CAN U.S. CONSTRUCTION CONTRACTORS WIN INTERNATIONALLY?

KEY QUESTIONS:

IFS WHITE PAPER
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BY KENNY INGRAM, INDUSTRY DIRECTOR, CONSTRUCTION, IFS

Construction was at one time a highly regionalized business. But inexorable trends are making it more important for major North American commercial, civil and industrial contractors to grow their global footprint.

- Consolidation and globalization of business means more customers and project owners have global footprints, and their construction partners need to serve them in the different markets where they have operations.
- Contractors with a presence in more than one geography will be less susceptible to regional economic downturns.
- Larger contractors must maintain the resources to execute very large and complex projects, and there are only so many major government infrastructure, utilities or energy projects to pursue. Even contractors involved in large multifamily projects may need to look beyond the borders of their home country to sustain themselves. They must have the robust business processes and the agility to pursue large projects anywhere in the world.

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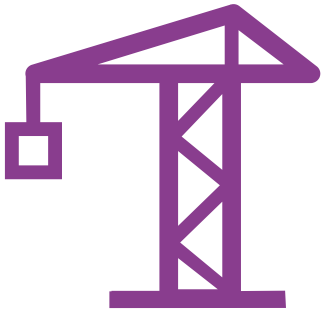
When it comes to the ability to deliver globally, size matters. Companies headquartered in countries with very large economies—including China and the United States—have grown more in total revenues in recent years than European contractors. But Chinese contractors lag a little bit when it comes to international work. China dominates the list of the largest global construction contractors. Until you get to the number six position, the ENR 2017 Top 250 Global Contractors list is identical to their list of 2017 Top Chinese Contractors. China dominates much of this global list, and U.S.-based Bechtel looks relatively isolated at #12, with Fluor Corp. trailing at #18. But once we look strictly at revenue generated outside of a contractor's home country, only three Chinese companies make the top 10. While economists' focus has been on China's dominance of manufacturing, the country's construction industry has grown apace, from under 14 billion yuan in 1978 to 5.57 trillion yuan in 2017.



U.S. contractors have built up some international momentum and according to ENR have in 2017 increased their international revenue by more than 12 percent to $60.14 billion. The U.S. construction market has a great deal of untapped potential as contractors also have a large potential upside when it comes to their ability to dominate as currently less than 20 percent of the ENR Top U.S. Contractors pursue international work.

How can international contractors based in the United States compete with China and its surging construction sector? What best practices will most reliably yield international construction success, and what is the role of enterprise software in helping contractors adopt these practices?

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GEOPOLITICS AND MACROECONOMICS

Geography and national affiliation will matter a little in the race for international construction dominance.

European contractors currently rank among the largest in terms of revenue sourced from work outside of their home country. But there is a good deal of cross-border commerce in Europe, and their home countries will only offer so many large projects to pursue. Contractors based in the UK have an edge due to a regulatory requirement for BIM in government contracts. UK-based contractors also seem to be further ahead in adopting construction-integrated manufacturing than those in other regions.

China, meanwhile, is a wildcard—the Chinese economy may consume some outside construction resources during growth periods. But as China's growth rate falls from a lofty 6.6 percent, large Chinese contractors may be prone to aggressively seek work in other regions. A downturn in the Chinese economy could be a leading indicator to contractors in the United States and Europe that they can expect more competition in the coming quarters. As they pursue international projects, executive teams will benefit from operational intelligence software that can help them frame decisions in light of external economic data like this side by side with internal key performance indicators (KPIs).

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Regardless of home country, the race for international dominance will be determined by how quickly each construction enterprise can transform their operations to execute on projects in new ways, leveraging new technologies. The competitive barriers to success will come not just from the ability of competitors in other countries to deliver traditional construction projects, but from their ability to radically transform their operations to lower cost, add value and mitigate risk.

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INTERNATIONAL CHALLENGERS MUST MAKE MOST OF ENTERPRISE SOFTWARE

In this demanding global construction environment, right use of technology will play a big part in separating the winners and the also-rans. And construction has been one of the slowest industries to adopt broad software suites that enable central management and visibility of the enterprise. Most larger contracting firms may have implemented the finance and human resources modules from an enterprise resource planning (ERP) software vendor. But that limited footprint will not enable them to manage, in a centralized fashion, a complex global enterprise or even the risk profile and cash flow of individual major projects. Most of the actual business operations essential to international success in these multi-billion-dollar enterprises are still housed in data and functional silos where they cannot be fed into a centralized view of corporate performance and risk.

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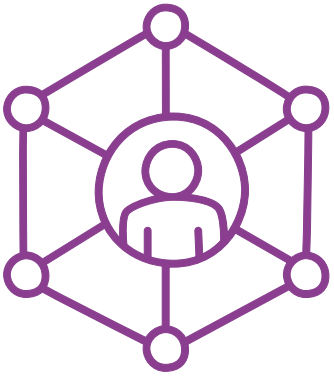
Using the latest technologies in one area of the business is ineffective if you cannot track performance across the entire organization. When multiplied across different geographies with regional nuances, it becomes even harder to obtain consistency. A single solution can unite disparate parts of the business, partners and subcontractors regardless of currency or language.

When multiple software systems, including something as disconnected as Excel spreadsheets, contain essential project details, it will also be difficult for a management team to identify and mitigate emerging risks. And distributed, disconnected records of project activity, whether they are in spreadsheets, Microsoft Project or Primavera, will cause delays in visibility of performance against contractual obligations and resource availability against project-related demand and margins on budget.

POOR INTEGRATION A ROADBLOCK TO PROGRESS



While most large contractors have implemented human resources and financial software, very few can exhibit a true integrated solution across the core elements critical to their success.

Even across finance and human resources, few contractors can demonstrate seamless functional interplay between the two. Fewer still have integrated risk management capabilities that interact seamlessly with the rest of the enterprise. Even when a contractor purchases finance, human resource and maybe even risk management software from the same vendor, they are often standalone projects with perhaps a service buss transporting select data sets from one software product to the other.

This arrangement may work fine for straightforward industries that operate in a continuous, predictable fashion, but not for an international construction contractor, where individual projects and changing business requirements mean the way these functions work together is constantly changing. This sector, more than other industries, requires a pure-play approach to

enterprise software, where all these functions are developed as part of an integral suite, so they work together seamlessly.

A construction business is a collection of business (i.e. projects). If each project is in control, then the business is in control. So, the importance of global visibility, speed and accuracy of the project performance measures cannot be overstated. Are you going to make the budgeting margin, or are you going to deliver on time and if not, what financial repercussions including contractual penalties or cost overruns are you exposed to? What is the status of contract change / variations and how has this changed the financial status of the project? When you look at the Monthly Cost Report, an international construction executive team must be confident of full visibility of this information, and trust the information is current and accurate. Unfortunately, even most enterprise-size contractors rely on grey IT and Excel. This means there are no controls against inaccuracy or manipulation, and that reconciliation with the system of record will be manual and slow.

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Tight integration between corporate functions will also enable a contractor to measure and report on corporate responsibility—delivering the ability to look at the corporation or an individual project not just according to necessary compliance reporting, but calculating an environmental footprint for materials, delivered components and activities.

With full enterprise integration, data can flow between functions seamlessly, and the way the business operates and how individual projects are structured can be configured and reconfigured as needed. This puts an international contractor in a better position for strategic delivery in volatile, global market. The enterprise solution gives them the ability to change and transform quickly and understand what it means to manage change on an enterprise level or across partnerships of diverse business entities.

OTHER CHALLENGES

In order to grow an international construction project portfolio, contractors must surmount other challenges as well, including project owner corporate social responsibility (CSR) disclosure requirements in the various countries they operate. In their 2015 article in the Journal of Construction Engineering and Management, Weisheng Lu, Roger Flanagan, Men Ye and Lunhi Ye laid out the complexity of the challenge a contractor must face when meeting project owners' CSR documentation requirements. On the one hand, the researchers point out the positive financial impact of construction, which generates approximately 10 percent of the world's gross domestic product, and the health, economic and social benefits of the finished products themselves.

"On the other hand," the researchers write, "construction is intrinsically 'irresponsible' … Buildings are responsible for more than 40 percent of global energy use and one third of global greenhouse gas emissions. Corrupt practices are also an issue with Transparency International suggesting that construction is one of the top three most corrupt 40 industries in the world."

So international construction contractors must systematically be able to measure both the societal benefits of large projects and devise ways to reduce any detrimental effects. And they must offer visibility into these complex metrics in an agile enough fashion as to meet different reporting requirements of various nation states, local governments and project owners.

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Due to the challenges of performing work in diverse geographies, and sometimes as a way to test new markets, international construction contractors also regularly complete work through joint ventures. Coordinating activities and managing risk across multiple business entities exposes a contractor to a number of internal, external and project risks. A study of international construction joint ventures in Thailand identifies the most consequential risks as:

- Differences in requirements between partners
- Difference on resource allocation between partners
- Improper project profit and risk sharing

The risk most likely to occur however was corruption and bribery, which taken together with the most consequential risks identified, suggests that contractors doing business through global joint ventures will need processes and systems to hold partners accountable for practices that could expose them to financial or legal risk.

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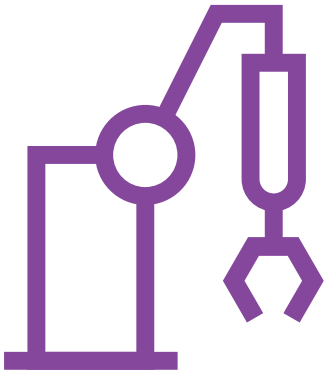
Making the go-no-go decision for each project, based not only on the risk profile of the project but that of the stability of the nation state where a project is located, is another area challenge international contractors are focusing on more heavily than in past years.

OPERATIONAL INTELLIGENCE

For contractors involved in international joint ventures, the ability to confidently manage risk, cost and revenue and project activities across corporate boundaries will be a significant strategic advantage. This requires technology to provide visibility, transparency and control not only into your

own operation, but the creation of a shared environment that extends to business solutions and data sets owned by partners.



While strong, integrated ERP is essential for the success of an international contactor, international contractors will benefit from adopting operational intelligence (OI) software—a revolutionary enterprise management tool that rests on top of these systems. OI ties the underlying data into a comprehensive business map that incrementally connects real-time data to monitor and manage the end-to-end processes. Once executives decide on a course of action, the software can initiate an automatic workflow to immediately operationalize that decision across the business, its partners and subcontractors.

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DISRUPTIVE TECHNOLOGY LETS YOU CHANGE THE RULES

International contractors can and should explore how the headline-grabbing technologies like BIM, AI 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. The most practical may be algorithmic-based scheduling, enabling crews and field-based employees to be deployed more efficiently based on real-time demand and need. Multiple active projects with shifting priorities and timelines with multiple dependencies result in a scheduling challenge that is too daunting for even a postdoctoral researcher to handle manually.

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AI construction scheduling software such as 4D scheduling—an approach for complicated construction sequencing—can solve complex problems in real time. But these problems are much too complex for any 4D planner to handle, especially when at times individuals act myopically based on their area of expertise rather than to the greater good for the company, the project as a whole or its customers. 4D BIM Modeling can intelligently address the construction schedule for smoother project scheduling.

BIM 4D scheduling enables more realistic project plans based on the geometry and physical constraints. It allows a what-if simulation of the construction process including virtual walk throughs. Through this advance constraints-based approach, contractors can detect conflicts before they occur, resulting in improved delivery times and quality and cost savings. 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.

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. New service offerings like maintenance and service contracting can extend the revenue profile of a project over the entire lifecycle of the asset, reducing revenue volatility and "lumpy business" associated with large projects. These new service offerings often deliver margin of about 14 percent, much greater than the 3 percent contractors generally see on project activity.

NOT WHAT YOU'VE GOT BUT HOW YOU USE IT

Just licensing software from a vendor that throws around terms like AI, BIM or IoT however will not prepare you to realize a return. Rather, those intent on challenging for a leadership spot in international construction will need to use these technologies to do business and deliver value to project owners in radically different ways. This transformation will not only help international construction contractors reduce cost and improve project delivery metrics, but decommoditize themselves by working more collaboratively with project owners and deliver something their competitors cannot. So, the ability to do business in new ways will give contractors a way to differentiate themselves while providing the cash to pursue business in new regions and re-invest in the business.

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All of these new business models are predicated on a quality, integrated ERP platform. That ERP platform should facilitate construction-integrated manufacturing, sometimes referred to as offsite or modular construction. Fabricating project components in a shop environment and then transporting them to the site lets a contractor make more efficient use of skilled labor and perhaps even some automation, cutting down cost, reducing demand for scarce labor and compressing the project timeline. It requires integrated engineer-to-order (ETO) manufacturing capabilities and supply chain management all in the same software application used for the rest of the construction project. The systems required for manufacturing will also give a contractor the ability to design with standardized parts and components—which while a given in manufacturing is potentially revolutionary in construction. Again, the importance of integrating this manufacturing and inventory functionality cannot be overstated. The desirability of this level of integration should be obvious from an operational standpoint, but as BIM becomes a more common element in

major projects, a single-source approach to all data on the built asset will be more important. BIM will be able to take that single source of project data and expose it in 3D models used by contractors, engineers, designers and operations staff over the asset's lifecycle.

CONCLUSION

The U.S. construction market is poised for growth internationally—but the successful contractors will be the ones who can help owners meet objectives in new ways, through new and innovative business models. It could very well be that the largest international contractors today will be outflanked by companies that can more rapidly deliver projects in new and innovative ways.

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Kenny Ingram 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.

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