyst for advanced management. For example, internal management, such as more efficient use of space, the creation of smarter living and working spaces and improving tenant engagement programmes which opens new revenue streams and value generation.
- Provides greater visibility and comparability within the market. Data can also be used for performance benchmarking.

The real estate sector, for the most part, is still behind the curve. There doesn’t seem to have been much evidence of capitalising on the potential that data analytics and the technology players could bring to improving the existing building stock. Adoption and progress has been slowed by challenges and legacies in the real estate sector related to underinvestment in modern technologies, perceived challenges around compliance, and security and lack of resource such as technical expertise.

In this eBook, we want to explore the industry’s ‘data journey’ so far and provide an outlook for the next phase of the transition. Our aim is to fill some knowledge gaps and give you a hands-on discussion into what the sector needs to do next to the genuine issues that the industry is facing to make this a reality. We’ll shed some light on the challenges, share some of our experiences and discuss what can be done now.
The data journey to date has not been an easy one, but there have been some pivotal moments that define the industry as it is today. Traditionally, data collection and reporting was a manual process, usually delivered in a physically written form. A more advanced tool was, and still is, the property management system. This started in the 1970s and grew through the 80s and 90s and helped to make the day-to-day running of a building, workflows and processes more efficient, partly replacing manual paper documentation. Property management systems were built and enhanced further to expedite some forms of analyses and reduce chances for human error.

As tools became more sophisticated and readily available, Excel spreadsheets gained popularity and became one of the most common forms of data storage and analysis. Spreadsheets began to replace paper for data collation. Generally, data was manually entered into computer systems and analysed for reporting. This is still the case for the industry in the present day, especially analyses that extend beyond the scope of the property management system.

Energy performance has understandably dominated the sustainability agenda and more accurate data is becoming more readily available. For example, the proliferation of Automatic Meter Reading (AMR) is playing a key role in providing accessibility to energy consumption data, especially at the half-hourly level which is vital for monitoring and targeting improvements. Evolving industry standards, legislative drivers and voluntary reporting indices have also exponentially increased the range of data types required to be collected and along with them created different data formats and structures often held in disparate sources.

As an industry, we are starting to move away from manual entry of data into computer systems for reporting to more fully automated data collation from source and smart reporting from multiple devices. As we said earlier, the main premise of web-based technology platforms is to help draw different data sources into one place to offer greater flexibility in data management and analyses, or ‘frictionless data’ as it is also known.

The current trajectory is one of:
- Increasingly automated data acquisition; there is an expectation that technology platforms will be able to integrate and automatically source data with little or no human intervention.
- Increasing insight; as we’ve said, there is certainly no shortage of data available to analyse. However, the demands being placed on platforms and digital players are that they cut through the noise and present the most pertinent data in a clear, understandable and actionable format. This is what will add value and inform decision making.

Despite continued industry efforts to harmonise the data requirements of the various reporting standards and benchmarking indices, there are inevitably going to be instances where similar types of data will be provided in diverse ways. Nonetheless, platforms that lead the way will be able act as one tool to report to them all. In short, there needs to be greater interoperability between systems and standards.

At the periphery, we are starting to see increasing potential for platforms to support automated, predictive analytics. To achieve this, the industry must think in an increasingly agile way to foster innovation and adaptation to these innovative approaches.

The story so far...

WHERE IS ALL THIS HEADING?
WHAT’S STOPPING US FROM GETTING THERE?

Big Data is a relatively new concept and real estate companies have now started to take increased interest in how this can improve performance. Improved computing capabilities and processing power are key to this, but there are still genuine and perceived barriers to harnessing the full potential of large scale digital data solutions in the real estate sector.

Data availability & acquisition

In our experience, there’s still a lot of hyperbole around predictive analysis of performance data and it is still far-fetched for most in the industry due to much more fundamental infrastructural challenges, such as the realities of data availability and acquisition. If we take energy data again, the roll-out of AMR on energy supplies has enormous potential to transform the automation of data collation and enhanced visibility of performance trends. However, whilst coverage is increasing across the industry and more significant energy supplies are prioritised, the reality is that many real estate organisations do not have the extent of coverage on the data they need to monitor performance and report to investors and stakeholders. A word of caution here - increased automation alone does not necessarily provide a panacea for all data acquisition difficulties, as we will elaborate here.

We have made finding solutions to the challenges of data acquisition one of the main objectives to the development of our software, SIERA.

• Where AMRs within client datasets exist, we have established automated connections directly to the source: APIs (Application Programming Interface) or (S)FTP (Secure File Transfer Protocol) have been set up to simply ‘talk’ to Data Collectors’ (DCs) systems to populate SIERA with half-hourly data. In fact, we have established the means of ‘pushing’ and ‘pulling’ data into and out of SIERA in an attempt to reduce the extent of human intervention – particularly helpful when clients and their property managers are resource constrained. It’s also important to understand that data formats from data providers can vary. This can be accommodated to support system connectivity but effort and resource is required to do so, which can be reduced with increased standardisation of data formats. We have also found that seamless connectivity does not necessarily ensure data quality; even AMR data can include errors, so we have built in automated validation processes to highlight anomalies to the user.
• Automating processes where possible is the aspiration. However, we have found that existing data infrastructure is not always present to support the vision of full connectivity. It’s important to recognise that many data types are still often collated offline. With SIERA we saw an opportunity to cater for those who do not have the facility to fully integrate systems and created a means of easily adding and editing large datasets through ‘drag and drop’ mechanisms, such as our selection of data loaders. On a deeper level, we are looking at BMS integration to build new insights, which we see as the logical next step for sustainability-focused technology platforms.

Resources & Leadership

Technical and infrastructural contexts show that many systems are simply not up to the task of quickly adopting innovative technologies of data acquisition and analyses. This is related to two key issues: technology spending has been squeezed in recent years so we’ve seen underinvestment in technology, and there’s also a large skills shortage within the industry. Technology suppliers can sometimes also lack the resources required to undertake necessary integrations. The various knowledge bases are often quite siloed and there can be challenges translating end users’ actual requirements into the final developed, implemented solution.

Implementation & Scalability

Although spreadsheets still seem to be used extensively for many data tasks, the platforms that are in place such as property management systems are often large in scale. This means that it can take a long time to implement change and achieve scalability with newer more fledgling platforms. This slower pace can be demotivating, leading to difficulties in achieving stakeholder buy-in.

In the financial services world, data security is understandably a critical issue. However, it could be argued that there are perceived barriers around compliance with both regulatory frameworks or self-imposed policy restrictions when it comes to data management. For example, the shift to more interconnected solutions can often involve platforms and infrastructure that rely on cloud-based computing. These needn’t be any less secure than conventional data storage but there are often stipulations around physical locations of servers which can impede progress to adoption of new technology.

Investment in technology is required, as well as a focus on technical leadership to bolster the vision to promote uptake within the industry.

What are the key questions to consider?

• Governance: Who owns the data? Data can be controlled at various levels. Some organisations choose to restrict access to data, whereas others prefer open-source datasets with and without anonymisation. Whilst financial and transactional data must remain secure, there are opportunities where large scale non-financial data sets can benefit the whole sector. For example, where sector-wide voluntary benchmarking indices can provide valuable insights when based on combined datasets from many participating organisations.
• Accessibility: How can the data be accessed and by whom? For sustainability issues, greater disclosure of data has become more attractive to build reputation, but it does present questions about data in terms of accountability, transparency and integrity.
• Compliance and security: How will security be managed if there are multiple data flows? Setting data protocols and focusing on audit trails are essential.
• Application: Who authorises the use of the data? How is the data going to be used?
WHAT NEEDS TO BE DONE TODAY?

Engaging data analytics will never be as effective without strategies to translate data acquisition into data insights which in turn inform decision-making to drive performance and value. To drive performance and achieve results, you may consider EVORA’s 4Cs for an agile sustainability strategy. This is suitable for the digital age to move your organisation to the next level and gain technical edge and advantage over your peers. ‘Agile’ originated as a practice in the software development world, but can be applied to all aspects of organisational strategy, including digital sustainability strategy. Agile allows processes to be broken down and efficiencies realised in an incremental way. An Environmental Management System (EMS) is an example of agile in practice to achieve continual improvements over time.

#1 Capture and Monitor

We are starting to move away from analyses on spreadsheets which has the benefits of minimising data loss and chances for human error, increasing auditability, driving efficiency of process, standardisation and rigour on data management. Data capture and on-going monitoring is essential for identifying areas for improvement.

Data Capture and Workflows

It is recommended that the real estate sector needs to look at the current data collation methods, file storage and workflows within the context of data.

- **Velocity**: How quickly it takes to process the data, draw insights, as well as granularity.
- **Volume**: The amount of data you currently hold and expect to obtain in the future.
- **Variety**: Different types of data, where they come from and their structures and how they can be captured, stored and integrated.

There is also a role for data providers, data collectors and technology platforms to help to acquire, consolidate and structure the data in more standardised formats.

For example, in SIERA we have created simple visualisations of half hourly data trends which enable comparison against optimum profiles and automated detection of anomalies. This makes for easy monitoring of performance and targeting of efficiency improvements.

#2 Communication & Collaboration

Collaborative efforts are required to use data as one key piece of the puzzle to design successful strategy, including achieving buy-in from stakeholders through relevant communication on all levels from policy, planning, implementation, evaluation, review and on-going monitoring.

#3 Change Management

Change management is essential for seeing strategy through to implementation. This includes technological changes and realising opportunities through data platforms, which help to manage the transition and establish communication and workflows.

At an industry level, it is essential that working groups understand the emerging technology trends in the context of improving sustainability in real estate, what the challenges are and how engagements and workshops can help to break the barriers when it comes to grasping what it takes to make the next step.

Internally, organisations may consider investing in the skills necessary for the journey and to create the next generation of experts.

#4 Creating Value

Data is useless without context. Value generation can be achieved through data-driven insights and may inform future strategy. Technology is one of the enablers for more sustainable investing and risk management of portfolios. Data visualisations through technology platforms such as business intelligence tools will be crucial for seeing patterns in the data. With the myriad datasets available, volume of data may seem attractive; however, it is quality of insights that provides strategic value in the real estate world.

Let’s take Energy Performance Certificate (EPC) MEES risks as an example. Many databases can hold entire portfolios of EPC records. This is not particularly ground-breaking. But as we know with EPCs, understanding the risk requires context which means pulling together multiple parameters together in one view. For example, it is not enough to know simply the letter rating but also EPC expiry, lease events and rental income to prioritise actions. The ability to be able to gain this context was fundamental to our development of the EPC profiling module in SIERA, key information is drawn from the database into simple but powerful visualisations. These strategic overviews can be easily filtered based on additional user-defined parameters to really focus on key sites.

In relation to the commercial real estate and wider built environment sector, the industry is still behind the curve. Big Data presents its opportunities but also challenges. There is still a way to go due to the challenges and legacies, underinvestment in modern technologies, perceived challenges around compliance and security and lack of resource. To make the journey a reality, it is important to discuss these issues openly.

Our vision is to harness innovative technologies and platforms and help clients manage the data transition; but we cannot achieve this alone. As an industry, we must engage in conversation to increase awareness, interest and investment in technical leadership and know-how to manage these changes.
EVORA: SUSTAINABILITY CONSULTANCY SERVICES

At EVORA, we understand all the environmental issues and responsibilities you’re facing. Through our holistic approach, we can deliver end-to-end solutions tailored to your specific business needs.

“We chose SIERA because it has been specifically designed for the commercial real estate investment market. It is practical and intuitive to use and helps simplify the many complexities of sustainability analysis and reporting, especially GRESB.”

Charlotte Jacques, Head of Sustainability, Schroder Real Estate

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