



Creating a Sense of Urgency

Part One: Uncertainty Management in Construction Projects

Construction projects can be complex and unpredictable, making it difficult to understand the full risk profile. Project surprises usually result from a failure to identify uncertainties, despite substantial evidence that they exist. Identifying these uncertainties throughout the project lifecycle helps to increase the probability of a successful outcome. Here, Moj Kesheh, a construction delay and risk expert at FTI Consulting in London, considers why uncertainty management needs to move up the priority list of project stakeholders and how to better manage these risks.

The Challenge of Understanding Uncertainty

“Everything is fine today, that is our illusion.”

- Voltaire

There are several sources of uncertainty in a construction project that can cause changes to scope, schedule and cost. Despite best efforts to prepare, the dynamic nature of a project can lead to significant changes to an initial plan, immediately throwing it off balance. This, coupled with a failure to fully understand uncertainties, can lead to costly project surprises.

Based on a study published by McKinsey, 98% of megaprojects face cost overruns or delays.¹ High-profile examples of cost overrun include the Scottish Parliament Building, Sydney Opera House, Concord and the Bank of Norway headquarters, which had cost overrun of +1,600%, +1,400%, +1,100%, and +400% respectively

against their initial estimate.² These projects often follow “The Iron Law of Megaprojects: Over budget, over time, over and over again”; 9 out of 10 megaprojects have cost overruns mainly due to “weak front-end planning and poor downstream management”.³

Potential sources of project-specific risks are technical, project management, commercial and organisational, which can all be part of a project hierarchical risk breakdown structure (“RBS”). Clearly, we cannot identify all uncertainties, even after the project is completed. However, this should not be an excuse for ignoring any processes to identify and quantify uncertainty. We get better at it with practice, although we will not achieve perfection. Most of the time, we know something about future uncertainties, but not enough. As Daniel Kahneman, Nobel laureate and Psychology Professor in Economics said, “we can be blind to the obvious, and we are also blind to our blindness.”⁴

A static view of a dynamic universe is momentarily useful. Like the uncertainty principle in quantum mechanics,

the act of observing reality changes reality. Most project managers will find this notion challenging because they are comfortable working on repetitive projects and providing standard status reports based on deterministic projections of the future. They may, or may not, acknowledge the inadequacy of this perspective, but it is still more comfortable than the idea that we are subject to the whims of uncertain fate. Each project has its own unique characteristics, which makes it uniquely interesting.

Navigating Threats and Opportunities

Risk and uncertainty management is a process for managing asset and project risks properly, efficiently and effectively to maximise the achievement of objectives. It predicts the time, cost and likely success in completing the desired scope within the given budgets. Most importantly, it's a guide for making everyday decisions. For example, should we abandon this project if it has a limited likelihood of success? What needs to be done quickly and what can safely be left for later? This allows us to quickly and cheaply determine if projects are as risky as they initially appeared. To certain eyes, risk is considered as an opportunity rather than a threat, if properly managed. Therefore, even if we conclude that we must abandon many projects at an early stage, the few that we finish will more than pay for the many we did not.

When risk events occur, they bring both threats (downside risk) and opportunities (upside risk). The meteor explosion over Chelyabinsk, Russia on February 15, 2013, broke nearly every window in the city causing many people to suffer injuries from the broken glass. Consequently, progress in every project was stopped. The meteor was not on the risk register of ANY of the projects. Shortly after that incident, many residents of Chelyabinsk began searching for fragments of the meteor because they could be sold for a high value. What happened over Chelyabinsk was a little reminder that uncertainty is the only certainty. When a risk impacts a project, a good project manager will start looking for the new opportunities.

In my view, 'safe' projects fail to produce enough return to justify the investment. This is because somebody else will accept greater risk and produce something that makes our safe products obsolete or too expensive to be competitive.

It is important to understand that having managed failed projects does not make the project manager a failure. Only wasting time and money on projects that fail late makes a project manager a failure. Failing projects

quickly and cheaply makes a project manager a hero and a wise leader. We should maximise our ability to resolve uncertainties in ways that will minimise threats and maximise opportunities.

The Illusion of the Work Done and Remaining Works



“The only certainty is that nothing is certain.”

- Pliny the Elder, Roman scholar, 23-79 CE

Imagine that we are involved with a brickwork project and want to measure the physical percent complete of the work done. If we know how much it costs and how long it took to do half the work, we are tempted to say we know how much it will cost and how long it will take to do the second half. Sadly, it simply is not true. Construction databases are full of average times and costs. What we do not see is exceptional times. Every project is unique even if we've done the same project many times. Different time, different people, different customer – there is no typical project. This is the “Flaw of Averages” created by Sam L. Savage, which states that plans based on average assumptions are wrong, on average.⁵

Sometimes we are lucky and complete earlier for less money than the average project. At other times, we are less fortunate, and we take longer and have higher costs. Sometimes, disaster strikes and we never complete.

The physical percent complete of work done can sometimes be measured and other times it must be estimated. If you have 62 sites and eight of them are completed, you can then calculate the progress percent complete. If it is reported that six additional sites are 50% complete, this is an estimate, and it is worth no more or less than the credibility of the person who has reported the 50%. In some projects, 90% of the work requires 90% of the time and budget, and the other 10% of the work requires the other 90% of the time and budget. Estimated percent complete should be used with caution. If a brick wall will have 10,000 bricks when complete and it now has 5,000 bricks in place, we may assume that the wall is 50% complete. However, if the remaining 5,000 bricks must be placed at a higher height, the remaining works may take longer and cost more than the first 5,000 bricks. We may not know how much more.

Progress measurements are useful when allocating resources within a portfolio of projects and within individual projects. An effective and reliable mechanism for measuring project performance enables project managers to make informed decisions about the future.

‘Physical percent complete’ is the main pillar of the earned value management system. Earned value is the physical percent complete multiplied by the budget at completion. Within this calculation, the value of the completed work needs to be based on objective measures and tangible evidence. As stated within the PMI Standard, *“The percent complete technique is among the simplest and easiest, but can be the most subjective of the Earned Value measurement techniques if there are no objective indicators to back it up...⁶However, if there are objective indicators that can be used to arrive at the percent complete (for example, number of units of product completed divided by the total number of units to be completed), then this can be a more useful technique.”⁷* When measuring the earned value, we need to have an independent assessment of the work which was accomplished regardless of the funds or time spent. It is my view that the application of earned value management (“EVM”) needs a cultural shift in the way project planners and managers measure time, money and the real physical progress of a project.

Using three-point estimates, i.e., estimating low (optimistic), best guess (most likely or expected), and high (pessimistic) durations (and costs) for activities is valuable in giving more insight into the duration (and cost) of the works.

The difference between optimistic and expected durations should be smaller than the difference between expected and pessimistic durations. Very occasionally, the optimistic estimate and the expected estimate may be the same; this is often an indicator that the estimates have not considered uncertainties.

Too much reliance on numbers when reporting progress percent complete deceives us into believing in certainty. As Douglas Adams put it *“Trying to predict the future is a mug’s game... but increasingly it’s a game we all have to play because the world is changing so fast and we need to have some sort of idea of what the future’s actually going to be like because we are going to live there, probably next week.”⁸*

Less Is More

“Make everything as simple as possible, but not simpler.”

- Albert Einstein

Although project uncertainties are unavoidable, we should not underestimate the information we have available to us. Douglas W. Hubbard, the author of *How to Measure Anything, The Failure of Risk*, says *“You have MORE data than you think, and you need LESS data than you think to estimate pretty good probability distributions.”⁹* We should aim to simplify things, especially when conducting an integrated cost-schedule risk analysis using Monte Carlo simulation to understand the model and its outcomes. At this point, less can be more in an uncertain and stochastic world.

Most of the possible future events that could impact projects are in part predictable. For instance, there is a possibility that the project team will be smaller than planned for a period of time. Therefore, before a sponsor authorises the commencement of works on a project, a detailed risk assessment should be carried out.

When the experts identify a catastrophic risk, it needs to be avoided. How many times have the gates at a railway crossing stop failed just as a school bus approached? Probably never. Yet all school buses stop at railway crossings because of the consequences of the risk occurring.

Shifting Away From the Blame Game

Within the current construction industry, risk anticipation and planning are not part of the standard project commencement process. Instead, sponsors choose to blame project managers or project team members when things go poorly. Project managers and team members blame the sponsors for failing to anticipate changes in the environment that impact the project. Blame can also spread sideways toward peers, suppliers, and customers. Once this culture becomes normal, risk identification ceases to be in the heads of anybody.

Changing a culture is extremely challenging. It requires commitment across the board. The blame game puts internal competition ahead of competing with others in the same or similar business, impacting success overall.

Creating a Sense of Urgency

“Don’t worry baby. It’s gonna be alright.
Uncertainty can be a guiding light.”

- U2 (from Zooropa)

One of the greatest joys in managing projects comes from resolving uncertainties. Uncertainty is our constant companion, and as the French scientist Louis Pasteur put it “*fortune favours the prepared mind*”.¹⁰ We should anticipate uncertainties and prepare for them to make projects less vulnerable, and it all starts with feeling a true sense of urgency.

Key Takeaways:

1. Risk (threats and opportunities) can arise from an infinite number of sources and it lies in the eye of the beholder.
2. Organisations need to have a reliable and consistent system for measuring progress to allow project managers to make the right decisions about the remaining works and the unknowable future.
3. Project teams can be easily fooled by the numbers when measuring the work done and the remaining work.
4. On average, an estimate based on a single point average is wrong. Estimates must consider variations and probability distribution.
5. In any complex project, we need to focus on relevant, high-quality information to build the model instead of overcomplicating it.
6. Organisations need to start shifting away from the blame game for uncertainty to be properly managed.

Part two of our uncertainty management article series will explore how we can take advantage of current information to make project decisions in an uncertain world.

For more information on how FTI Consulting can help you to better manage project uncertainties, please contact Moj Kesheh on the details below.

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Endnotes

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