



# What's standing in the way of offsite manufacturing?

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Understanding business models in the construction sector



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For decades, the construction sector has been hailing offsite construction as the next big thing but we have yet to see it really taking off. Why is that, when the technologies and processes already exist? Dr Zakaria Dakhli from the Cambridge Service Alliance believes it is due to a fundamental incompatibility between business models and it is only when this has been fully understood that the long-awaited transformation can take place.

The construction sector across the world is beset by many seemingly intractable problems. In spite of government efforts to digitalise the sector through initiatives such as the adoption of Building Information Modelling (BIM), building methods have remained largely unchanged for centuries.

Leaders in the sector recognise the gulf between their working practices and those of manufacturers, with their optimised supply chains and use of machine learning and automation to drive efficiency and productivity. Surely, by adopting these ways of working to manufacture buildings offsite, it would be possible for the construction industry to do exactly the same. So why isn't it happening?

Dakhli points to the difference in business models between the two sectors as a key barrier to take up. The construction industry is project-based and the manufacturing sector is production-based. What does that mean in practice?

In construction, every project is different. You are starting from scratch each time, to a new specification, in a new location, with a different set of contractors. Supply chain management and storage logistics are not considered to be a core capability. Problems are often not anticipated and their solutions improvised. Manufacturers, by contrast, are mass-producing products with limited variation in a stable factory environment with an arsenal of tools at their disposal to improve their production processes, manage their inventory and optimise their supply chains.

### Understanding the value chain

The complexity of the value chain in construction poses further challenges. At each stage of the process there is a

different client (depending on whether you are the architect, the engineer, the main contractor or one of the many subcontractors) each with a different notion of value. When the project is finished, the client who pays for the building is often not the client who operates it. This means that the end-product often fails to meet the needs of the end-user because they were not the purchasing client and therefore not involved in making key spending decisions.

According to Dakhli, the main source of waste in construction is the way projects are designed and managed. They are sequential with each stage being handed on to the next specialist. The consequences are lots of re-work, fragmented communication, latent stress and a culture of blame between supply chain partners.

### Offsite manufacturing

Surely, offsite manufacturing is at least one of the answers to this problem? It creates a controlled, information-intensive environment in which material, process waste and cost can be minimised and construction cycle time, safety and environmental performance improved.

### From project to product-based business model: the economics

However, the economics of the construction industry result in a business model which make this difficult. Manufacturing in sectors other than construction is driven by customer needs and relies on accurate demand forecasting. For large and complex assets, 'engineer-to-order' (ETO) production may only take place once an order has been received and is customised to the client's

needs. This is similar to a construction project in which there are many bespoke elements – but it is different because the manufacturer has much greater control over its costs and hence profitability.

Switching to offsite manufacturing requires major investment on the part of the construction firms. But without a steady demand, they are unlikely to take that risk. Their current project-based business model in which contractors come together as required is predicated on flexibility, in which labour is the safety net and investment in fixed assets is perceived as too risky. It is also the case that the sector lacks the skills to switch.

One manager we spoke to said: "Today, we manage people on the construction site. This is what we are good at. Tomorrow, we might need to manage machines, robots and production facilities. This is scary for us."

Dakhli believes that it is only by developing a better understanding of the different ways of working in construction and manufacturing – and the economic forces that are driving them – that the barriers to establishing a successful offsite manufacturing capability for the construction sector will be overcome.