



# WHY YOUR CONSTRUCTION BUSINESS COULD FAIL UNLESS YOU DISRUPT YOUR MARKET

## KEY QUESTIONS:

**P2**

How are economic trends forcing construction contractors to choose between transformational change and decline?

**P3**

Why is enterprise resource planning (ERP) software a barrier to transformation in most contracting businesses?

**P6**

What practical roles will artificial intelligence (AI), internet of things (IoT) and robotics play in successful construction businesses going forward?

IFS WHITE PAPER

By Kenny Ingram, Global Industry Director, Construction, IFS



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**Very few contractors—including large global firms—enjoy profit margins much beyond three percent even during times of strong economic growth.**

Even large contractors are typically one failed project or market dip away from insolvency. Masonry contractors like New York City's Navillus can after a decline in revenues find themselves entering and then emerging from Chapter 11 bankruptcy. The high percentage of pass-through income often associated with contracting puts contractors at risk from delays in government payments in countries ranging from [Sri Lanka](#)<sup>1</sup> to the United States. In the UK, [there has been speculation](#)<sup>2</sup> that a quarter of construction companies there could face insolvency by 2020, and fears over Brexit have contributed to a record [number of construction insolvencies](#)<sup>3</sup>, for instance, in Q1 of 2018.

Today, economic conditions, disruptions in global trade and advancing technology all suggest contractors need to fundamentally change their businesses to survive. Already, major non-construction players including [Ikea](#)<sup>4</sup> and [Amazon](#)<sup>5</sup> are pressing into the modular construction space. We are not talking about a change from one project delivery system to another here—contractors need to leverage technology and innovative thinking to offer disruptive new services and even standardized products.

## STORM CLOUDS ON THE HORIZON

With consistent economic expansion, a construction enterprise can survive or even thrive, if not make enough profit to fund proactive growth, expand into new markets or invest in disruptive technologies that make them more competitive. But economic growth [has already slowed in the European Union](#)<sup>6</sup>, from 2.8 percent in July of 2017 to 1.8 percent in July of 2018. [The World Bank has forecast](#)<sup>7</sup> slowing growth in all major advanced economies including the U.S., eurozone and Japan.

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<sup>1</sup> [www.ft.lk/top-story/Construction-cash-strapped/26-672034](http://www.ft.lk/top-story/Construction-cash-strapped/26-672034)

<sup>2</sup> [www.businessrescueexpert.co.uk/are-construction-firms-at-risk-of-insolvency-in-2018/](http://www.businessrescueexpert.co.uk/are-construction-firms-at-risk-of-insolvency-in-2018/)

<sup>3</sup> [www.companydebt.com/construction-industry-insolvency-trends/](http://www.companydebt.com/construction-industry-insolvency-trends/)

<sup>4</sup> [www.prefabmarket.com/ikea-toyota-and-muji-are-actually-prefab-home-manufacturers/](http://www.prefabmarket.com/ikea-toyota-and-muji-are-actually-prefab-home-manufacturers/)

<sup>5</sup> [www.pymnts.com/amazon/2019/healthcare-medmodular-hospital-rooms/](http://www.pymnts.com/amazon/2019/healthcare-medmodular-hospital-rooms/)

<sup>6</sup> <https://tradingeconomics.com/euro-area/gdp-growth>

<sup>7</sup> [www.bloomberg.com/news/articles/2019-01-08/world-bank-cuts-global-growth-outlook-as-trade-expansion-falters](http://www.bloomberg.com/news/articles/2019-01-08/world-bank-cuts-global-growth-outlook-as-trade-expansion-falters)

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Some of this global slowdown is attributable to major trade policy shifts as the U.S. and UK both distance themselves from the eurozone. And while downward competitive price pressures and volatile materials cost are constants in the industry, we are in extraordinary times that put contractors at even greater risk. [Materials costs have increased by more than 7 percent<sup>8</sup>](#) due in some cases to protectionist trade policies in the U.S. [and UK<sup>9</sup>](#). Interest rates in the U.S. meanwhile, are increasing after years of expansionist trade policy, putting project capital at a premium. [This increase is due in part to a tight labor market<sup>10</sup>](#), which is another challenge contractors will have to contend with as the cost of their other inputs also creep up.

The good news is that for contractors who take advantage, these disruptive technologies provide a platform on which management teams to stand during uncertain times.

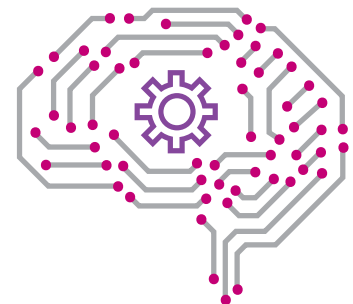


## DISRUPT OR BE DISRUPTED

If the global economy were not enough of an existential threat to construction contractors, the introduction of disruptive new technologies will be the determining factor making some contractors more competitive and others less competitive not only on price, but in the degree to which they can drive value for project owners and expand into the lifecycle of the built asset for stable, recession-proof revenue streams.

The good news is that for contractors who take advantage, these disruptive technologies provide a platform on which management teams to stand during uncertain times. These technologies will also enable contractors to adopt higher-margin business models that will make them winners in their regional market or in the global construction economy.

Contractors that make the most of technology—from digital transformation tools like building information management BIM, artificial intelligence (AI) to the internet of things (IoT) to agile back-office systems used to manage the entire business—will win. But it is not just the technologies themselves that will deliver success as much as the ways new smart construction executive teams can change the way construction is done.



But first, the industry has some catchup to do in terms of its fundamental business systems. Without making investments in core business infrastructure to connect the finance, project cost control, project management, procurement, sub contract management, human resources and risk management processes, advanced transformational technologies will not be able to transform the business significantly enough to enable a contracting business to survive and thrive.

## INTEGRATED ERP, BIM AND THE ASSET LIFECYCLE

To be transformed by technology, contracting businesses must build their operation around a consistent, agile and complete software backbone.

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<sup>8</sup> [www.agc.org/news/2018/10/10/construction-material-costs-increase-74-percent-contractors-continue-be-squeezed](http://www.agc.org/news/2018/10/10/construction-material-costs-increase-74-percent-contractors-continue-be-squeezed)

<sup>9</sup> [www.thetimes.co.uk/article/brexit-could-push-up-cost-of-materials-bosses-told-82tzxb6zf](http://www.thetimes.co.uk/article/brexit-could-push-up-cost-of-materials-bosses-told-82tzxb6zf)

<sup>10</sup> [www.readingeagle.com/business-weekly/article/building-insights-forecast-for-19-and-beyond-mixed-for-nonresidential-construction](http://www.readingeagle.com/business-weekly/article/building-insights-forecast-for-19-and-beyond-mixed-for-nonresidential-construction)

Most midsize and large construction concerns have implemented some form of enterprise resource planning (ERP) software. But often, they have implemented only financial and human resources modules, in part because the rest of a typical application suite is a poor fit for the business.

ERP should provide all functions of the business with one consistent set of data, enabling asset data, cost and value to flow through a project's life cycle all the way from inception to operation and maintenance through to disposal.

ERP<sup>11</sup>'s power for construction companies is that it allows management to get control of their business by providing an accurate set of management information that enables predictable project performance and provides strong governance of their business. Management can therefore make well informed decisions based on trusted information. In addition, it allows the functions of the business to be connected which enables projects to be delivered at lower cost, on time, at a high quality with minimum risk. The end goal is to integrate the digital asset data held in the BIM models with the integrated ERP processes. This goal can only be achieved if a truly construction-centric ERP solution is in place as the foundation for moving to an Integrated Digital Asset Lifecycle solution. In 2019, I believe we'll see the first construction companies take their first steps into discussing how to merge and build on the strengths of combining the two systems: BIM and ERP.

Complete construction ERP<sup>12</sup> already contains all the data necessary for BIM, including as-designed and as-built information. The most profitable contractors will, in 2019 and beyond, expand into maintenance and service contracts, extending this data set with as-maintained views. In the course of a refurbishment or refit, have there been changes to the design as it was built? That should be reflected in that BIM environment to inform spares and repairs re-ordering, preventive maintenance and, eventually, the design process for asset replacement at the end of the life cycle. BIM and even solid mastery of the asset data that underpins it, puts a contractor in a better position to deliver value-added services to customers and project owners, before and after the project is completed.

### SERVITIZATION MEANS MORE REVENUE AND MARGIN

When the contractor has and can make intelligent use of all of the data they have on the assets they deliver to a project owner, as required by BIM, they are in a position to sell maintenance and service contracts, becoming a strong strategic partner and gaining critical revenue and margin. While downward price pressure has kept the margin on new construction around 3 percent, margin on service contracting like this can be as high as 14 percent.

But to realize these profits that can in turn fuel growth, the contracting business must have the systems and processes in place to manage the entire lifecycle of the asset. The maintenance, service and facilities



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<sup>11</sup> <https://blog.ifsworld.com/2016/05/bim-means-change-in-many-dimensions/>

<sup>12</sup> [www.ifsworld.com/corp/industries/engineering-construction-infrastructure/construction-infrastructure-industrial-services/](http://www.ifsworld.com/corp/industries/engineering-construction-infrastructure/construction-infrastructure-industrial-services/)

management business model is more common, in the U.S. at least, in the mechanical trades than in building and industrial settings. It is common in many sectors in the UK. Very large global engineering, in water and wastewater for instance, have entered into operations, and maintenance contracts where they construct an asset and then actually profitably execute against that, meeting specific service level agreements (SLAs) for value delivery.

The initial construction contract and the maintenance contract must be treated holistically because from a cost standpoint, one affects the other. In short, the asset must be designed to be easy and cost effective to operate and maintain. The contractor and asset owner will focus on the total asset lifecycle cost. This requires a very integrated and agile technology environment that addresses the asset lifecycle through the design-operate-maintain continuum.

An annual maintenance and service fee will yield significant margin to contractors who can successfully address this challenge. In time, they may come to contract not for asset delivery, but for a fully servitized arrangement where they are paid according to the number of patients served by a hospital, or the tons of petroleum distillate produced by a refinery. This revolutionary approach will require intelligent application of transformational technologies like IoT to drive compensation based on usage of the finished asset, as the contractor becomes a full at-risk business partner with the project owner.

### BLENDING MANUFACTURING AND CONSTRUCTION BUSINESS MODELS

Some contractors, including heating, ventilation and air conditioning (HVAC) contractors, precast construction contractors and modular home builders, have performed some work in a shop environment and then transported those completed components or modules to the construction site. IFS has seen an increase in this approach in commercial and residential construction, and I believe that most construction projects worldwide will soon involve off-site fabrication of some type.

The benefits are significant. Better use of labor will help address the shortage of skilled workers in the industry globally. Lower total cost, reduced risk of theft of tools and materials on site, and compressed project timelines are also all associated with off-site construction. Work completed in offsite, using manufacturing processes, is also not affected by inclement weather and can benefit from standard quality management and quality assurance processes common in a manufacturing setting. But processes and software used in construction and manufacturing are vastly different. Contractors who succeed will require software environments that can encompass both disciplines seamlessly.

Offsite construction may help drive one other, and crucial, change in the way construction takes place—standardization of parts and materials. Estimating in a construction environment typically takes place against a specification

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Operational intelligence connects people and processes throughout the organization, and specific cockpits can be crated for asset managers, process managers, the CEO—anyone who should be empowered to make decisions based on the latest insight.

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from the project owner. In design-build projects, architects or engineers are at least free to, for instance, design around the length of materials, avoiding the waste that comes when an architect's plans require a floor that is 122 feet wide and the standard hollowcore concrete panel being used is 4 feet wide. Most larger projects also include a value engineering process. The industry has not, for cultural reasons, made significant moves towards a business model where a contractor will have standard parts and components that they may design around, lowering cost for the project owner and increasing margin for themselves. But to drive efficiencies significant enough to challenge this traditional way of doing things, contractors will need manufacturing-style software. Then they can work with owners to create unique and efficient projects that rely on standard components produced in accordance with lean principles in a manufacturing environment. Standard manufacturing ERP will not be sufficient though—a construction enterprise will still need a project-driven manufacturing solution that can also handle construction centric business processes and the time and resource constraints of site-based work.

This standardization process will at once remove risk from the project, cut cost and put the contractor in a greater degree of control over their own financial destiny by making construction more of a repeatable process from an operational and financial perspective. They may increasingly manufacture components or subcomponents used in their projects, represent or resell standardized building systems or components or a combination of the two.

### TRANSFORMATIONAL TECHNOLOGIES

Contractors can and should explore how the headline-grabbing technologies like BIM, AI, Robotics, Drones, 3D Printing and IoT can help them change the way they do business.

Artificial intelligence (AI) will impact every sector of business, and in construction, commercially-available technologies already exist.

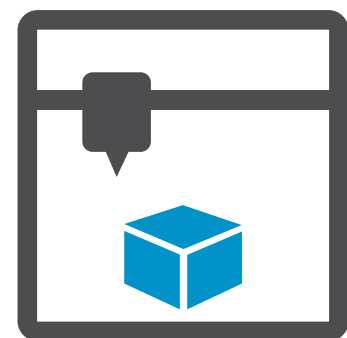
Construction scheduling software such as 4D scheduling with AI algorithms can solve complex problems in real time—problems much too complex for any human to handle, especially when at times individuals will act myopically based on their area rather than to the greater good of the company and its customers.

IoT also holds transformational potential for the construction industry. During the project, construction equipment may soon be remotely operated in hazardous environments or when skilled operating engineers are in short supply. The location and usage of equipment may also be tracked to reduce shrinkage in the field and capture hours of usage against a contract, eliminating manual accounting. RFID tags and other IoT technologies can aid in materials replenishment, enabling manufacturing-style just-in-time (JIT) replenishment in the field.

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But the greatest potential for IoT will come after project completion, when it can monitor structural members, mechanical systems and project integrity to support high-margin warranty and service and maintenance contracts. IoT sensors can also automatically update the databases that underpin building information modeling (BIM) on the condition of the structure over its lifecycle. As the industry adopts predictive maintenance practices in the future, data from these sensors can also be run past algorithms that can predict structural or system failure, enabling a contractor to ensure the performance of an asset over its lifecycle.

### CONCLUSION

Times are uncertain, but there is no uncertainty about the crucial role that technology will play in determining which construction businesses thrive and which fall by the wayside. Transformational technologies hold potential, but to make the most of them, contractors will have to implement enterprise-wide software infrastructures that can connect them to the way value and cost flow through the business.

Kenny is the Global Industry Director for the construction industry at IFS, Kenny's main responsibilities are to promote the IFS solution to the external marketplace and to educate the IFS workforce on the business issues and challenges these industries face. He is also a key member of the IFS Product Direction Board who are responsible for making decisions on the IFS product strategy. Kenny has been with IFS for 21 years and has worked in the business systems marketplace for over 25 years. He is now regarded as one of the top specialists in Project Based Solutions and construction software worldwide and has been heavily involved in driving the IFS strategy. Prior to joining IFS, Kenny worked in Industry in various management, supply chain, logistics and project accounting positions.

## ABOUT IFS

IFS develops and delivers enterprise software for customers around the world who manufacture and distribute goods, maintain assets, and manage service-focused operations. The industry expertise of our people and solutions, together with commitment to our customers, has made us a recognized leader and the most recommended supplier in our sector. Our team of 3,500 employees supports more than 10,000 customers worldwide from a network of local offices and through our growing ecosystem of partners.

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