

# Keep Score to Reduce Risk



By Ken Roper and Tyler Pare

**H**ow to improve risk management by creating a corporate culture that's focused on knowledge sharing, collaboration and learning.

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In today's construction industry, the pace of change and the speed of information flow are transforming the business landscape, escalating risk and intensifying vulnerability at all organizational levels. Technology is accelerating this trend, but technology isn't knowledge. It is, however, an effective tool for capturing, storing, retrieving and manipulating data from which knowledge can be gleaned. Over time, the knowledge accumulated by a group of people within an organization becomes the intellectual capital of that organization—a key asset in today's competitive engineering and construction markets.

Many construction firms struggle with leveraging the intellectual capital of their employees for many reasons, including the widely varied roles of individuals within construction firms; the project-based structure of the organization; the fact that individuals can work for extended periods without seeing their peers; and the inherent fragmentation of the highly decentralized construction industry. These factors all hinder knowledge sharing and result in sub-optimizing of the firm's intellectual capital. They also lead to continual reinvention of the wheel and repeated mistakes.

To offset these challenges, successful companies are implementing tools and processes that help them learn from their successes and mistakes while answering the questions, "What do we want to repeat successfully? What do we want to avoid in the future?" By analyzing past mistakes and successes, companies can lower their risk profiles. Based on research that spans several decades, FMI has found that the following two practices can have a critical impact on a company's bottom line and risk profile:

- Completed Contract Analysis (CCA)
- Post-Project Review (PPR)

"If you do something incorrectly, it is a learning moment. If you do something incorrectly more than once, it is a mistake."

— President of a large general design-build construction company

This paper discusses these two practical approaches to controlling risk and provides recommendations on how to get started with an effective culture for managing risk.

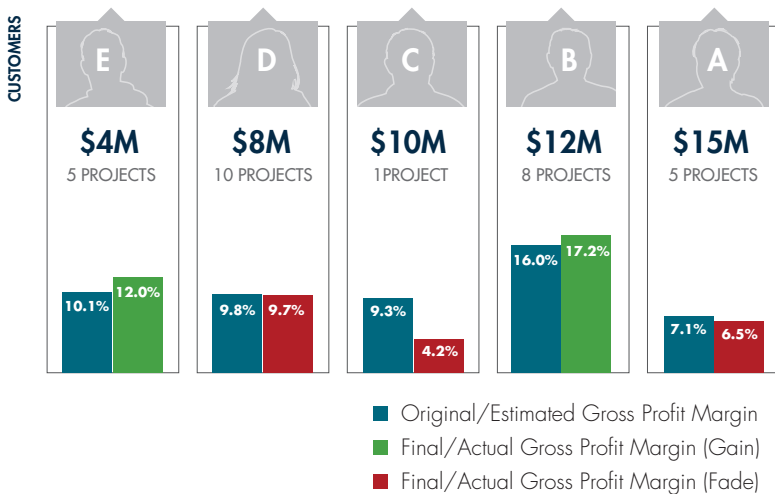
### Understanding Your Margins

Based on FMI’s experience, best-in-class contractors are truly students of their businesses and fanatical about understanding margins (defined as revenue minus direct costs of construction). In an industry where any slight schedule slip or claim can significantly impact gross margins, comprehending historical project performance in the context of gross margin and direct costs is critical. Analyzing completed projects or contracts helps project teams improve and refine their future work acquisition strategy and project efforts, as well as identify areas for operational improvements. The Completed Contract Analysis can be divided into two key areas: gross margin and direct cost.

### Margin Analysis

Margin gain and margin fade are fundamental metrics for analyzing gross margin. Gross margin gain is an increase from original estimated gross margin to final actual gross margin, while gross margin fade represents a decrease. Every job has some degree of gain or fade. The key is to focus on the frequency and severity of those fluctuations. If gross margin fade occurs more frequently and more severely than gross margin gain, for example, direct cost estimates may be too aggressive. However, if the large gross margin gains are frequent, then direct cost estimates may be too conservative. Essentially, true gross margin is buried in direct costs as “fluff.” The term “sandbagging” is frequently heard in these instances. These broad-stroke estimating dispersions are cast in the context of the current operational performance of the business. The effectiveness of a given contractor’s operations is also a driver of margin gain and fade (see Exhibit 1 for example).

**EXHIBIT 1** | **MARGIN ANALYSIS BY TOP FIVE CUSTOMERS**



Source: FMI Data Analytics

Beyond an aggregate view of gross margin gain and fade, project teams can gain important insights by analyzing historical data based on project characteristics (e.g., project revenue size, type of work, customer and geography). These different gross margin performance assessments will ultimately help contractors understand what types of projects are in their “sweet spot” in terms of their ability to accurately estimate and effectively perform. Slicing the data characteristics also helps firms gain an objective view of which projects have (and haven’t) been high-risk in the past and use that information to make future decisions.

**Direct Cost Analysis**

Gross margin fade is primarily driven by the additional change order work priced at margins below the original contract margin or direct cost overruns. The latter is the most common driver of gross margin fade and has the potential to create substantial project losses. Therefore, it is important to understand your direct cost variability. More insightful than total direct cost overruns/underruns is the ability to analyze each type of direct cost by exploring a direct cost profile. Labor is the most variable direct cost and highest risk to manage, followed by equipment (depending on how labor-intensive and equipment-intensive the work program is). Understanding the magnitude of and reason for direct cost overruns/underruns is extremely powerful for firms looking to improve performance and reduce risk.

Similar to gross margin analysis, gaining value from reviewing direct cost variability by project characteristics is a simple task. For example, if you knew that large, out-of-town work experienced significant labor overruns (disproportionate to the remainder of the work program), you would adjust your risk profile by making more conservative estimating assumptions for this type of work going forward (Exhibit 2).

**EXHIBIT 2 | DIRECT COST OVERRUN/UNDERRUN**

	<b>Revised Estimate</b>	<b>Final Actual</b>	<b>\$ Variance</b>	<b>% Variance</b>
Labor	\$43,545,672	\$51,033,245	\$7,487,573	17.19%
Materials	\$17,456,903	\$15,010,301	(\$2,446,602)	-14.02%
Subcontracts	\$51,200,954	\$50,095,674	(\$1,105,280)	-2.16%
Equipment	\$26,734,621	\$29,457,322	\$2,722,701	10.18%
Other	\$2,878,902	\$1,275,431	(\$1,603,471)	-55.70%
<b>Total Direct Costs</b>	<b>\$141,817,052</b>	<b>\$146,871,973</b>	<b>\$5,054,921</b>	<b>3.56%</b>
<b>Labor Hours</b>	<b>503,421</b>	<b>555,178</b>	<b>51,757</b>	<b>10.28%</b>

Source: FMI Data Analytics

**The Hidden Dangers in Data Analytics**

Construction teams or executives should not make hasty decisions based solely on the completed contract analysis. Oftentimes, other factors such as unexpected market dynamics or owner demands play into this whole equation too and need to be considered in the broader business context.

If the results of your completed contract analysis are inconsistent with your recollection of project performance, you may be a victim of bad data. Update change orders regularly and recognize the savings or overruns rigorously. Without this practice, much of the analyzed data could be worthless. Remember that success in construction is as much about which projects you say no to (proper risk assessment on the front end), as it is about which projects you pursue.

## Learning from Risks: The Importance of Post-Project Reviews

Don't neglect the all-important post-project review (PPR). The effective use of PPR serves as one of the most reliable strategies for reducing project risk failure and gaining the most value from the project management function. Risk management improves significantly through learning from past project performance and capitalizing on learning opportunities.

FMI has found that PPR plays an integral role in helping project teams capitalize on the "intellectual equity" gained from each project. By drawing on important lessons learned, construction firms can establish best practices going forward and avoid past mistakes. This is even more essential as young, inexperienced workers enter the workforce and older generations with decades of industry experience and knowledge retire.

For example, at completion, the job cost report includes the financial details of all project aspects: the initial estimate, change orders (approved and unapproved), actual job costs and comparisons of estimated costs compared to final actual costs incurred. From this data, firms can assess actual production rates as compared to estimated production rates and feed them back to estimating for updating the estimating database. Understanding actual crew performance provides opportunities for both developing best practices and improving areas where performance was substandard, while material and other direct cost variances give insights into actual performance capabilities.

Here are five key benefits that an effective PPR provides:

1. Consistently developed and applied project measurement standards
2. Improved (and better structured) communication from upper management through foreman
3. Evaluation of individual performances on each project (this provides valuable opportunities for feedback and improvement)
4. Project members who are focused on safety, change order management and productivity
5. "Closure" on each project and a vehicle for continuous quality and profit improvement

## Making the Commitment

Based on FMI's experience, the majority of today's construction firms lack effective processes for analyzing their project performance and risk profile. This happens for several different reasons, including:

- The pressures of time and workload
- Lack of established assessment criteria or procedures
- Inability to recall project information
- Fear of blame over project failures or issues
- No relevant data collection and analysis expertise
- No leadership support
- Lack of incentives or assessments

To overcome these obstacles, construction firms can start with these four steps to developing a culture of knowledge sharing, collaboration and learning:

1. **Build a Culture of Trust.** Trust is a key component of a successful knowledge sharing culture. Effective knowledge management initiatives can help break down cultural barriers and change how individuals share information across the organization. However, most people will not risk sharing knowledge without an established level of trust between employee and employer. For this reason, employers must work to develop trusting relationships with employees.

2. **Provide a Process and Structure.** Develop a knowledge management system that aligns with your organizational structures and processes and that encourages collaborative knowledge sharing across groups of employees. This collaborative approach can empower employees by allowing them to define knowledge in their specific areas of expertise and ultimately to share that knowledge. The two processes described in this article convert data into meaningful knowledge for project teams. Reams of data are not information.
3. **Motivate and Reward.** Companies that reward their employees for knowledge sharing recognize the value and importance of such activities. By instituting rewards and incentives for knowledge sharing, companies also prove their commitment to helping employees reach their potential. Consequently, such reward programs can also help increase employee engagement and retention, while also fostering a knowledge sharing culture.
4. **Accept Mistakes as a Way to Learn.** Successful companies have an open culture around mistakes and “learning moments,” which can help them gain deep insights into those learning moments and prevent repeated mistakes over time. This requires leaders who encourage their employees to test and try new things in a safe setting without putting projects or people at risk.

While the challenges to successfully implementing a knowledge sharing culture are significant, the potential benefits to construction firms are significant. Effective tools and processes such as the Completed Contract Analysis and the Post-Project Review can leverage a construction firm’s organizational knowledge to drive consistent, high-level performance and profitability, and a long-term strategic advantage.



**Ken Roper** is a principal with FMI. Ken has been implementing profitable growth strategies with construction companies across the country for the past 30 years. He may be reached via email at [kroper@fminet.com](mailto:kroper@fminet.com).



**Tyler Pare** is a senior consultant with FMI. Tyler leverages his construction experience, coupled with his advanced knowledge of business mechanics, to help clients manage risk and optimize profitability. He may be reached via email at [tpare@fminet.com](mailto:tpare@fminet.com).



# About FMI

For over 60 years, FMI has been the leading **management consulting and investment banking**<sup>†</sup> firm dedicated exclusively to **engineering and construction, infrastructure and the built environment**.

FMI serves all sectors of the industry as a trusted advisor. More than six decades of context, connections, and insights lead to transformational outcomes for our clients and the industry.

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### Denver

210 University Boulevard  
Suite 800  
Denver, CO 80206  
303.377.4740

### Houston

9303 New Trails Drive  
Suite 350  
The Woodlands, TX 77381  
713.936.5400

### Phoenix

7639 East Pinnacle Peak Road  
Suite 100  
Scottsdale, AZ 85255  
602.381.8108

### Raleigh (headquarters)

5171 Glenwood Avenue  
Suite 200  
Raleigh, NC 27612  
919.787.8400

### Tampa

308 South Boulevard  
Tampa, FL 33606  
813.636.1364



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