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Risk Watch.

THOUGHT LEADERSHIP IN RISK

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Leveraging Risk Management for Successful Infrastructure Works

Gareth Byatt and Chris Corless

Infrastructure work in Canada has a critical impact on the country's economy. As reported in the Top 100 Projects website this year, the top 100 public sector infrastructure projects under development in Canada have broken the $199 billion barrier. As part of this effort, Canada's new Infrastructure Bank plans to invest $35 billion of federal government funds into infrastructure projects, including work in the energy, water/wastewater, transport, and health care sectors.

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Infrastructure projects are major undertakings that come with significant levels of risk and uncertainty. They impact many different and diverse stakeholder groups that hold different views about the value that the project represents, how the project should proceed (or not), and what constitutes success or failure. With life cycles that can be measured in years (and sometimes decades); broad and challenging scopes; and complex finance and budgetary arrangements; infrastructure project teams need to use good risk management practices—just like all businesses and organizations do.

When infrastructure projects go wrong, they can go badly wrong.

When infrastructure projects go wrong, they can go badly wrong. A recent example of a project that has been fraught with problems is the AUD$2.1 billion light rail project in Sydney, Australia. The current situation is that a Spanish subcontractor has sued the NSW government for an additional AUD$1.2 billion, claiming that the company was misled with respect to the complexity of the project. The problems seen with the Sydney light rail project, as documented by various press reports, provide a concrete illustration of how understanding and managing risk is a crucial component to delivering infrastructure projects successfully.

Below are six points that describe how risk management plays a valuable part in organizing, planning, and implementing infrastructure projects to ensure that the ongoing management of these assets is efficient and effective.

1. **It starts with having a good team and stakeholder culture**
   All organizations and projects need a cohesive team culture in place to achieve success. When a team culture is positively impacting a team's performance, it includes the following elements.

- The tone from the top is one that promotes openness and the practice of recognized risk management techniques and tools that are proven to add value.
- The understanding of our risk appetite—which means how much risk in different types (financial, schedule-related, contractual, etc.,)—can and should be taken, and is consistent across the team and all project stakeholders, from the front line to the boardroom.
- Risks are openly discussed in everyday conversations, and are on the agenda of all reviews and decision-making forums at all levels of the project. Risks are not discussed in silos.
- Debate about risks and potential problems is welcomed. If problems materialize, the project team learns from them and does not adopt a "blame culture."

For infrastructure projects, the culture of the team is often made up of many different organizations. The core team, contractors and suppliers, investors and others—each with their own culture that must work together—is a vital element to get right.

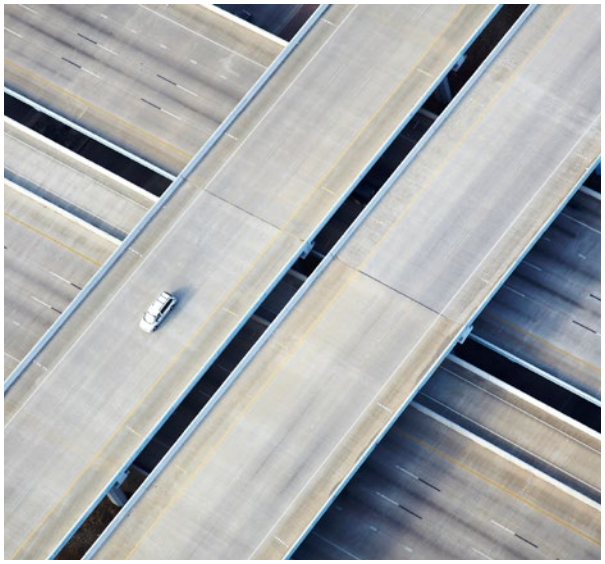
2. **Embed risk management into all decision-making**
   The way we look at risk plays a valuable part in how we make good decisions. Risk management helps us to understand cognitive bias, and how to "de-bias" decisions.

Making big decisions on infrastructure projects is difficult. Sometimes infrastructure projects start, only to be abandoned when they prove too difficult, or it turns out that they will not deliver the anticipated value. A prime example is the ill-fated IT patient record project of the UK National Health Service that was abandoned in 2011 after a multi-billion-dollar blowout. Risk management should help to detect such signs early.

As an example of ensuring that effective decision-making is in place, an infrastructure project team could adopt a decision-making model to help focus resources on the decisions that matter the most. For example, an article on *Untangling Your Organisation's Decision-Making* describes a way to look at decision-making, which includes the categorization of decisions into "big bet" (broad and infrequent in their nature); "cross-cutting," (broad and frequently taken); "ad hoc" (narrow in focus and infrequent); and "delegated," (frequent and narrow in focus).

In this framework, "big-bet" and "cross-cutting" decisions require more rigour. And, they can benefit from risk techniques, such as scenario planning, the judicious use of quantitative risk analysis, and good data. Less important decisions may be handled differently, perhaps by using rapid experimentation. Yet they still use good data to make informed judgements.

3. **Embrace your "unknowns" and "firsts of a kind"**
   Large, complex, and innovative infrastructure projects involve tackling "firsts of a kind," or "FOAKs." Risk management helps us to understand and deal with FOAKs—which starts with setting up a good culture on the project that embraces challenges.



An example of "known unknowns" are advances in technology, including opportunities through adopting the principles of what's been dubbed the Industrial Revolution 4.0; the application of automation; the Internet of Things in industry; and the data revolution. The convergence of technologies and advanced computing options that are now available opens up many possibilities and risks that need to be managed.

To ensure we manage the risks of our "unknowns," we need good governance, processes and procedures, and controls. All parties involved in the project need to work collaboratively, not in silos. Project processes and procedures need the "right amount" of structure to drive high-quality, risk-informed decision-making and to engender a collaborative way of working with all stakeholders. As an example, when we face "firsts of a kind," we could organize a risk workshop with representatives from many parties. We could also use a risk technique—such as Bowtie analysis or Gary Klein's Premortem—to understand the risk and the controls, which all parties need to ensure they are in place and working well.

4. **Understand your stakeholder perceptions of risk**

The many diverse stakeholder groups that have an interest and involvement in large infrastructure projects will inevitably hold different views about the value that the project represents. Their views about how the project should proceed, and what constitutes success or failure, will be different. With life cycles often measured in decades, broad and challenging scopes, and complex finance and budgetary arrangements, infrastructure project teams can benefit greatly from good stakeholder risk management practices.

Stakeholder groups have different "anchor perspectives" that influence their perception of risk because they are coming from different positions and perspectives. Understanding, responding to, and trying to satisfy the different expectations of stakeholder groups throughout the project takes time and effort.

To examine one example of managing stakeholder perceptions, let's look at financial risk. Managing financial risk on infrastructure projects is always a top priority. The client will want to manage the overall life cycle financial cost—which includes the long-term operating costs and the costs of funding the project. The construction and engineering contractors involved may be primarily interested in the construction costs and securing their profits from the project. Public pressure groups may demand to see that adverse financial effects on local communities, such as disrupted shop owners during the infrastructure construction period, are accounted for with appropriate financial compensation arranged. Transportation projects, such as Toronto's Eglinton light rail transit (LRT) or London's Crossrail (a high-capacity railway for London and the South East of the UK), are especially prone to this sort of business disruption.

Understanding the breadth of views requires collaboration by experts and representatives from different groups, and ensuring they appreciate each other's perceptions and perspective. This can be especially challenging where perceptions change over the course of multi-year projects. Good risk management helps an infrastructure project team to understand and act upon risks, and risk perception, in a forward-thinking and proactive manner. Being proactive is crucial: if a stakeholder relationship sours, it can be difficult to repair the damage.

5. **Good processes and controls foster good outcomes**
   Setting up good risk management means weaving risk management and a strong control environment into project processes. This activity must be developed collaboratively as a team and stitched into project operations; not run by a few individuals as separate exercises.

   For example:

- Schedule and risk need to be intertwined. You may wish to use the schedule Work Breakdown Structure, or WBS—which is a commonly used term in planning projects—to generate a Risk Breakdown Structure. This ensures that meaningful schedule quantitative risk analysis (using probabilistic and statistical analysis of risk) is undertaken to, in turn, make good schedule decisions. Design risk is a critical part of the project to manage, and risk management needs to protect the aspiration of the project, not limit it. For this to succeed, a culture of collaboration needs to exist.
- Management needs to ensure that people working on the project have the time, and the right forums (through timely facilitated workshops and reviews) to think through what the most important project risks are, as the project progresses. It's important to ensure people don't look at impacts as being risks. For example, "finishing XYZ late" is an impact. You want to understand what the real risk is that could lead to a "late schedule finish."

6. **Ensure you have appropriate resilience in place to deal with the unexpected**
   The need for resilience is increasingly recognized today in all businesses and organizations.

   As described by the resiliency expert, Roland Kupers, in an article published by the World Economic Forum: *"Resilience is, in fact, a property of complex systems. And complexity is the science of interconnected systems that has been driving a slow-motion revolution in science over the past 35 years or so."*

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Resilience is an important capability of an infrastructure project team. Even projects with the best risk management can encounter "unknown unknowns" that may have a significant impact on delivery. In these situations, the resilience built into the project will help reduce the potential impact. Depending on what the project is, it may encompass three broad areas:

1. Physically building in resilience measures for when the project is in operation.
2. Team resilience.
3. Responding to change during the project.

Building in resilience into the project may include measures and design to counter security threats, be they physical and/or of a cyber nature, and the impact that extreme weather could have (e.g., the so-called "once in a hundred years storm" event). A resilience assessment of major infrastructure should take into account events that, while they may be unexpected, will have major impacts if they occur.

Project team resilience is a different angle. It is about equipping the project team with the skills to deal with project events and major incidents—should they occur. As you consider the resources required on your project team, it is important to remember that efficiency is the enemy of resilience and you must consider both as a trade-off when you are resourcing your team. Good team resilience is about responding quickly and effectively to problems if they occur, and to manage "the long tail" that can result from a major incident.

Demonstrating resilience during the project's life cycle means being adaptable and having sufficient capacity to tackle changing economic situations, political change, social change, and broad events that could occur during the lifespan of the project.

Conclusion

The application of risk management techniques and tools is vital to ensuring that infrastructure projects achieve their objectives and that public funds are well-invested. With the right culture, mindset, techniques, and tools, incredible feats of engineering and ingenuity can be achieved for the public good. When risk management is not applied properly to infrastructure projects, major problems can result.

Endnotes

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