ANALYSIS

Scenario modelling – forecasting project outcomes in times of great uncertainty

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Large-scale construction and infrastructure projects have long been characterised by a persistent gap between forecasts and reality. Across geographies and project types, cost and timeline overruns are the norm rather than the exception, often reaching 30% to 50% and sometimes significantly more for mega developments. In many cases, cost growth of just 20% is more than enough to erode a project's expected returns, and such overruns are not uncommon outside the most straightforward projects.

In the past few years, projects have been increasingly exposed to disruptions that escape traditional patterns of risk. Within a matter of weeks, supply chains can be reshaped, logistics can stall, and input costs can shift dramatically. The recent conflict in the Middle East illustrates the situation well. According to a MEED survey, within a month of the start of the conflict, 36% of projects in the UAE reported logistics delays that almost no one had foreseen. Elsewhere, projects are suffering from double-digit increases in material costs, alongside even sharper rises in the price of diesel, needed to operate plant on site. In some cases, these sudden cost hikes have been enough to break a project's fragile business case resulting in deferral, cancellation and contract terminations. But the Iran conflict is not the only example; the conflict in Ukraine increased costs on European projects sharply in 2022, with steel prices being a major factor and, away from war, the US's recent unpredictable actions in trade policy have led to both material price increases and supply interruptions in many parts of the world.

These disruptions share a common feature: they stem from events whose timing, magnitude and transmission mechanisms are difficult to anticipate and even harder to quantify. As a result, **they challenge the very foundations on which project forecasts are built**. Traditional risk models rely on the ability to identify possible events, assign them a probability, and estimate their impact. When confronted with disruptions that do not fit within these parameters, **these models lose their predictive power**.

This raises a critical question for project leaders: how can decisions be made when the most material risks cannot be reliably modelled using conventional approaches?

In the face of the volatility the world has experienced since 2025, project leaders need to work even harder to understand and deal with uncertainty. **Scenario-modelling** – which inverts the traditional approach to understanding project risk – is an underused technique that can help leaders plan ahead better.

The typical approach to understanding project risk

In recent years, many tools have come onto the market that use ever more sophisticated risk modelling. Some draw on large databases of historical project information, some use AI to analyse the risk profile of a project and predict risk occurrence and impacts. But with the scale of uncertainty around us, even this approach has its limits. A different, complementary approach is required when thinking about questions like:

When and how will the conflict end – in clarity for the future, or ever greater uncertainty?

What will be the implications on global energy trade, demand, prices and interest rates?

How does all this impact my projects in terms of delays and cost increases in materials and equipment, fuel costs, demand destruction, etc.?

Conventional project risk modelling works well when trying to predict a normal range of outcomes in the event of a foreseeable set of risk events. Methods typically involve drawing on historical data and experience to identify the dozens of things that normally go wrong on similar projects, and how they impact delivery time and cost. With a large enough set of risk sample data and accurate characterisation of the project in question, good risk models can generate a reasonable probabilistic estimate of the average on any one project. Typically, this is good enough to inform the day-to-day decision-making of developers, contractors and asset managers.

But the things we're witnessing today are neither normal nor foreseeable. The – potentially major – impacts that projects will suffer are the result of key geopolitical decisions, which in turn drive the scale and timing of any impact on project costs and schedules. However, if we start to include these events in our traditional risk models, the approach falls short. How does a team of project professionals estimate the chances of increased tariffs on steel? How much contingency should be budgeted for a three-month interruption in the supply of façade panels? Because of its limitations, as we build these considerations into our traditional project risk model, it gets far less accurate and the project starts to become unaffordable.

So how can organisations strengthen decision-making under uncertainty

The organisations best equipped to deal with heightened uncertainty tend to share a common characteristic: they decided to complement traditional risk modelling with a scenario-based approach. While we see practices varying across organisations, several recurring themes emerge:

1 **Scenario selection**

The first step is the definition of the "worst" and "best" case parameters to consider. Going through this process in itself brings huge value: **leading organisations use scenario selection to align risk assumptions with their strategic priorities and risk appetite**. Defining a "worst case" is not as straightforward as it sounds. Without care, it can point towards some overly onerous or expensive mitigation measures. In the context of major geopolitical uncertainties like today's, the art is to interpret the range of qualified opinions or analyses out there to settle on some reasonable estimate of what the "credible worst case" looks like. An "analyses of analyses" approach can help: applying statistical models to determine confidence levels in different scenarios, based on which leaders can decide how far they will go to mitigate risk.

2 **Portfolio-level approach**

Given the truly "global" nature of the events in mind - many organisations are increasingly looking beyond individual projects and assessing risks at portfolio level. An interruption in supply of steelwork, for example, is likely to affect all an organisation's projects, perhaps to different degrees. Approaching such risks this way enables broader thinking about impacts and how they correlate – both direct and consequential – but more importantly, it means mitigation can be applied at an organisational level. We can assess how the same interruption of steelwork will affect costs across all projects, fund stockpiling at a business level and, if the risk occurs, determine which projects should be prioritised to mitigate delay in aggregate. This means organisations get better risk mitigation for less investment.

3 **Stress-testing**

Flipping the question – from "what's the impact of the worst event" to "how bad does the event have to be to destroy our projects" – is a valuable exercise to inform strategic decisions like which contracts to bid for, when to suspend site operations, or when to seek extended credit. A broad increase in fuel and material costs might be manageable on one project, while another might turn loss-making. Knowing in advance where that tipping-point lies, and with a portfolio-wide perspective, leaders can make decisions faster and ahead of time.

4 **Decision-trees**

Developing pre-agreed playbooks that are ready to go in the event of certain triggers, such as material prices or lead times reaching a certain level, means you can move quickly and objectively in the moment, should things take a turn for the worse. Horizon-scanning has become a continuous demand as model assumptions need regular updating.

5 **Wider impacts**

Assessing more than just time and cost impacts is even more important when considering portfolio-level scenarios. Reputation, workforce and supply chain knock-on impacts all come right into play when something affects all the projects in your organisation.

Overall, and most importantly, modelling the impacts of specific scenarios on each project and your portfolio as a whole enables a different way to budget for the cost of mitigating these risks. On a project-level, many options may appear difficult to justify, or perhaps not even be on the table, but when aggregated across the business, investment in certain mitigation measures can become economically rational. Securing plant through purchase over hire is one example, stockpiling critical materials is another. More structurally, extending working capital and other facilities is typically only feasible at an organisational level.

Conclusion

Many construction and infrastructure businesses have traditionally approached project risk from the bottom up, focusing on individual risks and outcomes. But in today's volatile world, it is clear that organisations using scenario modelling are better positioned to respond to unexpected global change. It has become a vital practice to help businesses understand and respond to major risks. The question for project leaders is no longer whether the next disruption will come, but whether their organisations will be ready to respond when it does.

Contact

Mathew Hazenberg
Director
mathew.hazenberg@accuracy.com
+971 52 416 6597

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