

An article from the Economist Intelligence Unit

# IoT-enabled buildings: still in construction

Companies that manage properties after construction are currently the driving force behind IoT-enabled buildings



From receptionists and catering staff to cleaners, caretakers and technical maintenance engineers, facilities management (FM) company ISS employs over half a million people worldwide with the aim of keeping its clients' workplaces running smoothly.

In a smarter building staff perform better, according to Martin Gaarn Thomsen, ISS group chief operating officer. That's why ISS is investing heavily in the Internet of Things (IoT) to transform the management of over 25,000 buildings worldwide. In fact, Mr Thomsen says that it's the single largest investment in technology that the Danish company has ever made since its inception in 1901.

Sponsored by



The company is embedding sensors into a wide variety of building elements: doors and windows, certainly, but also reception-lobby turnstiles, meeting rooms, plate dispensers in on-site cafeterias and air-conditioning systems. Once analysed, the data from these devices not only tell ISS how its own services are performing, but also form the basis for advisory services that it can offer clients around their utilisation of building space.

As Mr Thomsen explains: "We can show the data to our customers, for example, and say:

These offices you have on the third floor, in the north-east corner, are never used. So why not convert them into meeting rooms, which you are short of on the first floor, or change them into project rooms lacking on the second floor?"

He adds that for clients, including Rolls-Royce, Novartis and Nordea, more efficiently run buildings allow employees to focus on core business strategies: building new aircraft engines, creating new life-saving drugs or helping financial services customers open new accounts and take out loans.

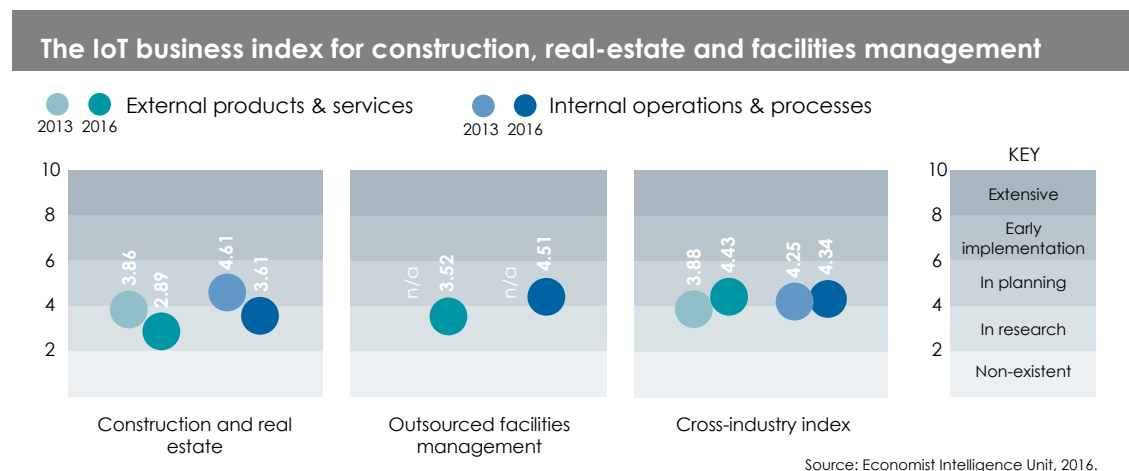
The IoT Business Index 2017, compiled by The Economist Intelligence Unit and sponsored by ARM and IBM, suggests that many outsourced FM companies worldwide are starting to think the same way. Measured for the first time this year, the sector achieves a score on the index of 4.06 when it comes to using the IoT to monitor their own internal operations, signalling a transition from "research" to "planning" (see chart). This suggests that FM companies are actively pursuing such IoT-enabled applications as building energy management and predictive maintenance.

When it comes to their external products and services, meanwhile, FM companies are a little further behind, with a score of 3.52, suggesting an industry still largely in the "research" phase.

The index reveals that the FM sector is more advanced in its use of the IoT than companies in the construction and real-estate industry, whose IoT index score for internal operations is 3.61 in 2016, a slide from 4.61 in 2013. For external products and services, meanwhile, the score slips to 2.89, from 3.86 in 2013.

These figures mean that the average company in the construction and real-estate industry is still firmly in the "research" phase of their IoT journey. The average company across all industries included in the study, by comparison, is closer to the "planning" phase.

These findings do not surprise Léan Doody, a specialist on smart cities and an associate director at engineering consultancy Arup. "The construction industry is quite risk-averse—often for good reason—but also not the most technically or digitally savvy industry compared to others that have been completely transformed, like retail or finance," she says.



That suggests an industry ripe for IoT disruption, a point underlined by a recent report from strategy firm McKinsey & Company. Large construction projects typically take 20% longer to finish than scheduled and are up to 80% over budget, say its authors. Construction productivity, meanwhile, “has actually declined in some markets since the 1990s; financial returns for contractors are often relatively low—and volatile”, the report says.

But there are huge gains to be had from using the IoT in internal construction operations, the McKinsey report suggests: “By measures such as the number of people, the profusion of construction equipment and the amount of work going on at the same time, project sites are getting denser. They now generate vast amounts of data, a majority of which is not even captured, let alone measured and processed.”

On a construction site, the IoT would allow construction workers, machinery and materials to “talk” to a central data platform that captures critical performance parameters. This has a considerable number of potential applications. A critical one is site safety: in 2014 the US construction sector had the highest number of fatal occupational accidents of any industry, according to the Bureau of Labour Statistics. Monitoring heavy machinery and, through wearable devices, workers themselves in real time can both prevent injuries by predicting collisions and mechanical failures and alert site managers to accidents instantly when they do occur. “Smart hard hats” fitted with sensors that monitor the temperature and heart rate of the wearer can help to predict and prevent medical incidents such as heatstroke in high-temperature environments.

More effective collection and use of data can also optimise site operations for productivity and efficiency. There are similarly opportunities for optimising site logistics, such as monitoring the supply of materials in real time to ensure delivery delays are minimised and compensated for.

However, when it comes to IoT investments, construction companies may be subject to split incentives. If they are not responsible for the management of a building once it is complete, they will not be incentivised to make IoT investments to support that management.

Ms Doody is already seeing this in action. “If a building is going to be owned and operated by a developer, then the developer has a much bigger incentive to think about the operations of the building,” she says. “We’re seeing a growing interest from large estate owners commissioning buildings in how [IoT] can contribute to future operations. This is where we’re starting to see the technology make its way into the design of buildings at an earlier stage.”

Consideration of the IoT at the earlier stages of a construction project is likely to lead to more powerful and impactful implementations. The capabilities and confidence that construction companies gain from their internal application of the IoT may also boost progress on this front.

In the meantime, the opportunity that the IoT offers building operators to create greater value for their tenants will be the driving force towards IoT-enabled buildings. ■

## About this article

This article accompanies The Internet of Things Business Index 2017: Transformation in motion, an investigation of business adoption of the Internet of Things (IoT), conducted by The Economist Intelligence Unit and sponsored by ARM and IBM. It draws on a global survey of 825 executives from a range of industries, including 75 from the construction and real estate sector and a further 75 from the outsourced facilities management industry. Responses to a subset of survey questions were used to calculate two index scores: one for the external use of IoT (i.e. with respect to products and services), and the other for the internal use (i.e. with respect to internal operations and process). The index score for each industry represents the average stage of progress for companies in that industry. For more details on the survey and index methodology, read the full The Internet of Things Business Index 2017: Transformation in motion report.

Whilst every effort has been taken to verify the accuracy of this information, neither The Economist Intelligence Unit Ltd. nor the sponsor of this article can accept any responsibility or liability for reliance by any person on this article or any of the information, opinions or conclusions set out in the article.