

Three construction game changers for 2017

By [Kenny Ingram](#)

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Huge tower blocks built in weeks under one roof, automated bridge-building behemoths, bricklaying robots... No it's not science fiction. These are all real solutions here and now doing business. And soon there will be more. So what are the big trends in construction in Europe, the US and Asia, and how can we turn them from opportunities into business benefits? Here are three trends and opportunities for companies to leverage in 2017.



Opportunity: Within five years, 35% of asset owners will move over to outcome- and performance-based contracts.

According to a 2015 report from Transparency Market Research, the global market for product lifecycle management will reach over \$75bn by 2022 — forecast to grow at a compound annual growth rate (CAGR) of 8.1% from 2015 to 2022. As with other industries, it means that contracts in the construction sector too will become increasingly complex and service-based.

It's not a new idea. Famously, Rolls Royce's pioneering 'Power-by-the Hour' concept, invented in 1962, supplied a complete engine and accessory replacement service on a fixed-cost-per-flying-hour basis. Recently Rolls Royce added engine health monitoring, which tracks on-wing performance using on-board sensors and lease engine access, which supplies clients with a back-up engine during off-wing maintenance – clearly connecting assets using the internet of things (IoT) with the enterprise applications that manage them will accelerate the innovation of business models. But the key takeaway for construction companies is that they need to be crystal clear about the core purpose of their asset. If a company is building a hospital, for example, it might win its contract through guaranteeing provision of an agreed number of beds over time, or even the health outcome of patients. And it will need to be able to measure both. For the client everything outside these core metrics could just be extra expense.

How can companies leverage this? Today IoT enables construction companies to measure things in detail and quality that has never been possible before. Essential key metrics to keep in mind are availability, reliability, maintainability, supportability, cost of ownership, and end result. Technology functions within construction firms need to empower business analysts with assets' performance indicators so that they can find the most profitable models that will enable them to turn service into an opportunity. Ultimately, construction companies will operate more like service industries acting on a performance-based model.

Opportunity: Within five years, over 50% of all construction projects will use offsite modular construction and 3D printing.

I recently visited an Irish construction company constructing beautiful, durable, high quality schools throughout the UK. But they built them at their plant in Ireland and shipped them across the UK for assembly onsite. Each school module took a few months to construct. These were extremely high quality builds. If you had seen one in its finished state, you would never have guessed it had been built in a factory.

Modular constructions are all around us. In fact we probably don't spot them precisely because they have become so usual. Modules are the new bricks and mortar in airport terminals and rail stations (Heathrow Airport and Birmingham New Street in the UK are just two examples). And they're built to last. These assets have upwards of a 30-40 year life, lasting as long as they are designed for. Globally, we are seeing modular move into residential housing too.

In Singapore recently, PPVC (prefabricated, prefinished, volumetric construction), a new type of modular construction, appeared. Complete apartment blocks were PPVC manufactured in a factory. Each separate unit contained internal finishes, fixtures and fittings, all manufactured en masse, transported and assembled onsite as modules. According to a McKinsey report, the companies using PPVC report 50% savings in staffing and time. The new method produced minimal air and noise pollution, and improved site safety.

In a world where the global population increases by a billion every 12 years, the speed and high-volume capabilities of modular construction and 3D printing means they will emerge as leading solutions. 3D printing is now becoming the rule not the exception for many companies, and wider social take-up is booming. Many high schools, universities and colleges in the UK and Germany now own 3D printing machines as a matter of course for students. Last year, 2016, Gartner forecast particularly strong growth for 3D printing in the enterprise sector — their five-year CAGR for 3D printers priced at more than \$2,500 is 57.4%. Worldwide, the shipment of 3D printers to enterprises in 2016 more than doubled its 2015 total. "Looking further out," Gartner says, "we forecast the total enterprise and consumer 3D printer worldwide shipments will expand at a 98.5% CAGR through 2020. Total spending will grow at a 66.5% CAGR to \$17.7bn in 2020."

How can companies leverage this? For businesses who have traditionally built everything onsite, the move to modular requires a different business model and a new skills set. They are in effect no longer construction companies, but a hybrid of construction and manufacturing. Bringing in new graduates and business expertise, learning from manufacturing companies about lean, agile, integrated processes — all these are vital for seizing the opportunity. Plus, they need these skills in-house. Clients in this new arena would not choose to go to a firm that outsourced its modular construction when they could choose one that had it all under one roof.

Opportunity: In the next five years 25% of work in the construction industry will be carried out by robots.

Driverless cars, battalions of self-driving trucks — for most of us, these are now firmly on the technology agenda. Yet for many in the construction industry it still seems some time away. It isn't. A 2016 PWC report pinpoints China as a prime

example of booming demand driving huge growth in industrial robotics: “Since 2013, the number of shipments of multipurpose industrial robots in China has roughly doubled to an estimated 75,000 in 2015... forecast to double yet again to 150,000 by 2018, according to the International Federation of Robotics.”

A new remotely operated bridge building machine in China, the SLJ900/32, operates without any conventional crane technology. It travels across the bridge constructing a temporary track as it goes and towing each new segment with it — extending between the bridge’s columns and dropping the segment into place. Bridge building is dangerous, time consuming work with high insurance premiums. An automated solution may already be with us.

Engineers are now exploring solutions for high-skilled, precision crafts in construction too. US firm Construction Robotics’ SAM100 bricklaying robot is currently being marketed as “assisting the mason with the repetitive and strenuous task of lifting and placing each brick”. But as the system gets more sophisticated, how long will it be before the mason disappears and the robot remains?

How can companies leverage this? Perhaps the most urgent action is to actually recognise the change, and start establishing a strategy for digital transformation. Again, reskilling and bringing on board tech-curious, tech-savvy younger professionals will pay dividends. Graphic design, augmented reality, virtual reality – all these will be hugely important in keeping companies competitive. Daring to experiment too is vital. Prototyping, trying out solutions on a small scale, gets companies ready to seize the opportunity. Digital transformation is going to be an enormous game changer. Its effects will be as powerful and epoch-defining as the invention of mass production at the beginning of the twentieth century.

Since time immemorial, construction has always been about men and machines. With cybernetics, services and speed to the fore, that is soon set to change. So start preparing now.

ABOUT THE AUTHOR

Kenny Ingram is global industry director of construction and contracting at IFS.

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