

Aden

Beyond Buzzwords

the four pillars of IoT success



Few technologies are generating as much interest and investment these days as the Internet of Things (IoT). But like any trend that makes a lot of noise, the buzz and excitement around the technology can distract from key questions:

- What goals does IoT actually serve, and for whom?
- How can IoT be harnessed to its maximum potential?
- How can we use data tools to stay flexible in the face of constant change?

The fact is, IoT and big data can produce game-changing results, but only for organizations that treat them as strategic tools rather than a “magic bullet”. As the old saying goes, if you don’t know where you want to go, you’re not going to end up anywhere.

Start with the right targets

Any tool has the potential to work wonders, or to prove useless. The difference comes down to how the tool is used and what the user wants to achieve. The same is true for IoT. If your organization is using smart tech to achieve the four outcomes below, you are probably on the right track.



SITUATIONAL AWARENESS

Is IoT giving you granular & accurate building information?



USER CENTRALITY

Is IoT improving the experience of your buildings?



FLEXIBILITY

Is IoT making your space responsive and resilient?



SUSTAINABILITY

Is IoT helping you use less and waste less?

1. Situational awareness

Is IoT giving you granular & accurate building information?



Knowledge is power. Used properly, IoT is a force multiplier, empowering you to make better decisions and strategy through richly detailed information about your facility and its systems.

But beware: data is only as good as its source. If your data is flawed at the root, IoT's ability to deliver vastly more detail will only multiply your headaches. Any good smart-tech project must help you achieve **situational awareness** - a detailed and trustworthy picture of what really happens in your facility and how all the data fits together.

The problem of “fake news” and “fake data”

In recent years, there has been much talk about the danger of “fake news”, which can lead to real actions with serious

consequences. Similarly, it is time for organizations to wake up to the danger of **“fake data”** - distorted or incomplete information that leads to wastage, missed opportunities and bad strategy.

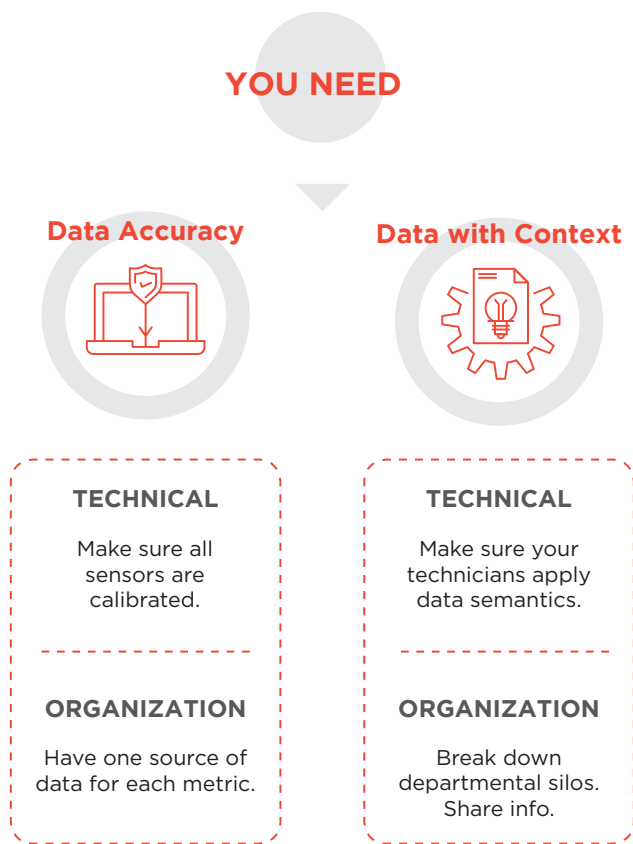
While “fake data” isn't usually designed to mislead, it shares many characteristics and consequences with “fake news”. First, it is information from an uncertain source. Second, fake news is one-sided and biased to a particular view. Similarly, bad organizational data is usually hard to pin down and verify; its information is typically incomplete or one-sided, focusing on the needs of one department without reference to the others.

Refine your crude data

It is often said that data is the new currency, but the better comparison may be oil. Like

crude oil, data needs to be extracted from its source and only becomes useful after it has gone through the refining process. Put crude oil into your car and you will go nowhere; put unrefined data into your systems or planning and you'll surely arrive at the wrong destination.

The key to refinement is in the foundations - establishing accurate sources of information and systematic correlation of data; and making sure these are supported on both the technical and organizational sides.



Start from the source

First things first: **calibration**. Whether it's heating, lighting, people-counting or other measures, companies must keep an eye on the technical side of their data-collection and make sure that all sensors are accurately recording information.

It's not enough to simply have lots of meters. Often, "fake data" stems from technical problems at the source, without regard to the amount of equipment installed. When false readings are sprinkled into a report of otherwise accurate figures, the effect on the whole is negative and interferes with a meaningful understanding of what's happening in your building.

Even more problematic for decision-making is when organizations collect multiple, contradictory sets of data. If two departments have clashing data for the same metric, whose numbers do you choose? The answer isn't obvious and results in delays, missteps and tension between departments.

For this reason, streamlining data collection is a must, and should be organized around the **"single source of truth"** principle - for each metric you monitor, your organization must designate a single source-point of data that each authorized party can draw from. However you organize this, within a single department or across many, having one source of information which everyone can access is a surefire way to make your data more reliable.

Correlate and conquer

Never forget: data without context has no meaning. IoT's revolutionary power is not that it allows massive data collection - the game changer is that IoT allows companies to overlap information like never before. When this contextualizing power is used strategically, to answer key business questions, companies see profound value creation.

For correlation to work, companies must first make sure their technicians are systematically applying appropriate data semantics to everything their IoT sensors collect. **Data semantics**, at its simplest, means categorizing data with a standardized

set of tags. These tags create a unified “language” to describe your data, adding contextual details (e.g. time, occupancy rate) that add meaning to abstract numbers and makes them easy to compare, no matter the source. Without this shared reference system, valuable data tends to fragment and disappear, instead of being linked in useful ways.

Successful data correlation also requires that organizations commit to data transparency and collaboration between their teams. It’s not just that departments often collect duplicate information; problems also appear when this data stays locked away in various departmental silos. Breaking down these organizational walls goes hand-in-hand with the effort to establish a “single source of truth” for all company data.

Takeaways:

- “Fake data” can be quite convincing if you aren’t looking carefully – question the foundations of your data and question your assumptions.
- Think technical about IoT: calibration of sensors and good data semantics.
- Think organizational about IoT: correlate your data and break down the walls between departments.

2. User centrality

Is IoT improving the experience of your building?



300 is the magic number

In property and facility management, **3-30-300** is a classic rule of thumb to estimate costs per square foot: 3 for utilities, 30 for rent and 300 for the cost of employees/users.

Historically, managers have focused on optimizing between 3 and 30 - rent and utilities. But what about the 300? More than being a cost, the people in your facility are the greatest generator of value and the ones whom the building ultimately serves.

Bigger picture, better decisions

Every organization using smart tech should demand that their technology enhance the quality of life, work and productivity for the building's users. If you aren't leveraging IoT for gains here, your organization is missing

one of smart tech's main benefits.

Consider lighting. Traditionally managers looked at lighting as an issue of "3" (in the 3-30-300 rule), simply affecting - and marginally, at that - building operation costs. The user-centric approach provides for a different context: how does human performance change with different lighting levels? What lighting encourages people to focus and work longer? How can building managers use data to optimize value for the business and working experience for employees? This approach shifts the focus from how lighting affects utility costs (a small part of the "3" in 3-30-300) to how lighting affects the larger "300" side of human performance.

The point isn't to ignore rent and utilities, but to use IoT to create a richer, multi-layered view of building interactions, with

people at the center. This bigger picture helps companies make smarter, more effective decisions and encourages best performance from all of the building's users.

Put hard numbers to fuzzy feelings

Long before the rise of IoT, building managers were collecting user feedback. But before IoT, the great difficulty was getting actionable feedback with quantifiable information.

Take one small example: an employee has emailed to complain the building is “too hot”. At a gut level, the manager reading this email may not be surprised – perhaps similar complaints have been submitted before, or have come up in conversation. Message received. But, how efficient can the manager’s response be with so many unknowns?

- What was the exact temperature at the time of writing?
- Where exactly was the employee when he emailed? Which rooms had he visited before?
- What other rooms and temperatures have people complained about in the past?

Minus IoT, the manager would need to do a time-consuming follow up to answer these questions, and would still rely on a good deal of guesswork. With IoT, all of these are answerable and measurable; and every piece of feedback adds to a growing web of comparable information. The end result is a sharper response this time, better-informed decisions in the future and better user experience overall.



Use IoT and big data to engage building users

IoT can deliver building data at an astonishing level of detail. Every mobile phone in the building, every laptop being moved from Point A to Point B, is its own complex sensor. And if companies have the will to do it, they can install sensors at every desk.

But it is essential to understand, IoT and big data collection don't need to be something companies only do *to* their building users; smart tech can contribute to a process that helps organizations engage *with* building users. With or without IoT, organizations should always seek out and listen to user feedback about the experience of the

building. What IoT adds here is the ability to take this user feedback and target the relevant data points, sharpening your organization's understanding of the situation with concrete information. With better understanding comes an opportunity for better responses and a better user experience.

When building users are brought into this loop, buy-in and participation shoot up, kick-starting a healthy cycle of subjective feedback plus objective IoT data. The resulting conversation can reveal important insights about your space and open up a new channel for innovation and building improvement.

Takeaways:

- Think bigger than cost - focus on how you can use IoT and big data to improve and impact the performance of your building users.
- Everyone has gut feelings about a building's good and bad points - use IoT to quantify these and make concrete improvements.
- Don't hide smart tech from your users - let people know how and why you use IoT and big data. Use this to build user-engagement.

3. Flexibility

Is IoT making your space responsive and resilient?



Be water, my friend

The ancient Chinese text *Tao Te Ching* famously speaks about water, and how its ability to move around any obstacle makes it the most powerful element. In an age where the pace of change is only speeding up, and building uses are growing more fluid, this adaptability is quickly becoming a must-have for facilities.

Follow the user

What value-producing actions do you hope will happen in each part of your facility? Placing desks at Point A may encourage working. Putting a coffee machine at Point B signals a place for socializing and mingling. But, it often happens that people have their own ideas about how to use a space. Especially because the tools of work have become light and mobile, individuals

tend to gravitate towards certain spots for certain purposes, while avoiding others.

For facility managers who embrace flexibility, watching and learning from these individual choices can reveal many opportunities to optimize their spaces. At a gut level, facility managers may already be aware of certain “hot spots” and “dead zones” in the building. But how to measure and make improvements based on these intuitions? How can managers optimize spaces they are less familiar with, or make optimizations at a larger scale?

IoT can be the answer. But this must be a strategic use of smart tech, fitting in as one component in a system that balances technology with organizational flexibility; a system where data feeds into a continual loop of hypothesizing, testing, measuring and improving.

Learn from your web developer

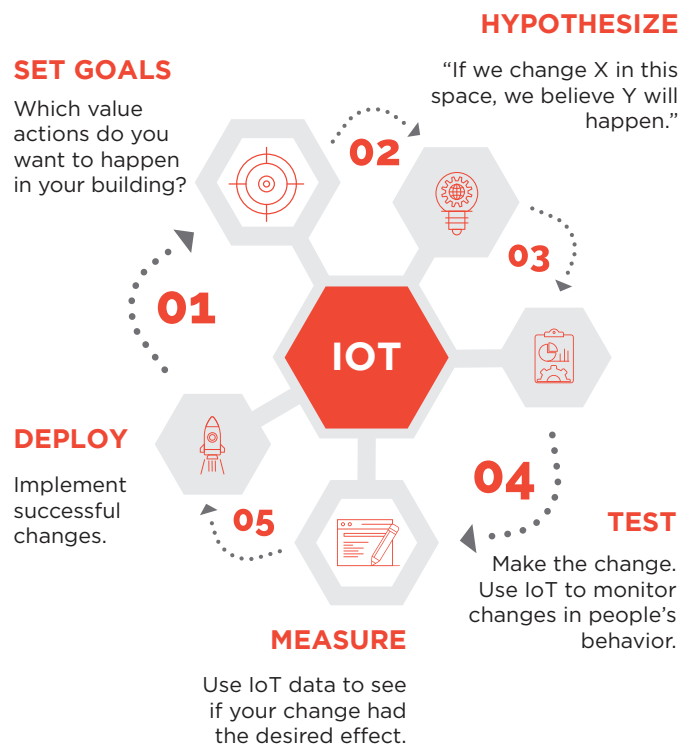
To manage physical spaces with more flexibility, it can be helpful to start by looking at how flexibility and optimization are achieved in the digital space.

Like a building, each webpage is carefully laid out to steer people in certain directions and encourage value-generating actions (**conversions**, in web jargon). But like a real building, the people who visit may or may not move around the virtual space as planned, or carry out as many target actions (conversions) as planned.

For years, web developers have had data tools with a sophistication and capacity that IoT has only recently opened to facility managers. Able to track millions of user journeys and interactions on the page, developers can measure conversion rates for each section with granular detail.

Web developers have also become expert at creating continual **optimization loops**. Equipped with the proper analytic tools, developers can quickly spot underperforming areas; theorize about which changes might improve the conversion rate; and use practices like A/B testing to measure whether their changes are producing real impact.

Online, the end result is a digital space that is permanently evolving alongside user behavior and routinely optimized to encourage more successful conversions. Real-world facilities can achieve a similar state of flexibility and optimization if they apply a these practices from web optimization, using IoT to create a rich data pool.



Hypothesize. Test. Improve.

The key to the optimization loop is that it is not a one-off project, or even a series of projects. Optimization must be a permanent state of operations, an essential feature of how facilities are managed. While optimization doesn't strictly require IoT, there's no better tool for putting hard numbers behind your intuitions; measuring the impact of changes on people's behavior; and collecting data at scale, in a continuous way.

To create an effective optimization loop, each of these steps should become a routine practice in the management of your space.

Set goals: First, identify the value-generating actions (conversions) you want to happen per space. Depending on your sector and facility, this could be anything from encouraging inter-team collaboration, to increasing customer sales in a shop, to getting children to spend more time reading in the school library.

Hypothesize: Use what you know to predict how you can achieve your goal: “If we change X in this space, we believe Y will happen”. Bring as much reliable data to the hypothesis as possible. With well-planned IoT use (see Section 1), your situational awareness and data resources will only improve with time, facilitating better and better predictions.

Test and measure: Implement your hypothesis, making sure your IoT tools

are measuring key metrics that reveal the success or failure of your hypothesis. If your facility has the space, try another classic web optimization technique, A/B testing: give building users two choices and measure which one they opt for. On the other hand, don't feel you need to test changes facility-wide – small tests can provide useful measurement data that can lead to larger changes afterwards.

Deploy: If you've seen that your hypothesis affected a positive change – keep it. Expand the approach if your data suggests it will work at scale. Just remember that the optimization loop doesn't end, and that no optimization is ever truly finished.

Takeaways:

- Pay attention to the places people gravitate towards, and what they do there. Follow their lead when optimizing your space.
- Continually hypothesize and test optimizations, measuring and making improvements accordingly.
- Using accurate data to adapt faster and further is a critical business advantage.

4. Sustainability

Is IoT helping you use less and waste less?



Buildings are now close to representing 40% of total global energy consumption and emissions. Despite this major role, construction and facility management have had a surprisingly quiet role in discussions of carbon emission and global warming.

The time has more than arrived to address how facility management and construction are impacting sustainability and the environment. With urbanization, the growth of service economies, and a general shift to indoor life, the impact of buildings on the environment is only set to increase. What can be impacted today is how building management practices can steer this impact in a positive or negative direction.

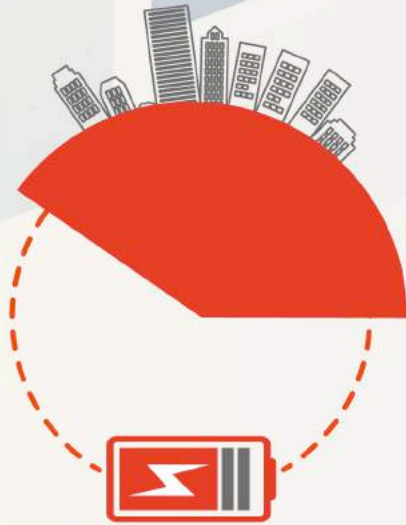
The solution needed is far bigger than any one technology, but IoT, big data and machine learning already offer valuable tools to optimize energy use and buildings'

overall consumption. If facility managers use IoT and big data correctly from the start, creating a continual optimization loop (see Section 3), there is an immediate opportunity to contribute to sustainability.

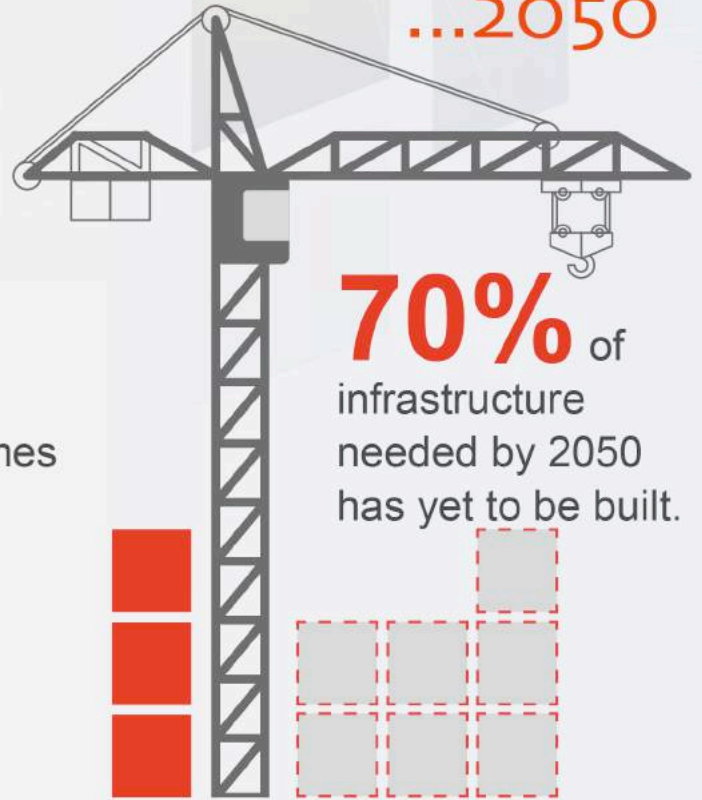
Four challenges to come

In many countries, the face of work for the average person is changing from the manufacturing sector and the factory floor to energy-hungry office buildings. With this shift, facility managers need to be ever more aware of the responsibility on their shoulders.

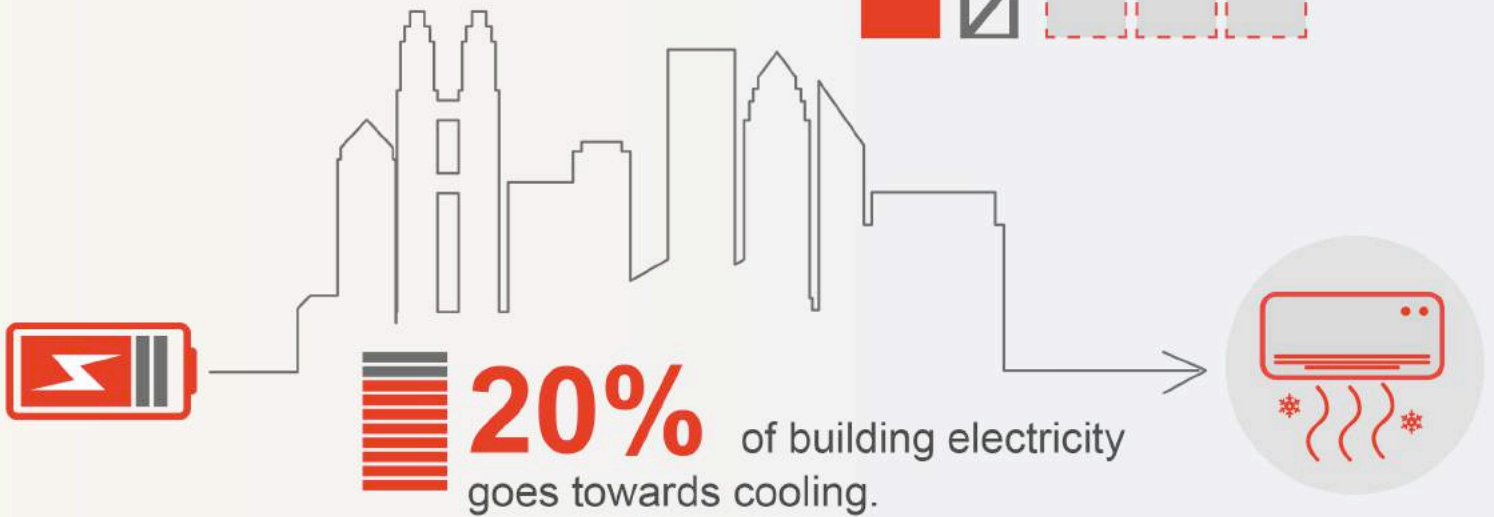
Four major challenges lie ahead. The way facility managers respond to these challenges, particularly in Asia, will reverberate around the world. Facility managers should lead by example, advocating and using IoT and big data as



40% of global consumption comes from buildings.



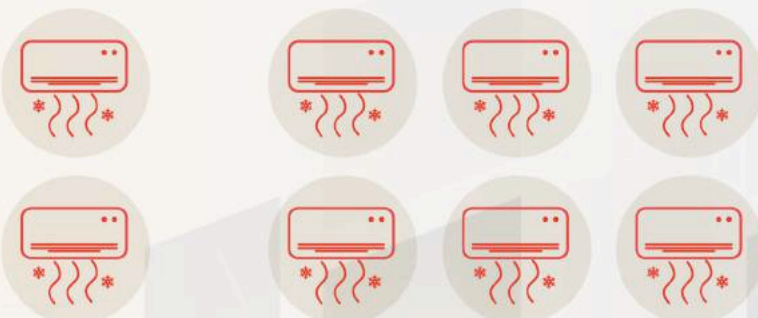
70% of infrastructure needed by 2050 has yet to be built.



20% of building electricity goes towards cooling.

... → ...2050

Experts expect space cooling to increase **3X** by 2050.



tools to create a sustainable, green model of facility management and development.

Infrastructure: The global population is steadily growing, particularly in the developing world. With this comes heavy pressure for further infrastructure, all carrying a carbon impact. For instance, 70% of the infrastructure which will be needed by 2050 is yet to be built.

Energy efficiency: Investment in the energy efficiency of buildings has actually been slowing down. This is partly due to rapid development in emerging economies, where energy efficiency has taken a back seat to fast growth.

Cooling: Worldwide demand for cooling is skyrocketing. The developing world, much of which lies near the equator, is installing low-quality systems in great volume without due consideration for efficiency. This has huge ramifications on a worldwide scale and HVAC optimization must be a crucial area of focus for buildings.

Resilience: As recent disasters have demonstrated, buildings in all regions must be prepared for extreme weather events that climate change will intensify.

Data-driven solutions

Why discuss these challenges in terms of IoT and big data? Because IoT applications offer solutions to cope with virtually all of these challenges.

When it comes to infrastructure, IoT can improve the efficiency of resource use. In terms of cooling, we can use modelling to modulate and improve efficiency. Lastly, IoT technologies can allow a building's technologies to be more resilient to extreme weather.

The key is not to be short-sighted or only focus on immediate costs; it's possible to save even while producing more value for the user. Facilities which harness new efficiencies to increase user performance are likely to find that money and resource savings will naturally follow.

Ultimately, organizations using IoT and big data must recognize a duty to make changes that move building users towards sustainable practices on the micro-scale, and help build sustainable cities, societies and industries at the macro-scale.

Takeaways:

- Facility management and construction have a larger role in carbon emission than is often recognized. Facilities should be managed with this in mind.
- IoT and big data already offer tools to make buildings more sustainable.
- Demand for cooling is growing fast. Using smart tech to optimize HVAC systems will be critical.

About ADEN

Asia has changed. Asia has evolved. So have the tools of business success: IoT, clean energy, AI and automation.

ADEN understands the new reality. We manage assets and workspaces in all sectors, developing customized, data-driven solutions for every need.

ADEN allows you to focus on core business concerns while we cover the complex needs of a modern facility in one simple contract. Every ADEN solution leverages the transformative power of new tech and big data.

Whether it's Aden Robotics, Adenergy or another Aden line, every team in the ADEN network has expertise in the tools and technologies driving business in the new 4.0 economy.



20 years



3 continents
25 countries
80 cities in China



1500 clients



26,000 employees
30 nationalities



Award-winning IoT platform

