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Dear Reader,

Transformation *and* Transformers

In keeping with our theme this issue and appropriate to the current publishing world, "The FMI Quarterly" is transforming from a paper-based journal to a digital journal with our next issue. This will be the last of the conventionally printed issues, a series that began 12 years ago with our April 2003 issue, Volume I. Producing nearly four dozen issues has been a terrific combination of work and fun. From these publications, we hope you have found ideas, inspiration and tools that have aided your own success.

If this sounds like a benediction, it is not. Rather, we are transforming our means of delivery to provide you with the same or even greater quality in our content but to provide that in an easier-to-use format. Now, you will be able to email articles or even entire issues to members of your company, your boards of directors or colleagues in the industry. What's more, your current and past issues will only be a tablet or laptop away. You will be able to file your copies in iBooks or similar applications on tablets or conventional filing on your laptop. If you want hard copies of individual articles, you can print those yourself without additional charge or permission from FMI. Soon, individual bound copies will be available through Amazon.

Transformation. Reformation. Alteration. Conversion. Renovation. These are familiar terms within the design, construction and real estate industries. But these terms are somewhat less familiar when applied to our business, division, marketplace or service lines. Perhaps they are less familiar because of our human tendency to keep on keeping on…even when the same old thing is producing poorer and poorer results. Change is threatening — never more so than when we risk our financial and human capital, as well as our reputation, by undertaking a different way of doing things, a different market in which we attempt work, a different ownership structure, a different management team, a new customer base. In the on-theme articles in this issue, we hope to reduce the threats and improve your odds in achieving successful transformations. Of course, a number of our articles are not on-theme in order to provide you with variety. However, when you consider the thoughts that FMI provides, most of those ideas are aimed at spurring change or providing validation that your transformational efforts are sound and, sometimes, providing you with other transformational targets.

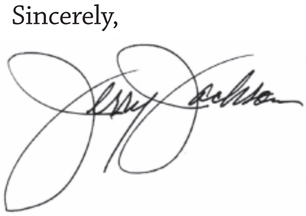
In this issue, Mike Dow and Jeremy Brown discuss fact-based decision-making and how better tools and technology can help enable this transformation in Part 2 of their series, "Leveraging Data to Your Advantage." Russell Clarke and Tim Huckaby outline emerging transformational opportunities for building contractors in their piece, "The Energy Services Opportunity: Attracting Traditional Contracting Firms." Greg Powell spots fundamental weakness in the water market that may compel some transformations as he asks, "U.S. Water Infrastructure Funding Needs: Who Picks Up the Tab?" Greg Schoppman, always thought provoking and/or entertaining in his writing, provides a peek into the Russian construction market in his article, "Raising the Concrete Curtain."

Jim Schug skewers the unready as he questions whether diversification will be a healthy transformation or whether energy would be better spent on the core business in his contribution, "Dividing but not Conquering: Ready, Fire, Aim." Rick Tison, David Madison and Tyler Paré provide the fourth installment of their series regarding data-driven decision-making, this time keying on "Data-Driven Estimating." Phil Warner, in the second installment of his CEO research, "The CEOs' Role: Forming a Culture for Success," brings key thoughts from several industry leaders on transforming a culture.

Mike Clancy undertakes no less than a national transformation in his piece, "Transforming America's Economy — Thoughts on the Energy Renaissance." In a piece from Hank Harris' forthcoming book, his interview with Ken Roper focuses on "Financial Controls for Value Creation." Appropriately, our publishing partner, Zurich, provides grounding for those who would transform their business by "Moving into New Markets."

Transformation can be exhilarating, breathtaking, and even profit-making. It can also be debilitating and heart breaking. FMI has more than 60 years of experience in helping clients achieve possibilities. Some of that experience may profit you.

Sincerely,



Jerry Jackson, Publisher

Based on

exciting trends

for the petrochemical production community, the

opportunities

for firms in the industrial construction segment are especially ATTRACTIVE **for the next several years.**

MIKE CLANCY

America's Energy Transformation: Petrochemical Manufacturing's 21st Century Renaissance

For the past several years, many eyes have been on the shale gas revolution in the United States. As U.S. oil and gas production has expanded exponentially, the attention has been on the impact on consumer markets, particularly such as natural gas for heating or oil and its attendant price impacts on gasoline at the pump. And while many have predicted a resurgence in U.S. manufacturing driven by cheap energy prices, the fact is that the needed investment in manufacturing facilities here has, for the most part, not been as significant or as quick as we might have hoped.

There are many possible contributing factors, such as public policy, labor immobility and decreased global demand for many manufactured products in the face of China's economic challenges, preventing the manufacturing growth we all would have preferred to see.

Nevertheless, there is one area in which the manufacturing renaissance can be decisively described as being "well underway." Chemical feedstocks are leading the Gulf Coast economy, with dozens of petrochemical manufacturing plants planned or under construction over the next several years. And while the current low prices may be introducing uncertainty and reducing investment in oil and natural gas production, in the words of Mr. McGuire of 1967's "The Graduate," "There's a great future in plastics." As worldwide demand for products like polyethylene and polypropylene continues to expand, industrial construction firms in the U.S. figure to have a role to play in helping Gulf Coast producers meet that demand.

Historical Movement of Petrochemical Manufacturing

Until the early 20th century, petrochemical manufacturing and processing focused on providing hotter-burning "coke" from coal to assist in smelting and other similar operations, and in the creation of aromatic compounds for use in textile manufacturing. However, beginning around World War I, petrochemical manufacturing became an end in itself, as Germany sought to create a synthetic tire rubber out of abundant coal, as a substitute for embargoed natural rubber.

Of course, in time many more useful petrochemicals were identified, and from the 1940s onward, the U.S. Gulf Coast region became the center of the worldwide petrochemical industry. Today, over 100,000 firms worldwide produce more than 70,000 distinct chemical compounds, many of which have their root feedstocks in crude oil, gas or natural gas liquids (NGLs). However, from the 1960s onward, the volatility of feedstock prices put petrochemical manufacturers at the mercy of the commodities markets and the national interests of the various oil and gas producing states.

> Today the world consumes 90 million tons of propylene per year, and the U.S. supplies more than any other country. Most importantly, this is a reversal of a long-term trend.

For most of last decade, conventional wisdom held that Asian and Middle Eastern producers would remake the petrochemical industry to reflect their own capabilities. After all, more than one-third of the total operating costs of petrochemical operations are tied up in feedstocks and energy costs, and the U.S. could not compete with cheaper Middle Eastern oil. In fact, at the start of the century, Saudi Arabian manufacturing costs were believed to be only half of that of U.S. producers. Plus, as these nations sought to move from strictly extraction-based economies to ones which generated more national wealth through value-adding manufacturing, the Middle Eastern oil producers invested heavily. As a result, the growth in petrochemical manufacturing capacity was expected to increase at a rate of 20% per year while the conventional wisdom was that the United States was expected to stagnate.

And then, when hydraulic fracturing made its mark on the world stage, conventional wisdom went right out the window (see Exhibit 1).

Today the world consumes 90 million tons of propylene per year, and the U.S. supplies more than any other country. Most importantly, this is a reversal of a long-term trend; U.S. production of propane and propylene has more than doubled over the past few years after decades of stagnation. The manufacturing resurgence is here now, especially in the petrochemical space. Manufacturers of these petrochemicals in the U.S. are in an enviable position, as their competitiveness has increased just as demand for petrochemical products is anticipated to grow by as much as 40 million tons over the next decade.

Impact of Hydraulic Fracturing on Petrochemical Manufacturing

Hydraulic fracturing has had several concurrent and self-reinforcing impacts on the overall dynamics of the petrochemical manufacturing industry and particularly on the competitiveness of U.S. petrochemical manufacturers.

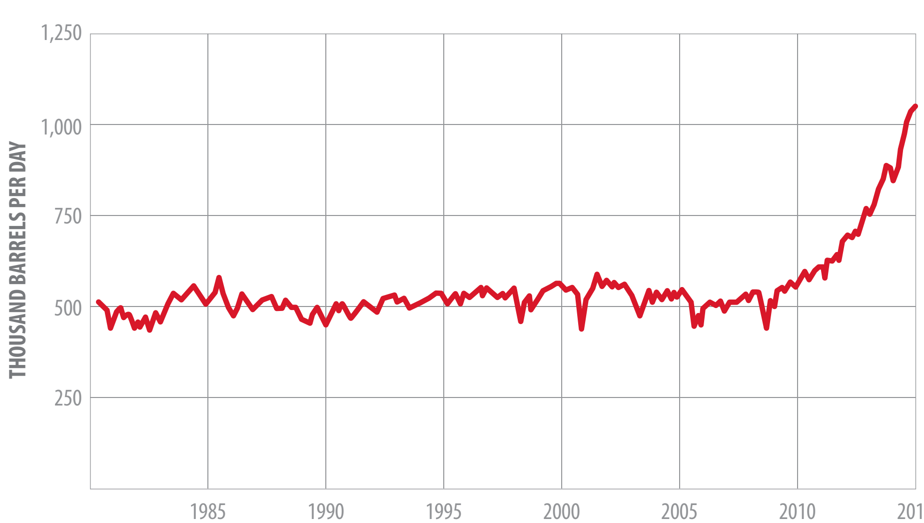
The key strategic cost drivers for petrochemical manufacturing don't vary much based on where that manufacturing takes place. All producers, whether in the U.S. or the Middle East, require reasonably priced, secure, uninterrupted access to feedstock material. The energy used in manufacturing is another key cost driver, making local energy costs as well as efficiencies critical. Because of the extraordinarily high initial investment costs, petrochemical manufacturers

EXHIBIT 1

PETROCHEMICALS

OVERCOMING DECADES OF STAGNATION

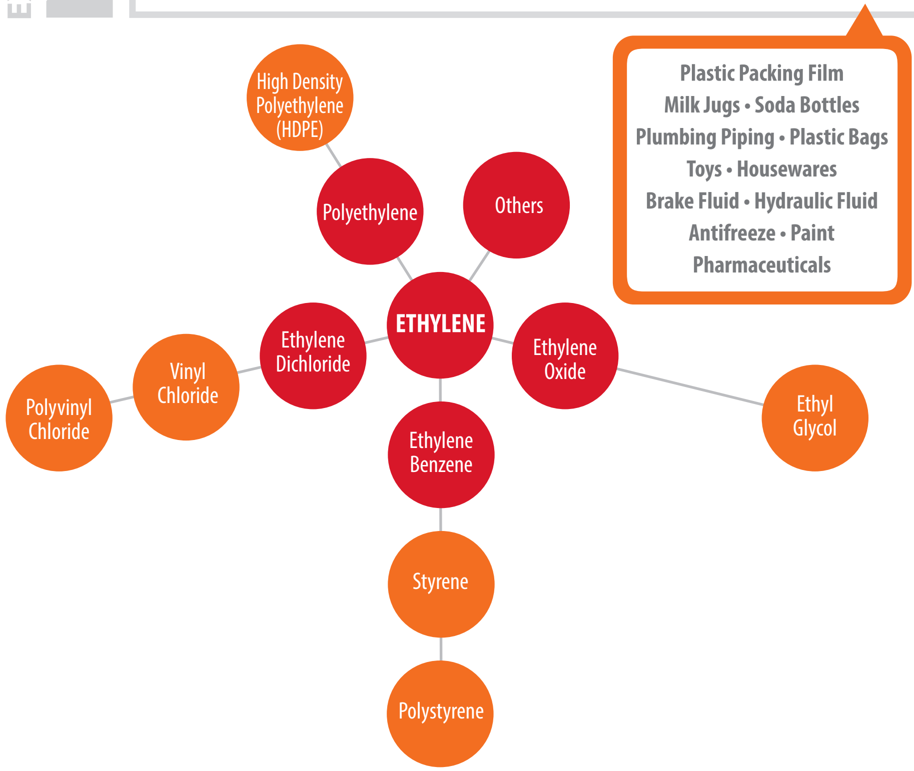
U.S. GAS PLANT PRODUCTION OF PROPANE AND PROPYLENE



Source: U.S. Energy Information Administration

EXHIBIT 2

ETHYLENE AND ITS MAJOR DERIVATIVE CHEMICALS AND PRODUCTS



must operate at high capacity year-round. Finally, processors connected to the broader refined products space can use existing relationships, storage, pipelines and skilled labor sources, thus making some degree of manufacturing to refinery integration important. We will examine how the U.S. energy renaissance has affected the price of feedstocks and fuels, and the strong positive impacts this has had for U.S. petrochemical producers.

Access to reasonably priced feedstocks and low-priced fuel

In the U.S., the feedstocks of choice come from natural gas liquids extracted during natural gas pumping. These NGLs tend to be high in ethane and propane, two hydrocarbons important in the manufacturing of ethylene, one of the most commonly used base chemicals. Ethylene is used in both polyethylene and HDPE as well as in vinyl chloride, PVC, CPVC and the styrenes and polystyrenes. These in turn become many products we use today (see Exhibit 2).

Ethane and propane prices have been extremely favorable for U.S. manufacturers of ethylene. Over the past two years, ethane prices have fallen by 60% or more, leading to a huge opportunity for producers of ethylene. Ethane prices are down to the equivalent of about $0.25/gallon (see Exhibit 3).

Propane, the other key feedstock in ethylene production, has had a similar

EXHIBIT 3 ETHANE AND NATURAL GAS SPOT PRICES

APRIL 2011 – APRIL 2013

Source: Platts

drop in pricing, and although its pricing is more seasonally dependent than ethane's, it, too, is remarkably attractive as a feedstock here in the U.S., where propane is selling at the equivalent of $0.48/gallon (see Exhibit 4).

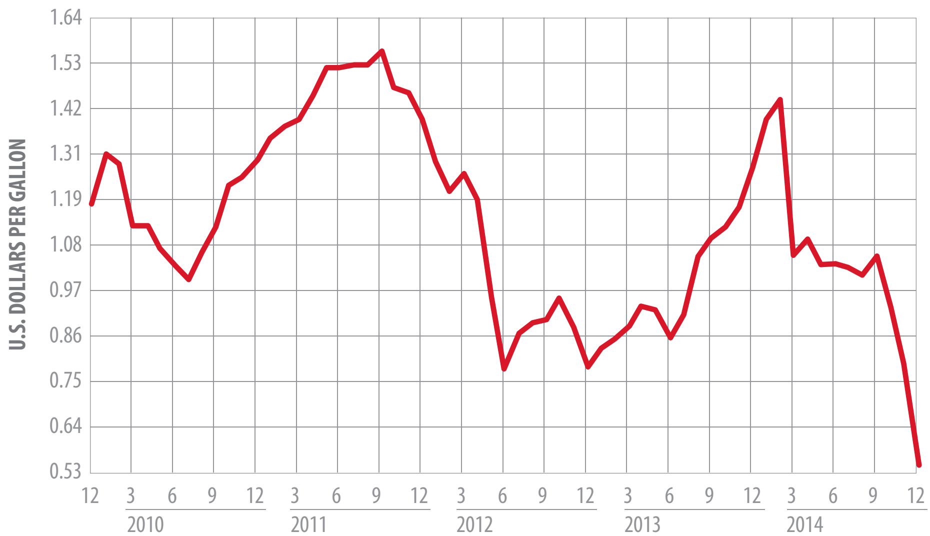
With prices for two of the major chemical feedstocks on the decline in the U.S., petrochemical production would already appear attractive here. However, when you also take into account natural gas's long-term low prices due to its oversupply situation, the energy cost of running petrochemical cracking plants in the U.S. also becomes quite favorable. With natural gas prices in the U.S. remaining below $4/MBtU (see Exhibit 5), the cost of energy to run these petrochemical manufacturing plants is only about one-third the amount it cost just six years ago.

Aggregate the cost savings on energy and feedstocks, and it's clear that manufacturers have shaved between 15% and 20% from their cost structures — a reduction that has huge implications for profitability. The fact that all of these feedstocks and fuel supplies are both safe

> Over the past two years, ethane prices have fallen by 60% or more, leading to a huge opportunity for producers of ethylene.

EXHIBIT 4

PROPANE SPOT PRICES
FIVE-YEAR TREND



Source: Index Mundi

and local means supply disruptions are extremely unlikely. This implies that predictable low prices are the norm for the foreseeable future for U.S. petrochemical manufacturers.

One would anticipate that overseas producers would have seen similar, if not as significant, improvements in their cost structures as well, but this is not the case at all. Saudi Arabian and Iranian ethylene production, which like U.S. production is heavily tilted towards ethane and propane feedstocks, had been as much as 50% cheaper than U.S. production. However, the changing price structure of U.S. petrochemical producers noted above has come at exactly the wrong time for Middle Eastern producers. Because of OPEC limits on oil production, many of the region's producers have severely curtailed production of natural gas (produced as a byproduct of oil production in much of the region), with significant accompanying repercussions for petrochemical producers. In both Saudi Arabia and Iran, ethylene manufacturing capacity has come online much faster than the natural gas needed to keep the feedstock supply chain fully engaged. This led to the Saudis declaring a moratorium on supplying new ethylene production facilities in 2006. As a result, undersupply issues at current facilities have been rampant the past five years.

European producers have struggled as well. European petrochemical production tends to be oil-based rather than natural gas-based, and ethylene is no exception. There, most ethylene is produced from naphtha from oil, which is already more expensive than ethane or propane produced from natural gas.

EXHIBIT 5

PROPANE PRICES
REMAIN FAVORABLE FOR U.S. MANUFACTURERS

Source: Index Mundi

And while we are currently in a period of low oil prices, it is reasonable to believe that trend will reverse itself in the not too distant future, and oil prices in the $75-85/barrel range will become the new normal. Should that be the case, European ethylene manufacturers will be operating with a greater than 100% price disadvantage with respect to their U.S. counterparts.

Finally, while Asian production has been a significant player, it too is dependent largely on naphtha feedstocks from oil. China is currently undergoing its own shale extraction efforts, but it seems likely it will find something more urgent to do with its natural gas and NGLs than ethylene, especially as China will likely need to replace coal as its primary power generation fuel to improve air quality and international standing.

Given all of these moving parts, it is clear to see that U.S. producers are advantaged compared to the rest of the world in terms of safe, reliable access to reasonably priced feedstocks for petrochemical manufacturing.

New Manufacturing Facilities are Underway or on the Way

Based on these exciting trends for the petrochemical production community, the opportunities for firms in the industrial construction segment are especially attractive for the next several years. In fact, five new plants are anticipated to be built in the Texas Gulf Coast area alone in the next five years, bringing online an additional 4.7 million tons of ethylene production capability (see Exhibit 6). These projects are only about half of the new ethylene production planned for the U.S. during the same time period.

These manufacturing plants will be built in the teeth of an extremely tight Gulf Coast labor market, which means that the ability to staff, manage and schedule these projects will be of utmost importance. While we have chosen to focus on one particular petrochemical product for much of this discussion, it is important to remember that similar pricing and demand pictures exist for dozens of other petrochemical products. This means that the industrial construction sector, and especially highly specialized aspects such as process piping, refractories, industrial coatings and other trades, will experience a surge in demand and extensive opportunities.

EXHIBIT 6 INVESTMENT IN GULF COAST ETHYLENE FACILITIES WILL BE SIGNIFICANT

EXPECTED IN OPERATION	LOCATION	OPERATOR	PROPYLENE PRODUCTION CAPACITY (Bn lbs./year)
2015	Freeport, Texas	Dow	1.65
Early 2016	Mt. Belvieu, Texas	Enterprise	1.65
2016	Point Comfort, Texas	Formosa	1.45
2017	Chocolate Bayou, Texas	Ascend/C3	2.2
Mid-2017	Odessa, Texas	REXpro	0.9

Source: RBN Energy

So, while the hoped-for surge in manufacturing (and its required construction investment) has not yet happened, there is reason for continued optimism. It is reasonable to say that just as the energy renaissance presaged this boom in petrochemical manufacturing, this particular expansion may be followed by a boom in plastics or chemical manufacturing. In short, industrial construction growth that is being driven by petrochemical manufacturing won't be the last word we hear from this segment of the industry. Forward-thinking industrial contractors will be looking for the next trend and positioning themselves to capitalize on the next renaissance, rather than chasing already developed markets. **Q**

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SOURCES

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HANK HARRIS

Financial Controls for Value Creation

This article contains an excerpt from Hank Harris's forthcoming book, "Creating Value in an Engineering Construction Business," a comprehensive guide to creating and perpetuating value in a design or construction firm. In Chapter 6, Harris details the importance of financial controls as indicators of firm health and tools for long-term value creation. Excerpted here are selections from his conversation with FMI principal Ken Roper. "Creating Value in an Engineering Construction Business" will be published in 2015.

Most design and construction industry firms operate on thin margins and in an environment of risk/reward dissonance. While few firm founders and operating managers chose this industry from a love of finance and accounting, the dynamics of these businesses suggest that tight financial management is essential to long-term survival and success.

Ken Roper is a former CPA and owner of an accounting practice working with the construction industry and longtime consultant with FMI. In this conversation, Hank Harris asked Ken to share his perspectives on financial controls, what tools are most essential, and how a firm can best use the resulting information.


Ken Roper


Hank Harris

Hank Harris: Ken, you have worked in this industry for a long time and have seen many companies that are financially well-managed. What are some common indicators that show a firm is running a financially tight ship? What kinds of techniques and tools do you see employed to help companies do that?

Ken Roper: Most companies I see that are well-run have timely and accurate financial statements, and they don't make excuses for the process taking too much time. Financial statements are perishable. The longer it takes to produce them, the older and less valuable the information becomes. Companies that emphasize producing timely and accurate financial statements tend to be some of the best-run companies. These firms also have useful dashboards, offering the ability to take appropriate action based on what the metrics show them. The firm may have metrics for work in process or cash flow balances or collection problems or outstanding change orders. When any of those things show up on the dashboard as being out of line, it is time to take action. A useful dashboard has a system of identifying and reporting exceptions, versus trying to look at every piece of data generated by the financial reporting system. The firm may highlight specific items in their dashboard reports, including unassigned contracts, missing subcontractor insurance certificates, open claims or similar indicators.

Harris: Finance and accounting are timeless subjects. Your team, the FMI Management Consulting Group, doesn't evaluate financial controls the way a CPA would. However, you still use a score card to examine how the company is running its operations. Has the view of good financial controls changed during the last 10 years? Have there been any trends within companies in terms of financial control management?

Roper: There have not been big changes in this past decade. Our job as consultants is typically to look at the information produced and study the flow of data, as opposed to the financial controls themselves. To me, financial control means a system of checks and balances and segregation of duties — everything that CPAs typically handle. FMI looks at roles and responsibilities, and the qualifications of people to work in their assigned departments and capacities. Sometimes a firm has inadvertently assigned unskilled people or the wrong person to a particular position. FMI gets involved in these areas to help the companies change or improve. This year I've been involved several times in helping the client find a qualified CFO. FMI's role has to do with structure, staffing and making sure that the people in a department are qualified, as opposed to only looking at financial controls. Getting the right people in the right place is key to success in any department.

Harris: You mentioned the importance of having the right talent. Certainly having the wrong talent is a red flag. Do other indicators, from a financial perspective, serve as potential red flags or areas of concern that something is not right?

Roper: When I taught my "Financial Management for Nonfinancial Managers" class, many participants asked, "What are the most important ratios?" This question was repeated every time we offered the program. To help formulate a good response to this question, I identified what I feel are the six most important ratios. These six are especially useful to nonfinancial staff because they are easy to compute and easy to understand:

- **Current ratio**, which measures the extent to which current assets can cover current liabilities.
- **Quick ratio**, which is the degree to which the most liquid current assets can cover current liabilities.
- **Leverage ratio**, which is debt to net worth.
- **Return on revenue**, which is the operating margin.
- **Return on equity**, which is return on investment.
- **Return on assets**, which is the utilization of capital.

An understanding of these six ratios offers a good, quick read of the important aspects of the firm's financial performance. There are benchmarks within the industry, so no matter the company's size, its performance can be compared to those benchmarks for a performance check. If any one of these ratios falls out of line with comparable industry averages, that should be considered a red flag by the firm.

Harris: There's an old saying that companies can be profitable but still go broke, which is generally a lead-in to talking about cash flow. What advice do you give to clients with regard to how they view their cash flow separately from the way they look at their profit and loss results?

Roper: I remember you saying that all sins are forgivable except for one: running out of cash. It's the job of the project manager not only to build the project correctly according to specification, but also to make sure that the firm makes a profit on the project. In addition to those two key roles, it is also very important to ensure that the cash flow stays ahead of the project cost.

Contractors should prepare schedules of values (project billing schedules) that promote cash flow ahead of project costs. That is just a training issue for most project managers, to ensure that billings and collections are done in a timely manner and monitored. One of the tools that we use with our clients is the liquidity indicator. This takes a select set of balance sheet accounts that project managers impact and analyzes the result to see if the company is generating cash flow from the work in process. The asset accounts, underbilling, inventories, accounts receivable and retainage receivables and the liability accounts payable, retainages payable and overbillings are compared. If the asset accounts exceed the liability accounts, then cash is applied to operations. The reverse is that if the liability accounts exceed the asset accounts, then cash is generated from operations. Looking at all of those on a project basis, a division basis and a company basis will show whether the firm is generating cash flow from construction operations. As an example, we used this liquidity indicator analysis with a big industrial contractor specializing in interiors for laboratories. We spent two years educating the firm's divisions across the U.S. and setting up worksheets for this liquidity indicator for each of them. Within that two-year cycle, the firm's cash flow improved by $13 million — for a $200 million company. Once a firm's management understands the cash flow drivers and what improvements are needed, these results are achievable.

Most firms took quick action to cut back on staffing, thereby minimizing their operating losses, making it at least possible to sustain a breakeven level, or, for some, generate a modest profit during the toughest years of the recession.

Harris: Firms have a variety of sources for advice on financial management of their operations. For example, they get certain advice from sureties, from consultants like FMI and from their bankers. How do you compare what these different advisors offer? Does this advice always line up, or are there differences?

Roper: The nature of the advice depends on two conditions: the financial condition of the firm and the motivation of the advice source. For the firm that has achieved sufficient financial strength that its sureties and banks no longer require personal guarantees, the advice will be different from that provided to those firms whose creditworthiness still requires personal guarantees. In cases with no personal guarantee requirements, these relationships have evolved to this high level because the owners and the managers of the business have managed its financial position so that the business holds adequate assets to secure any financial loss that may occur. That is a very desirable place for a construction business to be in today — an unsecured position with the bank and the surety credit. The downside of this condition is that it is necessary to leave more of the capital in the business, which drives down some of the typical performance relationships like return on investment and return on assets. Businesses can sometimes have more capital than they need, but the tradeoff is that they can have the unsecured relationships. The banks always prefer to have more assets in the business that they can access. By contrast it is in the owner's best interest to move those assets out of the business to get them away from the risk inherent in construction activities, and to put these assets where they can generate additional adequate return. Surety companies want more held within the firm, and the owners, if they are looking after their own financial interests, want to move the assets out of the construction business. However, the firms that really excel and have a competitive advantage have left excess capital in the business, so that those relationships are sound and solid.

Harris: Have you seen any changes in contractors' use of debt or some other form of leverage since the recession began in 2008?

Roper: Contractors appeared to be using less leverage (debt) entering the 2008 recession. In fact, I've seen banks closing down lines of credit and cutting back on leverage at the beginning of the recession for those using lines of credit. One reason companies did well during this recession was that they were well capitalized as the economy entered the recessionary period. There have been some bankruptcies, but for the most part, companies have survived well.

Harris: That introduces the question of the overall health of balance sheets today. Most companies have been through a recessionary time and an anemic recovery. Have you seen evidence of a damaging effect to balance sheets, or are the balance sheets you see still relatively healthy?

Roper: We get to see many financial statements every year, both in FMI's peer groups and with our clients. Most firms took quick action to cut back on staffing, thereby minimizing their operating losses, making it at least possible to sustain a breakeven level, or, for some, generate a modest profit during the toughest years of the recession. This quick action limited damage to the balance sheets. The recession was still tough and the firms contracted in size — many firms emerged from the recession smaller than they were when it began — but they were able to sustain either breakeven or profitability, so their balance sheets came through intact.

Harris: Earlier in our conversation, you mentioned having the right talent. Small companies probably start out with a bookkeeper, and then, as they grow, they hire a controller. The bigger companies have CFOs (or all of the above). What are the differences among those roles, and how does a company know which is right for them?

Roper: I hope you were right when you said they start off with a bookkeeper and then they end up with a controller. Many companies try to continue to use a bookkeeper who gets overwhelmed pretty quickly by growth, and this situation can become an obstacle. The challenge is to find the resource needed to really help the business grow and evolve. That first step is a controller who is a technician — typically a hands-on person who does a lot of the day-to-day but doesn't supervise too many people (maybe up to a dozen people in the accounting group). Sometimes this person also handles human resources and similar functional areas. Generally, the span of control for a controller is somewhat limited. As the business grows and evolves in complexity (somewhere between $30 million and $50 million for a subcontracting firm and $75 million and $100 million for a general contracting firm), the need for a CFO arises. A CFO is a much more experienced financial person with between five and 15 years in the controllership function. The controller should have evolved with an organization of the same size or larger than the current company, so that he or she has the knowledge and experience to help get the firm to the next level. One of the mistakes in this area is to hire a $30 million CFO when the firm aspires to be a $70 million company. It should go the other way: hire the $70 million CFO to help grow the $30 million firm to a higher level. A more sophisticated CFO is required as the business gets more complicated and has more moving parts. A CFO oversees all of the financial aspects of the company, and the department size can vary from as few as five or 10, up to 50 to 100, depending on the number of divisions.

Many companies try to continue to use a bookkeeper who gets overwhelmed pretty quickly by growth, and this situation can become an obstacle.

Harris: Do you see companies failing to raise the talent level on this position because they are afraid to hurt the feelings of their longtime, loyal bookkeeper/controller, or because they're afraid to insert a new boss over them? Or have companies learned to get around that?

Roper: Yes, this still happens a lot. You have to appreciate the organizations that are really loyal to their people, but this is one area where you really need the confidence in the talent of your staff. Everybody is depending on these numbers and making decisions based on them, so you need someone who can do a good job of developing timely, accurate financial statements. Also, firms will need the processes and the procedures in order to change and evolve as the company gets bigger. You want someone that has that kind of sophistication and who can install systems, including hardware and processes and software, that will keep up with the business's needs.

Harris: How hard is it in today's market to access and hire financial talent?

Roper: It is certainly achievable. In fact, it's easier than in other areas of the business. I've been seeking out financial talent through a website called www.ConstructionExecutive.com. The response to CFO positions is much better than it is for operations managers, estimators or division business unit managers (all of which tend to attract fewer applicants than the CFO position). There's a wealth of talent out there, including experienced professionals and those who have grown up in public accounting and who are looking for private industry — yet have the qualifications to run a construction company. There is good availability for both controller and CFO positions.

Harris: Are there any other general points that you would like to offer our readers?

Roper: I keep going back to Doc Fails saying 60 years ago that contractors do three things: They get work, do work and keep score. You need to have exceptional performance in all three of those areas. Each one of them has unique challenges. If you start to deconstruct them and see what it takes to get work, do work and keep score, they are extremely complicated. If a company is going to excel, the CEO and the senior-level executives all must make sure that all three aspects are performing exceptionally well.

Harris: The proverbial three-legged stool…

Roper: It still applies today. **Q**

Hank Harris is president and chief executive officer of FMI Corporation. He can be reached at 919.785.9228 or via email at hharris@fminet.com.

Shorts

Raising the Concrete Curtain

GREGG M. SCHOPPMAN

The world of construction in the U.S. and Russia is **more alike** than you'd think.

Most consulting business trips begin and end with little fanfare. From the fun associated with airport security to the monotony of the typical business hotel, business travel rarely looks as fanciful as George Clooney presents it in his Academy-nominated performances. However, many of the industry's challenges are fun to triage, and the solutions are equally rewarding to discover.

Imagine the intrigue associated with a consultative trip to Moscow during the chilliest international relations since the Cold War. Exit George Clooney, enter "The Bourne Identity." What might normally have been a 10-minute travel search for a domestic flight and hotel became an arduous two-week exercise to simply acquire work visas. How different would the Russian construction marketplace be relative to our own? Ideologically speaking, there are only a few countries that might be as far apart from the United States. Would this dichotomy exist also in the construction industry?

Interestingly enough, the two markets have more in common than one might think. As part of the engagement, it became important to document observations and provide solutions. What began as a seemingly impossible task to assimilate in a new culture, muddle through a complicated language and navigate the quagmire of bureaucratic red tape quickly morphed into an engagement with an all-too-familiar theme. The observations below are three of the most commonly aired observations from the client's perspective.

"We don't have time to plan at the project outset — things happen too quickly to plan."

Apparently, things eight time zones away are no different than they are in the U.S. Projects are awarded and, in our fervor to get things done, we send crews, materials, equipment, trade partners and so forth to job sites with little to no advanced planning. Why does any firm think this model will be successful? Even those contractors that create a "Job Book" for their field managers are leaps and bounds ahead, but it is imperative that some level of planning and face to face take place. There are those customers that will insist on having boots on the ground — in those cases, planning has to occur in tandem.

Excuses abound when it comes to preconstruction planning failures. Things happen too fast, the project is too small, the project is too big, the customer won't allow us to plan, and so forth. The excuses must end if firms expect to be more productive and more profitable. One of the primary reasons customers fail to buy into the notion of planning is because contractors fail to buy into planning. Planning is not simply "checking the boxes," but rather a constructive, collaborative dialogue that occurs between the office and field, estimating and operations — with the end game being a winning project strategy.

One of the primary reasons customers fail to buy into the notion of planning is because contractors fail to buy into planning.

"We get to the end of a project and have just enough time to start a new project, barely thinking of the one we just finished."

The "Superintendent Shuffle" is a dance that's not exclusive to western contractors. The superintendent that started a project rarely gets to finish it as he or she is swooped away to begin the next big thing. Getting to the end of a project and finishing strong requires as much planning as the start of the project. While analogies of an NFL "Two-Minute Warning" may have been lost with the Russian contractor, firms must develop an effective strategy to close out projects, cognizant of items such as demobilization plans, utility transfers,

A post-job review is less about sharing the wins and losses with the people that lived the project and more about sharing those lessons with the rest of the firm.

equipment returns, punch list completion, commissioning and closeout documents. Often these items are afterthoughts that lead to margin erosion.

The corollary of closeout is the project postmortem. If there is little time to close out a project effectively, it is a safe bet that there is little done to evaluate the successes and challenges of a completed project. In this case, failing projects were only examined in the cases of catastrophic failure (and we'll avoid the easy jab to say that project team was sent to Siberia…). A post-job review is less about sharing the wins and losses with the people that lived the project and more about sharing those lessons with the rest of the firm. Think of a post-job review as an opportunity to populate the firm's "Wikipedia" of best practices. The "Lessons Learned Library" becomes an essential resource in training new associates wherever they are located — Siberia or otherwise.

"We have a real labor issue. Most of our labor comes from outside of the country. Young, local 'kids' don't want to be in the construction industry."

It was easy to see the parallels of this conundrum. There is a distinct shortage of labor worldwide, particularly among the trades. Simply put, construction is a "dirty job" (thank you, Mike Rowe), and regardless of your zip code, young people are not as interested in being part of this industry. While no one can argue the fact that construction is a rewarding career, and one in which a decent living can be made, it is far from being the most desirable occupation. While the Russian market might be lagging at this moment, the American construction market is on fire. So as backlogs surge, who will do the work?

While there may be no immediate solution to a large, systemic problem, firms can work to secure their current employees by taking these steps:

- **Realize the value of training and career development and invest in the people within the firm.** This doesn't mean everyone has to have tuition reimbursement to an Ivy League school, but spend the time to grow talent within the confines of the firm.

JUST THE FACTS

According to IHS Global Insight for Eastern Europe:

- Russia is the largest construction market in Eastern Europe, accounting for half of the construction spending in the region.
- In 2014, total construction spending in Russia was expected to post a 1.4% decline, to be followed by a 3.4% rebound in 2015.
- Construction spending in Russia will increase at a 2.3% CAGR between now and 2018.
- Construction in Russia will also pick up in preparation to host the 2018 World Cup, with spending amounting to an estimated 632.37 billion rubles (US$22 billion).
- For the World Cup, 241 billion rubles will go to road construction and 123 billion rubles will be spent on stadiums in 13 different cities.
- Russia and Bulgaria will spend the most on infrastructure over the next five years when compared to their Eastern European peers.
- The Russian/Ukrainian conflict put pressure on growth potential across the region, where GDP was expected to increase 2.9% in 2014 and 3.4% in 2015.

- **Next, communicate with the people within the firm.** This doesn't mean leaving the income statement on the break room table, but it does mean sharing the direction of the firm with employees.
- **Listen to the firm.** More often than not, firms fail to listen to the pulse of the firm. Leaders will preach from the pulpit but fail to listen to the congregation.
- **Lastly, reward the top talent.** Develop a sound, incentive-based compensation system that rewards the right behaviors. Superstars should be compensated like meritocracy.

The simple fact is, with a strong infrastructure built on talent development, robust internal communication and performance-based incentives, employees are content. When the first two areas aren't addressed, associates look at one another and say, "I put up with all of this AND I only make XXXX."

Moscow offered an insight into a world that many only read about in the news. To see the city from a business perspective rather than as a tourist, I caught a glimpse into a construction industry that was more similar to its American counterpart than most would think. For all its bluster, once the Concrete Curtain was pulled back, it was easy to see the similarities of the construction world. Well, maybe the next visit we'll get to work on international relations. For now, *das vadanya!* **Q**

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The CEO's Role:
Part 2 — Forming a Culture for Success

PHILIP WARNER

The CEO's role is to **shape** a company's culture and **empower** the employees.

Whether they are large public businesses or small, family-owned startups, successful construction companies have strong, positive cultures. These cultural roots typically start with a founder who has a vision of the type of company he or she wants to build.

Jack Mascaro, chairman and founder, Mascaro Construction Company, L.P., Pittsburgh, Pennsylvania, talks about how his own growth path was limited while working for another company. Mascaro left that company to start his own firm:

I knew the kind of company I wanted to build and took out a second mortgage on the house to start the business in the basement. I wanted to create a company with a reputation for great customer satisfaction. One that does what it says it is going to do the first time, then delivers. Construction is a big industry in the U.S., but it is widely reported that there is 30% waste in nonresidential construction. The industry spends less on R&D than does any other industry in the country. There's lots of room for improvement.

Mascaro also knew his own strengths and weaknesses. One of the first people he hired was a CFO to manage the money it expected to bring in. As company chairman, Mascaro still works to transfer the company's core values to the next generation. His sons, who now own all the stock, were reared in the business — a sure way to ensure that the company culture was transferred to the next generation. But the senior Mascaro goes a few steps further to see that everyone feels like an owner in a family company:

We have our core values, and they have made us successful into what is now our 25th year. In order to pass on that culture, one must live it every day. I teach an ethics class every year. We have even won a national award for being an ethical company. I tell stories, for instance, of how I have been tempted over the years to bend my ethics and how I overcame those temptations.

Mascaro also acts as a mentor to a few chosen leaders each year, helping to prepare them for new roles as they grow within the company. In exchange for that effort, the Mascaro Construction Company maintains a very high retention rate of 98.5%. Mascaro explains that this is also due to a sophisticated hiring process to, as Collins wrote in "Good to Great:" "Get the right people on the bus and the wrong people off the bus."

CEOs who understand, practice, shape and lead with their company's culture can raise the firm above mediocrity and assemble many different people and talents.

The importance of culture runs deep in well-run companies, and sometimes the CEO must act as a cheerleader — or change leader — especially in difficult times. Guy Gast, president, Iowa Division, Waldinger Corporation and current chairman of the New Horizons Foundation in Des Moines, Iowa, explains how, in the depths of the Great Recession, he told his team that he would "own woe is me" so they could stop worrying about the vicissitudes of the markets and focus on their own important tasks. Gast explains:

It is a role, or a competency, of the CEO to be able to get the group "pumped up." That can take a lot of energy, but it should be on every CEO's actionable agenda.

One CEO competency is influencing the culture of the organization to grow in a positive direction. Often the culture in a construction company can become a losing one, especially in tough times. By inspiring higher levels of execution and celebrating individual and team successes, a CEO can raise the aspirations of the organization's human resources. CEOs who understand, practice, shape and lead with their company's culture can raise the firm above mediocrity and assemble many different people and talents. Taking the lead to shape the corporate culture can be quite a challenge anytime, but it's even more important

> Purpose sets the path for the long haul. In order to strengthen and carry out this purpose, leading to success, the organization must have the right talent in place.

when the company grows to a multibillion dollar organization, like Norwalk, Connecticut-based EMCOR. Tony Guzzi, president and chief executive officer, described how he manages all the companies that make up EMCOR:

The companies are first focused locally. Then we work together at corporate to see where we can help each other. We look for areas where we can work together. We are all united in wanting to do things the right way. We are big on entrepreneurial leaders. We are a company of leaders.

According to Ron Magnus, managing director of FMI's Center for Strategic Leadership, the CEO is the main caretaker and leader of the culture of the company. He presents the cultural model and "shines bright lights on it." A culture that involves everyone in the company is at the core of the business. "Success=[P(urpose)*(T(alent)]$^{C(ulture)}$." What this means is that success is determined by three critical factors within an organization. Purpose sets the path for the long haul. In order to strengthen and carry out this purpose, leading to success, the organization must have the right talent in place. Knowing how to recruit and retain this talent and adequately build the pipeline of "Peak Leaders" contributes and acts as a multiplier of success. These two pieces are raised exponentially by organizational culture, which reflects the organization's vision. The CEO's role is to assure the company is organized around its core vision. The CEO makes it clear why the organization exists. "The 'tweaks' the CEO makes need to be such that they enhance the culture and empower the people in the company to do great things. That's magical!"

Success = [P(urpose) x T(alent)]$^{C(ulture)}$

Is There Any One Characteristic That Makes a Successful CEO?

When we asked interviewees which characteristics make a successful CEO, picking just one was difficult in light of the CEO's long list of responsibilities. However, we did get a short list that most CEOs would agree with. For starters, the CEO should be able to recognize his strengths and weaknesses, and that awareness comes up again on the short list. It also tends to have some relationship to several other characteristics on the list. The following list is not in any specific order of importance; all are important characteristics of the successful CEO:

- Having integrity, trustworthiness and transparency
- Exhibiting competency in all of the CEO's responsibilities (or assembling a team that completes all those competencies)
- Being strategically agile and adaptable
- Being the head salesperson for the company (as in selling the brand of the company and sometimes the services as well)
- Acting as a servant leader
- Taking responsibility for "making the numbers"
- Knowing to ask the right questions in order to get the needed information for decisions and to stay informed on all aspects of the business

To shorten the list even further, we might stop at the third bullet point, incorporating most of the others under competency; but that would lessen the importance of characteristics like being a "servant leader." To anyone not familiar with the phrase, "servant leader" appears to be an oxymoron. If one is a leader, how can he or she also be a servant? Actually, it is a powerful concept whereby a leader in that privileged position understands his or her role as helping others to realize their full potential. Ultimately, this idea can be a cornerstone of building a strong and enduring company culture.

Integrity, trustworthiness and transparency, especially as these terms relate to ethical concerns, were all mentioned several times during the interviews. Integrity and transparency were at the top of Gast's list, as he emphasized the need to build trust within the organization:

The CEO or president and other high-ranking executives must have integrity and be able to build trust with the people in the organization. Without mutual trust, things or plans just won't work out very well. That would be my No. 1 characteristic of a CEO. People in the organization must trust the leadership. Along with that, one must add ethical behavior and good communication skills. The leader sets the tone for the organization on these issues.

Terms that describe the successful CEO include trustworthy, strategic agility, adaptability, speed/reaction time — needs to get all the information in a timely fashion and understand problems so they can be solved quickly.

For Guzzi of EMCOR, being ethical is considered a highly important CEO responsibility:

This is very important to us and to the culture of our company. I know the industry hasn't always had a stellar track record here, but it is improving. At EMCOR, we do training on these issues, talk about ethical principles and invest in ethics training. We want to be known as an ethical company. It is not only a good thing to do; we see it as a business advantage.

We hold training sessions in leadership at West Point, and ethics is a part of this training. I always attend these sessions.

Guzzi also noted the importance of being a servant leader and working for the good of those he leads. That item was No. 1 on the short list of Hank Harris, president and CEO of FMI:

1) Be a real servant leader.

2) Be the head salesperson. While most CEOs are extroverts with the personality to be the head salesperson for the company, those who are introverts need to delegate that role to others..

Lee Smither, managing director for FMI, puts "head salesman" at the top of his short list:

Probably the most important role for the successful CEO is to be the head salesperson. The CEO must spend time with customers to keep in touch with the market. Sales is one of the toughest jobs in the construction industry.

If I were to make a short list, head salesperson would be No. 1. If the CEO isn't very good at that, it will be difficult to be successful. The CEO must be able to sell the company's services. He must also sell the company to other stakeholders like the banks. The No. 2 characteristic would be the ability to ask the right questions. That goes for most every role from sales to getting the right information internally.

Although we try to make it easier to study the role of the CEO by breaking down different characteristics and responsibilities, it is apparent that all of the characteristics are interactive and present simultaneously, or nearly so. There are no compartments for these characteristics. For instance, being a servant leader also embodies being ethical and trustworthy. Those are characteristics of a head salesperson for the company. Understanding how and when to delegate is not only a sign of a servant leader but also of trust and fostering integrity. Together, all the characteristics serve to strengthen the bottom line of the successful company.

A deeper awareness of the importance of a strong corporate culture focuses the goals, values and behaviors of the organization.

A Culture of Success

A deeper awareness of the importance of a strong corporate culture focuses the goals, values and behaviors of the organization. The CEO is the leader, keeper and shaper of corporate culture — whether handed down from generation to generation or forged anew to reflect the markets and times. Social culture must also be addressed by the CEO. FMI has called this "cultural intelligence" or CQ:

Cultural intelligence (CQ) is the capacity to adapt to unfamiliar, ambiguous, culture-based beliefs and attitudes of the people with whom you interact. In other words, people with high CQs are able to adjust their own thoughts, behaviors and communication style to match those of culturally diverse employees. In reality, people are engaging in cross-cultural interactions every day, due to globalization and increasing diversity within the industry. Leaders with high CQs understand their own cultural assumptions and suspend judgments when interacting with others. Effectively communicating with culturally different employees requires the adjustment of verbal and nonverbal behaviors to match the diversity of others. High-CQ leaders are better able to manage diverse expectations than their low-CQ counterparts are. Recent research links high CQ to several performance outcomes, including better judgment and decision-making, negotiation success and global leadership effectiveness. Cultural intelligence has also been linked to higher leadership potential, interaction adjustment and overall mental well-being.[1]

Being intelligent and aware of both corporate and social culture is a key CEO component that cannot be completely delegated, although it can be taught and passed on through example and influence. As always, the role of the CEO includes managing the bottom line, but managing and shaping a great culture is the key to keeping up the bottom line. **Q**

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[1] "Preparing to Lead Tomorrow's Workforce Today," Kim Morton and Jake Appelman, *FMI Quarterly*, 2013 Issue 3

Dividing, but Not Conquering: Ready, Fire, Aim

JIM SCHUG AND DEBRA BERNAL

The industry of the future awaits the companies willing to re-evaluate their business and make difficult decisions about future needs.

The purposeful approach to dealing with targets is outlined by the commands, "Ready, Aim, Fire." The reactive, often disastrous approach can be found in the title above. The construction and engineering industry is full of action-oriented entrepreneurs. Entrepreneurs, by their nature are action-oriented, often preferring quick response. (Fire!) Such desire for action often leads to the rapid-fire proliferation of initiatives, easily overwhelming an organization. Couple that internal combustion with the creative destruction[1] of disruptive changes in the marketplace, and you have ingredients for an organizational disaster.

Growth and profit are concepts that shape and mold our everyday business lives. Business owners or executives continually look for new avenues of higher production, new business services and new partnerships that will propel the organization towards increased growth and profits. Additionally, these same executives and managers more and more frequently encounter new technology and processes that are more than the normal evolution of industry standards. Within this newness is further fuel for disruptive change in the marketplace. In times past, significantly new standards and procedures were introduced most often as new generations of executives took over ownership of the business and its operations. Nowadays, rather than a slow pace, changes are rampant. Business disruptions across industries are more the daily norm. Retailing is not just shops or even big boxes. Communications are not just telephone and fax. Banking is hardly just saving and lending. Health care has so many faces that the boundaries are hard to define. Higher education is not just provided within ivy-covered walls. Business leaders are continuously challenged to keep up with the churning demand of developing technologies and the growing complexities of their customers' changing needs.

In this ever-changing and rapidly morphing environment, business owners and executives respond with different strategies, operations and tactics in an effort to stay ahead of the volatility, to remain relevant, and to hopefully catch at least one of the new waves. One frequent response to market changes includes developing a business or operation unit that focuses on a niche market need for a unique process or a specialty in materials and manufacturing. Executives foresee that honing a high level of expertise or specialization allows the company to gain a competitive edge in the market. In and of itself, the concept of specializing is a good approach and responds directly to technology-driven market opportunities. However, simply changing a company's operations or developing different tactics does not necessarily generate new growth or profit. In fact, taking on new targets without due diligence and analysis may well expose the company to higher levels of loss with minimal options for recovery, all the while wasting precious resources of talent and money.

Step by Step or Take a Leap

As companies look to grow, executives find it harder to maintain the agility and responsiveness that is imperative to meet the market's tempo. Over time, the industry's changing demands often result in companies that are hard-pressed to bring about new solutions. To stay competitive, the concept of developing a new division or business unit feels like a natural response. Yet the expected advantages from developing a new business unit can quickly turn into weakness if the new direction is not judiciously evaluated or if the resulting organizational entity is not managed effectively.

As posed at the outset of this article, many executives within the construction and engineer sectors demonstrate entrepreneurial spirit; they tend to be action-oriented and focused on getting the task done. Although the industry often demands a "can-do" response, that same proclivity for action can produce reactionary response during times of crisis or high pressure. What may be appropriate or even necessary on the job level for a quick fix is generally much less appropriate at the executive level. Boardroom decisions should not be based largely on gut feelings that produce knee-jerk reactions. Relying on intuition alone typically produces a "tunnel-vision" perspective. Having cast their lot based upon nonfact-based decisions, companies compound their losses through failure to see their own blind spots within their competitive fields. In such environments, competitive edge is easily lost if it ever existed in the first place. What were intended to be growth and profitability are now merely sunken costs of misapplied talent and unwisely spent funds.

So how should an organization respond to rapidly evolving market demands for specialized services or customized product development? How can companies take steps towards smart growth and development of special skills, whether through cross-functional teams or special-use business units?

To produce the best outcomes, entrepreneurial management should develop strategic plans using evidence-based market analysis. Setting the right goals and objectives is not enough. Key elements in the strategic planning must deal with how rapid achievement of essential skills and further management development will be accomplished. Further, the strategic plan and its organizational end product must provide cohesive implementation, including coordination oversight, metrics of and means of achieving consistency in results. The intent is to be responsive to emerging market trends — retooling company assets as required — all while maintaining sustainability of the core.

Don't let a bias for action undermine your need to properly analyze and plan. Entrepreneurial executives tend to fear that they will be bogged down by analysis, thereby missing a window of opportunity. The marketplace does not generally reward those who jump blindly into a new business entity simply because of the scent of a business opportunity. Rather, growth and profit favor those who develop a thought-out process where their business unit is planned, prepared, ramped up and primed for the opportunity at hand. Achieving success requires skillful integration of strategy, business structure and a sustained effort.

The marketplace does not generally reward those who jump blindly into a new business entity simply because of the scent of a business opportunity.

Implementing the Plan of Action

Proliferating new divisions or business units can easily lead to decreased performance across the company, even erosion of core competencies, hardly the intent of the venture(s). In one situation, the leadership team worked diligently to study the market and identify adjacent businesses to deliver in its geography.

Over a two-year period of time, the company adjusted from three divisions to six after a reorganization to reflect its new strategy. Unfortunately, the efforts did not involve the company administrative staff in the analysis and lacked administrative support and integration. While efforts to identify and trigger startup divisions were initially well-thought-out, their execution and coordination were disjointed across payroll, accounting, HR and estimating. The results led to a rocky implementation. Performance across the company suffered because of weak staff support to the new divisions.

It's Not a Farm but It Might Have Silos

Poor implementation during a business unit's infancy often leads to a silo mentality across what should be a cross-functional business group. Troubles in the infant make them a pariah that no one wants to engage. As the implementation unfolds, the new organizational construct generates confusion across operations. How does 1 + 1 = 3? If the separate divisions cannot work together and maximize each other's advantages to add value to the parent organization, company leaders need to reconsider if the division fits the "whole."

In some cases, startup divisions are instant silos as they pull resources (people and even work awarded) from the profitable divisions. The immediate effects are certainly perceived as harmful by the donors, but the long-term wake of such decisions, absent early success for the new ventures, is a strained culture for all. If nothing else, new business units are a distraction for company leadership. Future leaders are often assigned to lead "the next great thing," either as a test of their prowess or because leadership has great confidence in their skills. Many of them put their hearts into the effort, but sometimes their efforts and development would yield higher return if applied to the efforts of the core business. For the first year(s), this is almost always true. Having realistic and clearly communicated metrics of success and time frames is essential for wide organizational support.

...Still Not a Farm, but It May Have (Sacred) Cows

In other cases, early business unit successes can result in sacred cows over time. A high-potential business developed 20 years ago, for example, may not be relevant today. It is difficult to let go of those businesses that were developed and flourished for a time. Holding onto legacy divisions as a show of respect for the company founder is seldom a solid business decision. In similar fashion, companies hold onto some of their least profitable and most capital-intensive business units (with only 15% of total revenue) because they are part of their identity. Sometimes you ought to hold 'em and sometimes you ought to fold 'em. "There is a time and a season for everything," as the old adage states. Recognizing when to augment or to close down a business unit is a crucial skill for management and company executives.

Pain Without the Gain

A factor rarely established during the startup of a new operation or business unit involves the time expectations for a return of investment. When will this venture be profitable? When will growth be evident? Typically, the time horizon given for these initiatives to become contributors to the whole is woefully short. Studies show new businesses take longer to develop and flourish than is usually allotted. Most leadership teams expect to see returns in one to two years; yet it historically takes at least four years for most new divisions to be profitable. One study indicates that new ventures need approximately eight years before reaching profitability.[2] The study sampled Fortune 500 companies, and the results showed that corporate ventures suffered severe losses through their first four years of operations, and average ROI was an average of -40% in the first two years and -14% in the second two years.

Clear company strategy recognizes limited resources and identifies the best allocation of those resources.

Similar to an investment portfolio, it is good management to periodically evaluate your portfolio of business units. In the development of new lines of business, budget assumptions often lack any market grounding or fact gathering. Companies develop a new capability to answer a key customer need (build a high-pressure coatings capability) and consider the great things that could evolve from the new capability. At the completion of that one-off project, the new service or product becomes a capability in need of a customer. Assigning leadership to further develop a potentially unneeded business will likely result in unmet budget promises year after year. Some of the most basic costs to run the business unit are ignored, yet the actual cost to acquire new clients and build projects may exceed that of any logical or fact-based market determination. With facts in hand, an analysis of less than a day could have foreseen disaster on the horizon.

Crystal-Clear Vision

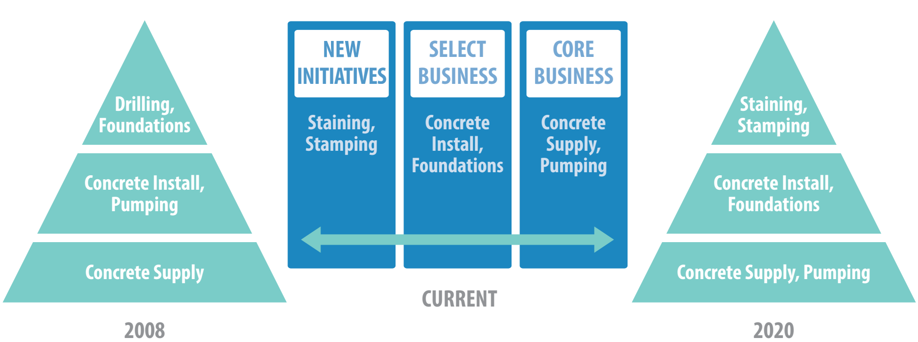
Clear company strategy recognizes limited resources and identifies the best allocation of those resources. In a declining market, this often makes sense because there are fewer resources to assign to tasks along with fewer opportunities to pursue. Companies pay more attention to highest and best use in tough times. However, a similar review is often neglected in a growing market. It is just as critical to ensure the company keeps focus during good markets.

Rapid changes in the markets, especially changes that create abundance of opportunities, mean companies should conduct a portfolio analysis to ensure that their divisions are reinforcing their core business proposition and maintaining their relevance. This review process searches for laggards or wayward initiatives that are draining energy from the core.

Another benefit of such a portfolio analysis is to identify and focus efforts for the development of the right new business units in the future. Exhibit 1 demonstrates the evolution of company services over time. Typically, the majority of company revenue often comes from the core businesses and customers, with select businesses and customers accounting for a high percentage of profit margin. New business concepts are often at the top of the triangle. Over time, these businesses mature to select businesses or, through evaluation, are replaced with other market opportunities. This allows the organization to consider new ideas, while constantly developing and improving the core business. In the example below, the company is evaluating where it came from (2008) and where it is heading (2020) in services provided to the market. While foundations were a new concept in 2008, the business matured and became a select business unit. Likewise, drilling was evaluated and, after a suitable period of time, not invested in to mature into a business unit.

Divisions or business units are relatively easy to start up, yet it can be hard to shut them down or spin them off. Using a portfolio approach allows for clear communication of goals and a sequencing of initiatives. It also allows a company to face reality in the markets and head off disruption while pursuing innovative concepts. Take Blockbuster, for example. Had it focused on its core business (retail rental of entertainment) while "testing" small blue boxes located at grocery stores and convenience stores, it may have evolved to a more relevant business model rather than losing business to both Redbox and Netflix.

EXHIBIT 1 EVOLUTION OF COMPANY SERVICES OVER TIME



Navigating Strategy

Some guiding principles achieve strategic diversity while maintaining the core. Whether examining current divisions or thinking through the "best fit" for future divisions, consider the following:

Companies must be deliberately clear about their core competency. Core competencies are no place for generalities. Getting specific about the language used to describe the company's greatest advantages becomes much more difficult. For example, "general construction" is not enough of a core competency around which to frame a business. Few companies are "standouts" in their markets across all new construction types and for all customers. Parent companies that lack clarity and specificity around their core competencies will find themselves wandering into different business distractions. Vagueness of core competency may also limit great opportunities that don't fit the general sense of the term. Take, for example, Time Warner's acquisition of AOL. Time Warner's action was based on becoming the world's largest media company. For many reasons, the merger didn't work, much of it stemming from a lack of clear purpose around Time Warner's true competitive advantage and definition of the market in which it competed.

There is no excuse for sloppy execution, and pushing more work (or more types of work) through a broken system will not yield better results.

Is there room for growth if we took the same energies and put them towards growing the existing business? This trade-off question forces critical decision-making regarding market penetration and market expansion. Should we invest these resources and efforts in delivering new solutions to current clients, or should we target another customer segment? If, after our analysis, our resources and investment are better-suited in a future growing segment, then that is the right target to pursue.

Do we have a culture and system of disciplined execution? There is no excuse for sloppy execution, and pushing more work (or more types of work) through a broken system will not yield better results. In many cases, success is at the intersection of competency and market opportunity. Company strategy is often limited by what we can deliver and by our own execution. If the company lacks the ability to self-perform and track costs, starting a self-performing division may be a stretch.

Revisit company structure. Construction companies have a tendency to align themselves by capability rather than by customer need. Selling services based only on company capability could shortchange effective recognition of market needs. Customer focus rather than capability focus on "what we do" is a more successful model to evolve with the market. For example, an industrial contractor that goes to market with mechanical, electrical and sheet metal services will not yield the same results as a company that targets manufacturing, biopharmaceutical and energy markets. The difference is a team devoted to knowing common customer needs and developing solutions to fit them compared with a fragmented approach to the market – mechanical divisions seeking only mechanical work and little or no collaboration across divisions.

People are the most critical resource to lead new initiatives. When we end up involving our great leaders and high potentials on distractions or wrong-fit clients, it is criminal abuse of talent. Great talent is limited, so we must ensure that the right people are focused on the best market initiatives with the highest potential return. Knowing this, constant development of new talent and empowering for business responsibility are critical. A weak people strategy is a recipe for poor results over the long term.

Good strategy focuses the company for profitable growth and should serve as a filter to review both the core business and each division/business unit. It should serve to challenge current business models to innovate. General Electric CEO Jeff Immelt once said, "Constant reinvention is the central necessity at GE. We're all just a moment away from commodity hell." The current market requires a change in how businesses operate and how decisions are made in the boardroom. As the construction industry continues to recover, good companies will face the challenge of choosing from myriad market opportunities. The industry of the future awaits the companies that are willing to re-evaluate their current business and make difficult decisions about business needs in the future. Using this approach, companies can prune the weak branches, graft the right stock, plant the right seeds and flourish in the future. **Q**

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[1] Creative destruction, a term coined by Austrian-American economist Joseph Schumpeter to describe the essential characteristics of the capitalist dynamic. Essentially the "process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one."

[2] "The Risky Business of Diversification" by Ralph Biggadike https://hbr.org/1979/05/the-risky-business-of-diversification/ar/4

The Energy Services Opportunity: Attracting Traditional Contracting Firms

RUSSELL CLARKE AND TIM HUCKABY

Demand for energy efficient buildings offers advantages for contractors.

The abundance of energy services opportunities in the building stock in the United States and abroad is drawing new service providers into the industry. Traditional mechanical, electrical, controls, design-build and general building contractors have recognized their clients' demand for more efficient, comfortable and productive buildings. These firms have seen energy services companies (ESCOs) deliver higher-margin projects and services that provide significant value and benefits to building owners and occupants.

The founder of one mechanical services provider states, "Moving into the energy services business absolutely sustains the ability to provide the best service to our core customers." This view has led many traditional contractors to expand into energy services, often seen as a natural extension of their core businesses.

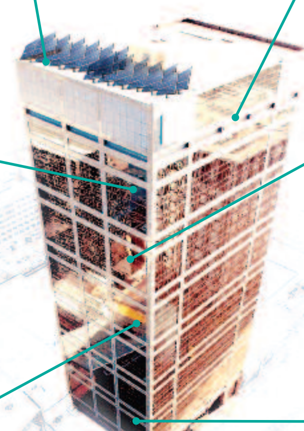
The Energy Services Opportunity

The marketplace for energy services is complex and dynamic. Exhibit 1 outlines subsectors of the energy services market.

EXHIBIT 1

FMI'S ENERGY SERVICES LANDSCAPE CLASSIFICATION

ENERGY SERVICES AND CLEANTECH COVERAGE



Distributed Generation (DG) Renewables
- Traditional DG/CHP
- Onsite Renewables
- Energy Storage
- PQ&R Services
- Utility Technologies
- PQ&R Technologies

Demand Response Microgrids
- Demand Response
- Building Systems Integration
- Microgrids
- Smart Controls/Meters
- Utility/Gov. Programs
- Energy Info./Software
- Energy Analysis & Management

Energy Efficiency Load Shifting
- Performance Contracts
- Energy Retrofits
- Energy Engineering
- Cx, RCx, MBCx
- Efficient Technologies
- Utility/Gov. Programs
- Load Shifting

Facility Operations & Maintenance Measurement & Verification
- Outsourced O&M
- Third-Party M&V
- MBCx
- Energy Info./Software
- Facilities Services
- Utility Services
- Third-Party Ownership

Energy Procurement Energy Management
- Bill Analysis, Payment
- Energy Analysis & Management
- Energy Procurement
- Energy Consulting
- Risk Management
- Energy Info./Software
- Commodity Sales

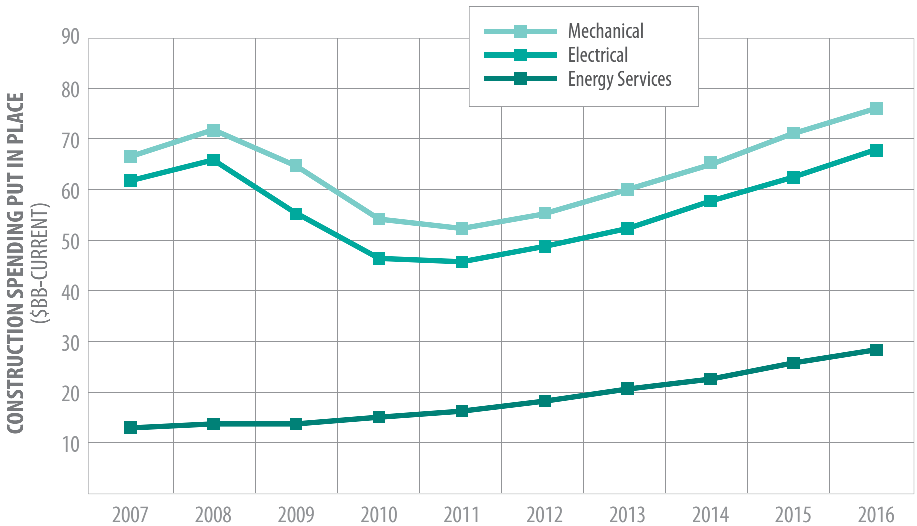
Power Quality & Reliability Energy Storage
- Energy Analysis & Management
- Cx, RCx, MBCx
- Energy Quality Services
- Microgrids
- Backup Power Infrastructure
- Energy Info./Software
- Energy Storage Technologies

Many of these energy services are far removed from the work of traditional contractors. Others, such as design and construction of energy efficiency and distributed generation projects, two pillars of the energy services market, are direct extensions of a traditional contractor's core business.

As shown in Exhibit 2, the market for conventional mechanical and electrical construction declined from 2008-11. During this difficult recessionary period, the energy services market continued to grow. Although the mechanical/electrical markets have recovered since 2012 (and are expected to return to 2008 levels by around 2016), the energy services market has expanded and is expected to continue doing so at a somewhat higher rate than the conventional mechanical/electrical market. Additionally, energy services projects often have higher gross margins than traditional electrical/mechanical projects, because the required services are more specialized, differentiated and often tailored to unique client attributes.

EXHIBIT 2

MARKET SECTOR GROWTH IN THE UNITED STATES



Source(s): Lawrence Berkeley National Laboratory, Pike Research, Lime Energy, FMI, Global Insights, U.S. Census Bureau

These market fundamentals present an attractive opportunity for contractors who can leverage their current capabilities and expand or shift their strategies to the energy services marketplace — either organically or through acquisitions. This market opportunity has benefited many firm owners who want to solidify their customer relationships and grow revenues and profits. "It is a threat when one of our good clients has a need and we are not able to provide for that need, but it is also an opportunity if we have the right strengths," states an owner of an HVAC service company.

The Pitfalls

While expanding into energy services may be attractive, actual implementation can be difficult. As one industry veteran put it, "There are a lot of wannabe players and very few real players. That is the hazard of it all. When you peel back the covers, it becomes clear who is real and who isn't pretty quick."

When traditional contractors transition into energy services, the following issues often arise:

Efficiency and Effectiveness of Business Development — Selling an energy services contract (i.e., an energy savings performance contract or a distributed generation project) may be a very different process than the contractor has experienced. Sales cycles can be long and upfront development costs high. Selling often occurs at the building manager/engineering level and at the executive level. Projects often require structured third-party financing. The competition may be different and more entrenched (say pure-play ESCOs), and the selection process may differ.

The Pitfall — Taking too long to develop projects. Spending too much to develop projects. Selling unprofitable projects.

Design Capabilities — There is a shortage of experienced engineers who can quickly and effectively develop energy services projects. Energy services projects often are complex and include performance guarantees.

The Pitfall — Inability to design "market-winning" and long-term-performing energy services projects.

Project Delivery — Energy services projects may be outside the scope of a contractor's core business. This presents additional project delivery risk, and companies experience expensive project learning curves.

The Pitfall — Inability to deliver a new project type profitably.

Risk Allocation — Energy efficiency and distribution generation projects often require contracts to provide long-term guarantees, such as energy savings or run-time guarantees. Overcommitting (or underperforming) on such guarantees can result in significant losses. Furthermore, there may be indemnification or liquidated damages commitments in energy services contracts that are outside of the normal scope for a contractor.

There is a shortage of experienced engineers who can quickly and effectively develop energy services projects.

The Pitfall — Unforeseen losses on guarantees, indemnifications, liquidated damages or similar.

Project Financing — Energy services projects often require third-party financing. Firms must understand how to develop projects that are financeable in the capital markets and acceptable to client CFOs.

The Pitfall — Developing projects that cannot be financed or that are not acceptable to client financial officers.

Balance Sheet Management — The cash flows and working capital needs of energy services projects may differ from a contractor's standard projects.

The Pitfall — Adversely affecting return on invested capital or damaging the company's working capital position.

The benefits of gaining traction in the energy services market can outweigh the risks, if the risks are properly managed.

The Energy Services Advantage

Despite the pitfalls noted above, the benefits of gaining traction in the energy services market can outweigh the risks, if the risks are properly managed. Paul Oswald of ESI states, "We saw it [shifting ESI's focus from a trade contractor to energy services] as a transformation in the business to try and move away from being a commodity….most people pick that kind of service based on your rates."

The less commoditized service landscape and the dynamic suite of energy services allow firms to easily differentiate themselves with their technological capabilities and project resumes. Furthermore, the energy services marketplace allows many opportunities to grow recurring service offerings. These can include on-the-ground facilities services or more technology-dependent offerings such as monitoring-based commissioning (MBCx).

Many energy services can be expanded across a client's portfolio of buildings (one service to many buildings). Similarly, an energy services provider can often expand energy services once a strong client relationship has been established (many services in each building). Additionally, certain energy services offerings allow the service provider to remain involved with the project and the client over the long term, putting the service provider in the "first responder" position. This allows a firm to gain a competitive advantage when new projects are being planned. Often, service providers can help shape new projects due to their intimate knowledge of the facility and systems. This proximity to the client allows providers to "mine" for opportunities.

Service providers can help shape new projects due to their intimate knowledge of the facility and systems. This proximity to the client allows providers to "mine" for opportunities.

Client relationships earned and maintained through successful energy services can be very important for regional firms that compete with the large national firms. Commenting on the importance of energy services to his customers, the owner of one HVAC service provider stated, "The threat is that the local service companies end up losing the relationship with the owner. Multinationals become a threat to that relationship. Energy services was a way that we could become valuable enough on a local basis to preserve that important link."

While the opportunities for contractors within the energy marketplace are growing, it's important to remember that this marketplace is both complex and dynamic. It often requires a different set of skills and a new approach. By taking a calculated approach to the market and factoring in key points, contractors will be well-positioned to take advantage of these opportunities. **Q**

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From Laggard to Leader: How the Construction Industry Can Catch Up With "Big Data"

MIKE DOW AND JEREMY BROWN

Now is the time to harness available data to make informed business decisions.

In this article, we will give specific examples of how the world around us is changing — i.e., how the construction as well as other industries are harnessing data to make more informed business decisions. The final article in this series will give readers more insight into how they should go about selecting the tools and technology to make these changes happen.

Executive Summary: This is part two of a three-part series about how the construction industry can embrace progressive data strategies to drive improvement to top and bottom lines. The most recent article by Mike Dow and Jeremy Brown focused on helping readers think about the organizational dynamics of becoming more data-driven — i.e., the structure and leadership needed to make change happen.

Data Sprint: Construction CAN Catch Up!

It's all around us. Doctors are looking at patterns of effective care; retailers are watching how customers move around their stores, looking for merchandizing clues; and taxis are unsure what to do about Uber's algorithm-driven pricing model. If the construction industry thinks the status quo will leave us alone, think again. At the very least, we need to hire up-and-coming next-generation employees — individuals who are already living 100% in a data-driven world. They expect nothing different.

Of course, there are other imperatives too, including:

Profitability. Pennies add up to real profits. Construction is still notoriously inefficient. Why, for example, do mom and pop retail stores have sophisticated real-time inventory processes and technology, and construction companies rarely have any? At a recent CFMA presentation, one of the authors presented to over a dozen construction companies that had little or no inventory management technology. Jewelry kiosks at malls have better inventory control than many construction companies, with yards and warehouses holding many times the inventory value of these basic kiosks. Mall kiosk owners know that controlling "shrinkage" helps protect profits. Why do they know this and many in construction do not? That type of data control is basic, to not even mention more sophisticated activities such as pricing algorithms and statistically validated inventory planning.

Time Constraints. No one has time to read long reports. And even if they do have time, they don't want to take that time, given the pace of projects in today's environment. And while information "noise" is overwhelming, there are key metrics that can change unprofitable or unsafe behavior, prevent operational problems and better serve customers. This combination of need and time constraint means that data must be delivered visually, in real time and in a format to allow for additional insights. "Dashboarding" is becoming the old term. Associative search and data visualization are the new and emerging terms. Microsoft, Qlikview, Tableau, Jasper and many others are evolving their products quickly in order to accommodate these shifts. Not surprisingly, most firms in the industry are slow to adopt these tools; clients often want help rewriting Crystal and Oracle reports. The challenge is, these are typically static reports that the younger generation will not read, especially if delivered weekly in PDF or paper "hard copy." Meanwhile, Uber drivers get immediate feedback on their performance, and mining companies are monitoring environmental data in real time to prevent accidents. A company called Blueforce Development has created a platform for service companies to view in real time a variety of sensors associated with crews of workers in sensitive, dangerous situations. Adoption of this technology by life-safety companies is strong but, sadly, it is less so in construction.

Planning/Predictions. Ultimately, we need to look ahead. What is coming in new markets? Where are employees coming from? What are the trends in our safety program? Data analytics are key to answering all these questions. An interesting article in The New York Times by Sendhil Mullainathan recently pointed to research showing that the exact same resume, one a with "stereotypical" minority name and one with a "stereotypical" white name, received statistically (and significantly worse) response rates by HR departments.[1] While this example can happen in any industry, not being cognizant of hiring biases is dangerous to your reputation and is not helping you win the war for best talent. Is your HR department using data to look at the flow of employee prospects? What actions might increase the inflow of better candidates? Who, indeed, are the best candidates? In one of the more people-intensive industries in the world, the need for sophisticated hiring data management should be obvious. The actions we take can improve

NOT THIS MATH (Average)

$$AM = \frac{1}{n}\sum_{i=1}^{n} a_i = \frac{1}{n}(a_1 + a_2 + \cdots + a_n)$$

THIS MATH (Regression)

$$y_i = \beta_1 x_{i1} + \cdots + \beta_p x_{ip} + \varepsilon_i = \mathbf{x}_i^{\mathsf{T}}\boldsymbol{\beta} + \varepsilon_i, \qquad i = 1, \ldots, n,$$

performance. We need to move beyond simplistic numbers and look for true cause and effect. Averages and trends of data sets tell us what happened yesterday; regression and correlation help us predict what is going to happen tomorrow.

For a number of years now, we have heard and read about some industry leaders buying and/or developing technology and, sometimes, technology companies — to serve theirs and other construction companies' needs. Sometimes those investments are for competitive advantage, some are to reduce internal cost, and others are for a combination of the two. Technology cycles are compressing so fast — and costs are coming down at such a pace — that other, smaller companies can make important investments too. Instead of investing millions in enterprise software, could perhaps the amount of investment similar to the cost of a backhoe be invested in data management software and/or a custom-developed mobile application that meets a specific internal need? Surely, these business decisions are not easy, and often the "real" equipment that construction firms need to invest in represents the urgent decisions, whereas investments in data intelligence may be important for long-term improvement to profits and mitigation of risk.

Changing the Discussion

The question used to be, "Can construction firms evolve towards data-driven investments?" Now the question is, "Who will the leaders and laggards be in this area?" Here are some things that you need to think critically about, and reference Exhibit 1 for how the industry's "get work, do work and keep score" functions will change the nature of managing a construction business:

What is your long-term data and IT strategy, and how do you spend your time and money? Do you invest in "one-off" ideas du jour in the name of being an "innovative" company? Or do those investments relate to one another as well as to your firm's strategy? Rather than just tell your staff that, "We are open to all ideas," do you also provide understanding as to the most critical business imperatives that you are trying to solve for (whether it's operational or project challenges, talent shortages, business development constraints, etc.)? Providing transparency into your most critical business challenges and allowing staff to be part of the solution tend to go miles.

Are your systems producing accurate data? Also, do your systems provide data and insights for today… or partially accurate data for last month? And lastly, do you put the reporting into the hands of your bright staff or rely on accounting or IT to create static reports?

Are you delivering visually appealing and easy-to-understand data? Our observation is that if field and project management staff cannot read and understand a report in 15 seconds or less, then it will have no impact on them. They will move on to the next order of business very quickly — it's just how we're wired.

EXHIBIT 1 "KEEP SCORE" USING ADVANCED DATA AND ANALYTICS

"GET WORK"	"BUILD BENCH"	"DO WORK"
Market Assessment	Workforce Monitoring	Safety Analysis
Project Information	Employee Predictive Analysis	Project Performance Analysis
Competitor Assessment	Salary Regression	Risk Monitoring
Customer Assessment		

Are you using any statistical methods, even simple ones, to interpret your data? Or are you relying simply on averages and linear trends? One simple example of this is that while many companies survey employee engagement and morale, they are unable to attribute the specific talent practices that have the highest correlation to higher-performing employees.

Per our most recent article, we want to ensure that we are doing everything possible to minimize intimidation surrounding this topic. Developing your data strategy is really just a more advanced "keep score" function with the purpose of making better decisions surrounding getting work, doing work and building your bench. The following graphic summarizes this theme and calls out a few of the key areas of invaluable data and information.

What Next?

We would like to leave you with some advice on framing your own data strategy. Given all of the "noise" about this subject, the more focused you are, the more successful you will be.

We've developed a "closed loop" data strategy model to help you think through your business life cycle and specifically identify the areas where you think you are the most susceptible (Exhibit 2). Additionally, we give a

EXHIBIT 2 DATA STRATEGY ELEMENTS CONNECTING THE DOTS

"CLOSED-LOOP" STRATEGY

EXHIBIT 3

DATA AND ANALYTICS AREAS

CONSTRUCTION AND NON-CONSTRUCTION EXAMPLES

AREA	MODERN TECHNIQUES (OTHER INDUSTRIES)	IDEAS FOR CONSTRUCTION
Market Pattern Assessment	• Search engine analytics • Social media campaigns	• Search engine optimization (SEO) – What industries are looking at our website? • How does construction spend in our markets and sectors historically interrelate with other markets and sectors?
Demand Planning	• Material re-supply algorithms	• Forecasting and negotiating with suppliers based on future aggregated material volumes.
Human Capital Planning	• LinkedIn talent solutions	• Personality, other company-specific metrics. • Employee engagement studies
Pricing	• Surge pricing (Uber) • Demand pricing (airlines)	• Harnessing external indicators for maximum pricing • Utilizing risk analysis to drive pricing strategy
Supply Chain Management	• Vendor managed inventory (VMI) • Real-time inventory visibility • Warehouse automation • Transportation route planning/optimization	• Real-time visibility to inventory, supply chains. • Monitoring and managing inventory "shrinkage" • Improving site logistics planning and communication
Operations Planning	• Robotics/automation	• Real-time equipment gap analysis. Actual and predictive utilization.
Customer Feedback	• Transaction-based feedback	• Multiple, constant stream of client/transaction feedback (rather than only end-of-job feedback)

few ideas about what other industries are doing in each respective business area as well as what leading construction firms are focusing on.

Other industries live by data, and the construction industry is ripe for change. The time has come. Construction can, and will, get there. In Exhibit 3, we outline some of the trends that are starting to become commonplace in the industry, and this is only the beginning. What insight will give your firm the biggest competitive advantage in the coming years? Q

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[1] "Racial Bias, Even When We Have Good Intentions," "New York Times," Jan 3, 2015, by Sendhil Mullainathan

U.S. Water Infrastructure Funding Needs: Who Picks Up the Tab?

GREG POWELL AND PAUL GIOVANNONI

Close the funding gap with improved spending across the board and direct access for private investment.

Consumers, utilities, politicians, investors and international onlookers are well aware of the declining condition of the U.S. water and wastewater infrastructure. Water scarcity conditions compound the issue through the need for increased efficiency and innovation in our water systems. Chronic underinvestment has created an unprecedented level of demand to repair, expand, renovate and replace these systems. With such demand for investment in a recovering economy, why are construction forecasts in the water sector so modest?

The primary answer remains funding uncertainty. The industry needs improved spending at the federal, state and municipal levels as well as more widespread and direct access for private investment to begin to close this funding gap. In this article, we look at key funding drivers and trends for water and wastewater projects and the economic, political and social factors affecting investment.

Utility Rates

The vast majority of water utility revenue, 80% or more on average, comes from water sales to consumers. In recent years, water expenses for the average

EXHIBIT 1

WATER UTILITY RATES
SELECT COUNTRY COMPARISON

COUNTRY	COMBINED RATE	WATER RATE	WASTEWATER RATE	% CHANGE
Mexico	$0.95	$0.82	$0.13	13.70
Turkey	$1.73	$1.25	$0.48	8.20
United States	$3.53	$1.46	$2.07	7.00
Russia	$1.01	$0.62	$0.39	6.90
Brazil	$2.43	$1.28	$1.16	6.70
Canada	$3.54	$2.05	$1.49	6.60
Italy	$1.90	$0.97	$0.93	4.40
Australia	$6.50	$3.32	$3.18	3.80
Japan	$2.12	$1.21	$0.92	3.30
South Korea	$0.95	$0.66	$0.29	3.10
Poland	$3.42	$1.55	$1.87	2.90
India	$0.14	$0.13	$0.02	2.90
United Kingdom	$4.91	$2.41	$2.51	2.70
China	$0.52	$0.38	$0.14	2.70
Spain	$2.58	$1.81	$0.77	1.50
France	$4.59	$2.39	$2.20	0.90
Portugal	$2.41	$1.77	$0.64	0.50
Germany	$6.02	$3.18	$2.84	-0.30
Denmark	$8.66	$3.94	$4.72	-1.40

Source: Global Water Intelligence – 2014 Country Survey

consumer rose faster than other major utility bills, including natural gas, electricity and phone service. This trend is hitting low-income consumers the hardest and is creating public pressure to stem the tide of rate increases. According to Circle of Blue, a water industry analytical group, consumer water costs for 30 major U.S. metropolitan areas rose 33% between 2010 and 2013.[1] Over the past year, U.S. water and wastewater rates rose 7%, among the highest annual rate increases compared to other developed countries (Exhibit 1). However, capital expenditures in infrastructure have not kept pace.

Rate increases continue in order to fund water system repairs and replacements as well as wastewater combined sanitary and sewer upgrades mandated by the EPA. The U.S. remains the largest water market in which the cost of wastewater services exceeds that of water services, a byproduct of these federally mandated upgrades. Despite sustained rate increases, demand overhang continues to grow. Water scarcity in many regions throughout the U.S. is complicating matters, as consumers are encouraged to reduce water consumption, which decreases utility revenue. The goal of many utilities is to increase rates in the face of decreased consumption such that there is little net effect on consumer budgets. While this tradeoff may appease the public, it will not finance the gap in spending. U.S. water and wastewater rate increases are likely to continue; however, utilities and municipalities will need to increase reliance on other funding sources to meet system upgrade demands.

Federal Infrastructure Investment

Despite the increased stress on water and wastewater systems, total federal infrastructure spending as a percent of GDP is at the lowest level in the past

20 years. The Obama administration has pushed for increased infrastructure investment, though budgetary battles in the lame duck administration have limited progress. According to research by McKinsey & Co., the U.S. government needs to increase infrastructure spending by roughly one percentage point of GDP ($150 to $180 billion annually), with increased focus on water and transportation systems, to catch up after years of underinvestment.[2] As illustrated in Exhibit 2, federal spending specifically on water and sewage/wastewater systems as a percent of GDP improved in 2014. Yet government spending trends remain well below prerecession levels.

In 2014, Congress passed the Water Resources and Reform Development Act (WRRDA). Embedded within this act is the Water Infrastructure Finance and Innovation Act (WIFIA), a five-year pilot program providing $350 million in low-interest credit subsidies for large-scale water infrastructure projects. WIFIA is modeled after the Transportation Infrastructure Finance and Innovation Act, which has supported over $60 billion in transportation project investment since 1998. The hope is that WIFIA is extended and expanded to become a similar catalyst for water infrastructure spending over the long term. Interestingly, WRRDA and WIFIA encourage private investment alongside government funding.

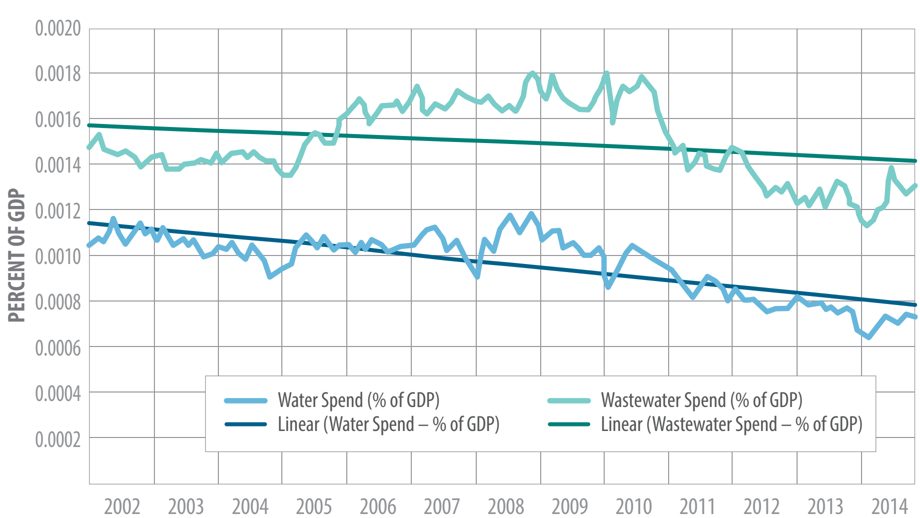
State and Municipal Funding Channels

State and local governments rely on several financial tools to fund infrastructure projects that utilities cannot fund through revenues alone.

EXHIBIT 2

GOVERNMENT WATER AND WASTEWATER SPENDING

AS A PERCENTAGE OF GDP



Source: Federal Reserve Bank of St. Louis – Economic Database

Tax-exempt municipal bonds are a mainstay in water project finance, for example, and are used by the vast majority of utilities. Bond issuance has now declined for four straight years. Municipalities are dealing with continued budget restraint during this uneven recovery as well as a taxpaying public that acknowledges the need for infrastructure spending but is increasingly unwilling to foot the bill. Many analysts expect limited new issuance growth over the next year or two, especially if interest rates begin to rise.

State revolving loan funds, which include The Drinking Water State Revolving Fund and Clean Water State Revolving Fund, are capitalized by federal and state contributions. These funds are critical conduits for investment in water and wastewater infrastructure, but are facing dramatic reductions in funding. The 2015 federal budget reduces allocations to these funds by as much as half a billion dollars. State legislators are working to reinstate some of this funding shortfall, but face an uphill battle.

Tax-exempt Private Activity Bonds (PAB) are another financing source for water and wastewater infrastructure projects, but are underutilized due to structural constraints. These bonds compete with other state programs for room under a funding cap and will not evolve into a more potent financing source for water projects until these cap restrictions are lifted.

Public-Private Partnerships

In many countries, public-private partnerships (P3) serve as an increasingly important solution to bridging the funding gap in water infrastructure needs. Major foreign markets, including several countries throughout the European Union, East Asia and Australia, regularly rely upon private investment in infrastructure to support water infrastructure development needs. The U.S. is behind the curve in exploiting this mechanism for various economic, political and emotional reasons. In the current economic environment, municipalities covet the stability and predictable returns provided by water utilities and hesitate to give that up. In addition, municipalities and consumers often remain skeptical about handing over control of utilities to private companies, especially foreign-based firms.

In many countries, public-private partnerships (P3) serve as an increasingly important solution to bridging the funding gap in water infrastructure needs.

Both private and public forces are working to overcome these obstacles to facilitate more widespread adoption of private investment, though legal barriers remain. While several states, including Florida, Texas, California, Indiana and Virginia, are developing P3 programs insufficient support across all states impedes private inclusion in government projects. Currently, 14 states[3] lack the legislation necessary to foster P3 investment in water infrastructure projects.

EXHIBIT 3

P3 IN WATER INFRASTRUCTURE

KEY CONSIDERATIONS

POTENTIAL BENEFITS	CHALLENGES
• Improved quality and volume of projects	• Municipalities hesitant to yield income stream
• More disciplined – completed to plan and on budget	• Difference in private vs. municipal debt costs
• Performance risk transferred to private sector	• Concerns over private utility control
• Encourages innovation in technology and efficiency	• Insufficient and inconsistent legislation across all 50 states
• Emphasis on life cycle cost of project vs. upfront cost	• Lack of momentum and familiarity with mechanism

As the water industry experiences declines in government spending and municipal bond issuance, it awaits signs of growing support from the government on P3 investment. While WRRDA and WIFIA support private investment, they are limited in scope. Perhaps more promising, the Obama administration recently proposed a new class of municipal bonds called Qualified Public Infrastructure Bonds. If enacted, these bonds would extend the tax benefits of municipal bonds to private investment, thereby leveling borrowing costs with municipalities, which has been a key barrier to P3 growth.

Recent wins by the Republican Party may lead to further fiscal discipline and limit growth in federal infrastructure spending. However, the change in power may also foster stronger interest in private participation in the sector. Many industry stakeholders hope the Republican leadership will be more aggressive in legislative support for private investment due to the compelling value proposition: repair water and wastewater systems, not saddle wary taxpayers with the bill, and generate the most important political currency — jobs.

Outlook

Trends in traditional federal, state and municipal funding programs for water and wastewater infrastructure are not overly optimistic for the near term. However, there are signs of improvement as politicians are increasingly vocal about the benefits of alternative investment sources to supplement traditional funding. While private investment is not a panacea, the government needs to continue working with the water industry to carve a clear and sustainable path for such outside participation. Further, if the economic recovery strengthens, then budgets throughout the water ecosystem will be able to support more capital projects. Yet history has shown that underinvestment persists even during economic expansion. The hope is that increased political emphasis, coupled with private participation and economic improvement, will create a formula for bridging the water infrastructure spending gap. **Q**

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[1] Circle of Blue: "The Price of Water" 2014 (May 2014).

[2] Source: Standard & Poor's Economic Research: "U.S. Infrastructure Investment" (May 2014)

[3] States include Idaho, Montana, Wyoming, New Mexico, South Dakota, Nebraska, Kansas, Oklahoma, Iowa, Kentucky, New York, Vermont, Hawaii and Rhode Island. Source: "Global Water Intelligence."

RICK TISON, DAVID MADISON AND TYLER PARÉ

Create a fact-based filter for project selection and a data-driven mark-up policy that maximizes profitability.

Construction is a competitive business. Especially in hard-bid markets, contractors compete fiercely for every project. The price the market will bear is sometimes determined by a few hundredths of a percent.

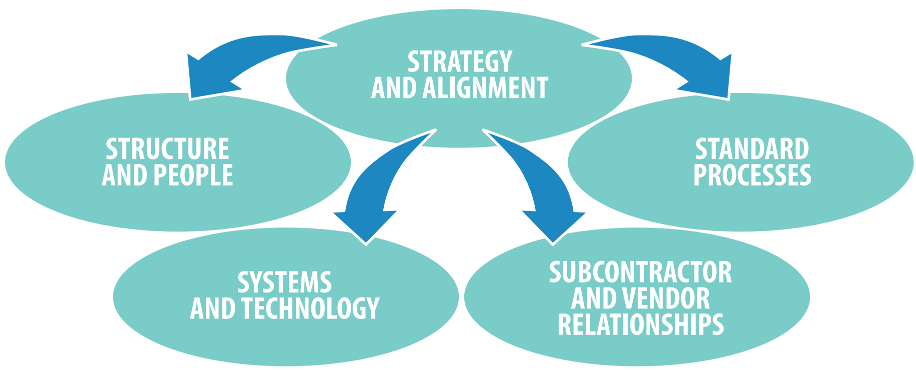
Competition in the construction industry, however, should not be about winning projects; it's about making a profit. In the construction industry, that profitable competition begins in estimating and pricing work.

The role of an estimator is not simply to bid work, prepare quantity takeoffs or manage subcontractor outreach and communication. No, the role of an estimator is to help his or her firm acquire profitable work.[1] FMI's 5-S Estimating Model (Exhibit 1) highlights the key elements of a best-in-class estimating department, which are:

- **Strategy and Alignment:** How well does our project selection process align with the overall corporate strategy?
- **Structure and People:** Does our estimating team function as a team with the right mix of business acumen, negotiating and selling skills, and technical knowledge?

EXHIBIT 1

5-S MODEL OF A BEST-OF-BREED ESTIMATING FUNCTION



- **Standard Processes:** Does our estimating team have standard processes that maximize time spent on high-value activities?
- **Systems and Technology:** Does our estimating team effectively and consistently use available technology?
- **Subcontractor and Vendor Relationships:** Have we developed strong subcontractor and vendor relationships that we can leverage to create an advantage during project pursuits?

Running through this model is a significant amount of data that, when analyzed properly, greatly enhances an estimating department's ability to acquire profitable work for the firm. The focus of this article will address answers to two key questions:

- Should we bid this job?
- How much profit should we build into our bid?

Answering these questions results from analyzing two primary sources of data:

- Past project performance to inform project selection criteria
- Bid data to inform the correct mark-up policy, given a set of bid criteria

This article is the **fourth in a series** on data-driven decision-making in construction. The first article laid out the rationale for data-driven decision-making in the construction industry, while the past two discussed data-driven operations and business development, respectively. This article addresses the role of data in estimating and pricing decisions. The final article in the series is a capstone article that will pull together all of the pieces to present a case study on running a data-driven construction firm.

Data-Driven Decisions in Project Selection

Data-driven firms look to past performance to understand what an "ideal" project looks like. While no two projects are alike, analysis of past project performance, as outlined in the seminal article in this series, uncovers performance trends around where a firm performs well and where it struggles.[2]

> While the go/no-go process is not necessarily an absolute ruler on pursuits, it is an effective screen to know whether to pursue the job, and if so, with how much effort.

Data-driven firms have robust and structured go/no-go processes that align the estimating team with the strategic direction of the business and mitigate risk exposures to projects outside the firm's "wheelhouse." The first step is crunching the numbers to define what projects fit. This analysis creates the first filter to use when screening new projects. While the go/no-go process is not necessarily an absolute ruler on pursuits, it is an effective screen to know whether to pursue the job, and if so, with how much effort. Many firms may still decide to "go" on a job they are not excited about but not make a significant investment of effort. They price the work high and essentially throw their hat in the ring while guarding against estimating busts.

Without an effective, data-driven go/no-go process, your results may look more like the company in Exhibit 2. By analyzing cumulative gross profit over the past few years — sorting jobs from most to least profitable — you can see that this company achieved 90% of its gross profit with only 15% of its projects. The next 75% of projects contributed only an additional 30% of gross profit, of which the final 10% of projects gave back 20% of gross profit. Can you imagine the impact better project selection and execution would have on this business?

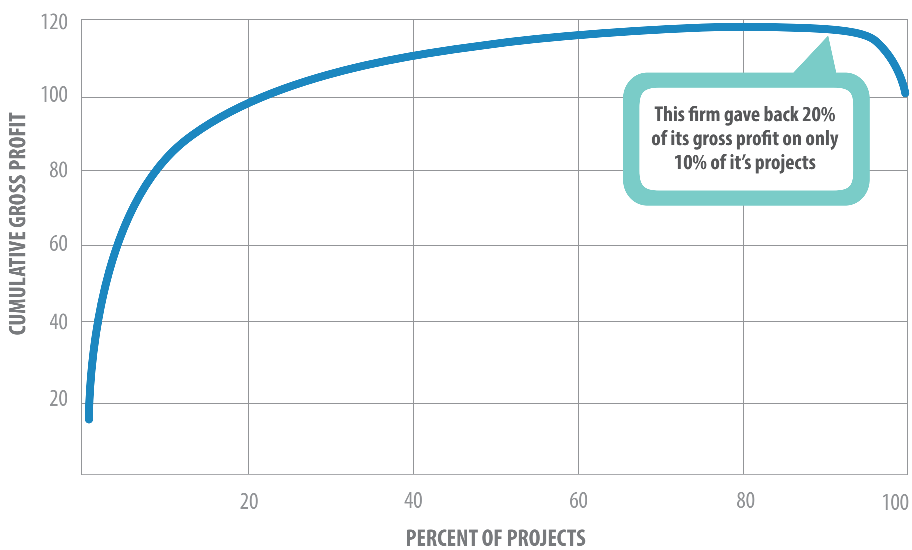
EXAMPLES OF PROJECT CRITERIA TO CONSIDER:

- Types of clients
- Project type and size
- Duration
- Geography — distance from an office

To be fair, no company can operate without a few underperforming jobs — there are too many variables at play to achieve that level of perfection. That said, there is no reason not to try to eliminate underperformers. While estimating is only one aspect of project performance, it is the front line in the fight against underperforming projects.

EXHIBIT 2

CUMULATIVE GROSS PROFIT
AS A PERCENT OF TOTAL



Data-Driven Decisions in Optimizing Mark-up Policy

Project selection is the first filter. It answers the question, "Should we pursue this job?" If so, the next question is how much profit should we build into our bid to maximize profitability? Not all jobs are created equally when it comes to potential profitability. Just about every business has a "sweet spot" when it comes to targeting projects. Part of the answer for this question comes from the analysis outlined in the last article of this series.[3]

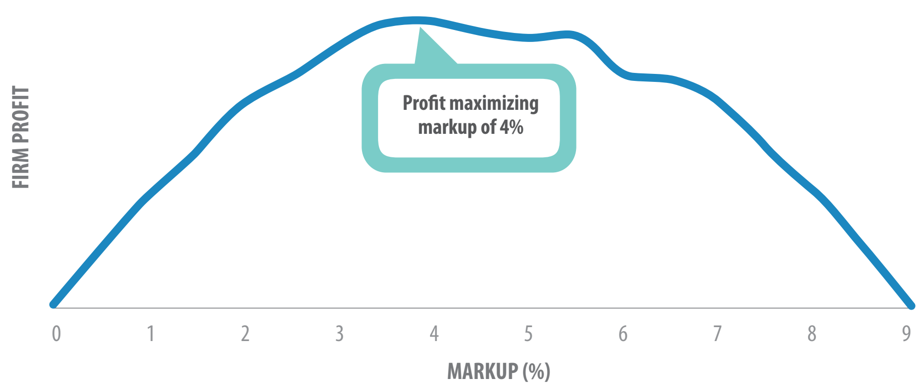
- What does an "ideal" project look like for us?
- How do we target clients who create those project opportunities?

The rest of the answer comes from bid data analysis, which highlights where a firm should be aggressive, where it should be conservative, and where it might be leaving money on the table. To analyze past bid data, a firm needs to collect and analyze the following data:

- Your total contract costs for each project that you bid
- The lowest bid for each of those projects

Let's start with the analysis required to understand what the overall mark-up policy should be. To answer this question, you need to quantify how different mark-up percentages would have changed the result of each project that you

EXHIBIT 3 FIRM PROFIT UNDER DIFFERENT MARK-UP POLICIES



bid. For example, if you won 100 projects with a 4% markup, how many more would you have won at 3% given your cost for each project and the lowest bid? Next, compare how profitable that decision would have been to the baseline of profitability at a 4% markup. When you aggregate the results of the analysis, they yield a graph similar to Exhibit 3, which reveals a profit-maximizing markup of roughly 4% for this sample company. The company ends up winning fewer projects but makes more money as a result.

Much like the earlier analysis of project selection, this analysis adds much greater value when determining the right mark-up policy based on bid criteria. These criteria create categories of projects for which there is a unique and optimal markup to maximize profitability within that category. Depending on the project specifics, different markups result. For example, you may find that you only want to win a project with 10 or more bidders if you have the lowest number after a significant markup of 8%. Alternatively, you might find that you consistently underbid the competition by a large margin on small projects.

In practice, using the three example bid criteria to conduct analysis may result in three separate mark-up percentages for an upcoming project. Making the final call will come down to old-fashioned, managerial decision-making based on these analyses.

Sound project selection and pricing approaches are essential first steps toward superior performance.

Data-Driven Pricing

Applying the two analyses above to your organization creates a fact-based filter for project selection and a data-driven mark-up policy that maximizes profitability for the firm in project pursuits. Obviously, a firm must also understand its true costs and execute in the field to ensure successful project outcomes. Nonetheless, sound project selection and pricing approaches are essential first steps toward superior performance. **Q**

EXAMPLES OF BID CRITERIA TO CONSIDER INCLUDE:

- Project type
- Project size
- Number of bidders

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[1] Clancy, Mike. *Estimating for Advantage: It's a Hard, Hard, Hard (Bid) World.* FMI Quarterly. July 2010.

[2] Tyler Pare, David Madison, Rick Tison. "Deconstructing Data." FMI Quarterly, 2014 Issue 3.

[3] David Madison, Tyler Pare, Rick Tison. "Data Driven Business Development." FMI Quarterly, 2015 Issue 1.

Contractors should check and recheck their *projections* because costs — from labor to retention requirements — differ widely *by location.*

KAREN KENIFF

Moving Into New Markets

Pursuing growth in a new market? Be mindful of the increased risks to protect your reputation and profits. From all predictions, 2015 looks to be an opportune time for contractors to take advantage of an improving economy to expand their businesses. The "Dodge Construction Outlook,"[1] for instance, estimates that commercial building will increase 15%, led by the technology, hospitality and financial sectors. Institutional building is expected to grow by 9%, supported by an increase in K-12 school construction and health care facility building.

For many contractors, seizing these opportunities may mean broadening their geographic focus and even project scope. However, the enthusiasm for more projects and profits needs to be carefully balanced with the reality of increased risks when moving into a new state, region or country.

"Oversights in personnel hiring, worker safety, management training, compliance and financial contracts can quickly turn a potentially profitable scenario into a bottom-line loss," said Angela Skow of the Zurich Insurance Construction Group.

Swinerton Builders' expansion model is typically based on following existing clients into new markets, said Senior Vice President-Chief Administrative Officer John Capener. But this doesn't preclude the firm from performing sophisticated and robust due diligence and risk assessment when working in a new geography. "We're an employee-owned company, with no outside shareholders. So we're especially careful of putting our employees' financial well-being at risk," Capener said.

Bechtel has been entering foreign markets since the 1940s, and today, a significant portion of its projects is overseas, said Mark Falloon, corporate manager — risk financing.

"Our reputation in the industry is based on the surety of outcome for our clients," he said. "We do not want to put our reputation at risk, so Bechtel has rigorous processes in place to ensure we are working with the right subcontractors and other partners — especially ones with the same moral and ethical approach so there are no surprises."

The downside of the improving U.S. economy is that there is a workforce shortage in most markets around the country.

If your organization is looking to move into a new market in 2015 or beyond, here are some of the key risk strategies to consider before breaking ground:

Plan for Labor Challenges

The downside of the improving U.S. economy is that there is a workforce shortage in most markets around the country.

"A successful expansion is predicated on finding qualified people in the area as well as equipping current employees to take on new roles to manage the teams," Capener said. "Finding experienced people is a lot tougher than it was five years ago. And taking on less experienced workers requires more training — both for quality and safety."

Screening hundreds of candidates to fill 50 positions is not unusual in high-demand markets. And if a contractor can't find the labor in that market, transporting existing employees or contract workers in from another area can get costly.

"We often relocate an employee to take on an expanded role in the market, like an engineer becoming a team leader," Capener said. "This requires additional employee training and setting clear performance expectations to ensure the job gets done right."

Further, labor laws and physical working conditions differ widely by state, Skow said. New York, for instance, has one of the most stringent labor laws in the country. There, the burden of proof lies with the contractor if a worker injury or death occurs. In North Dakota, contractors might need to be prepared for working in the extreme cold, while in Alaska, they might have to be prepared for bears infiltrating their construction sites.

"The details surrounding your labor force can be numerous — everything from varying laws to pure environmental factors themselves," Skow said. "Consulting with others familiar with target areas for expansion can help mitigate the risk."

Explore a Joint Venture

A successful joint venture with a local contractor can ease the expansion into a different geographic area. A reputable partner in the new market can deliver the relationships with local governments and the labor pool to both secure a new project and execute it on time and on budget.

"Even though Bechtel has a large global footprint, we still look to joint ventures to provide support in regard to sourcing labor and having deep knowledge of the local jurisdiction," Fallon said.

Swinerton's Capener said joint ventures in a new country often require a different set of working agreements depending on the partner's operating principles and relationship with the local government. "It's critical to assess if a potential partner has a similar culture in regard to quality, safety, treatment of workers and risk management philosophy," he said.

Other considerations before entering into a joint venture include:

A reputable partner in the new market can deliver the relationships with local governments and the labor pool to both secure a new project and execute it on time and on budget.

- Is there a willing exchange of business plans and financial data?
- Who will be the project lead?
- Who is responsible for the daily execution of the job?
- Who is going to manage the project risk—including the financial aspects?
- How will the workers be trained?
- Do you agree on the right safety programs to put in place?
- How will worker losses be managed through return to work or other programs?

Perform Rigorous Due Diligence

Breaking into a new market or taking on a different scope of work requires a deeper dive into the risks and rewards of the project in question. Skow suggested contractors always ask themselves if they have the people and management skills for the project, and whether their bottom lines can support the potential for any loss.

Capener said Swinerton's due diligence is focused on determining if there is enough capital to cover any and all unforeseen costs, and if the appropriate skills are in place to manage the execution.

But situations exist, said Bechtel's Falloon, where you can't always totally manage the risk — especially in locations prone to severe weather like the Gulf Coast of the United States or the Pacific Rim's earthquake zones. "This is when we work with our insurance broker to make sure there is adequate coverage for a potential catastrophic incident caused by nature," Falloon said.

To determine the financials involved in project execution, Skow said contractors should check and recheck their projections because costs — from labor to retention requirements — differ widely by location. Many contractors bring in outside consultants or use sophisticated modeling tools to help identify risks in new markets.

> Breaking into a new market or taking on a different scope of work requires a deeper dive into the risks and rewards of the project in question.

"You can't always get to every risk detail by working in a vacuum," Skow said. "It's wise to tap into the local expertise — whether it's legal, tax or even the knowledge of the local subcontractors. You can also ask your broker or insurance carrier to help assess the market risk."

Swinerton has taken advantage of Zurich's Total Risk Profiling (TRP) tool to perform rigorous due diligence when moving into a new country. "This tool helps us evaluate everything from the currency conversion to environmental issues and the political environment," Capener said. "The tool also helps the company manage its foreign insurance coverages, which can be another completely new territory for most companies."

Capener said the tool's Risk Room feature provides a dashboard that Swinerton uses in senior executive meetings to objectively determine the project risk and set profit expectations. Some of the factors analyzed during the meeting include regional stability, country rules, taxation, investment level and level of profit penalization when taken out of the country.

"It's a very visual tool that really helps us to understand how much capital we can invest and what we can get expect to get back out," Capener said.

Falloon said Bechtel's highly structured due diligence process gives new clients confidence that the company has done its homework and has planned for everything possible to deliver at the highest level of quality and safety.

"Preplanning well done leads to a project well done," he said. "It can be that simple." **Q**

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[1] http://construction.com/about-us/press/construction-industry-to-see-more-balanced-growth-in-2015-according-to-DDG.asp

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