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# A Standardized Approach to Risk Improves Project Outcomes and Profitability

## Executive Overview

Every project has risks. Organizations that succeed are the ones that plan for those risks - anticipating, mitigating, and providing response and contingency plans for negative events that may or may not occur. Risk Analysis solutions provide the tools for doing just this, enabling companies to identify, assess and model risks - and, in the process, taking much of the uncertainty out of project and portfolio management.

## Introduction

Well-known project failures - such as the problem-prone automated baggage handling system that delayed the opening of the Denver Airport by over a year - have drawn attention to the risks inherent in every large project. The dangers and consequences associated with risk have increased along with the strong headwinds faced by companies in today's uncertain economy. Traditional informal approaches to risk management force project managers into the role of firefighters who race around responding to problems as they arise rather than avoiding them in the first place.

A new generation of risk management solutions delivers a standardized approach that fully analyzes the risk sensitivity of the project, so that the impacts of risks can be fully understood. The effects of alternative mitigation strategies can be evaluated at any stage of the project lifecycle, ensuring that the project is managed proactively to avoid the most potentially damaging risks. Risk management can be integrated with enterprise project portfolio management (EPPM) and scheduling solutions, providing input and visibility of risk to the entire project team. As a result, the risk management process helps ensure that mission-critical projects come in on time and within budget.

## The Consequences of Project Failure

The Denver Airport baggage handling system installed in the mid 1990s is one of the most notorious examples of failure to effectively manage project risk. The system was originally planned to support all three concourses but was never able to operate at this level due to an underestimation of the complexity of the new technology and the failure to build in a back-up process to handle situations in which part of the system failed. The result was that the opening of the airport was delayed by 16 months, adding \$560 million to the cost of the airport. The system was made operational only by drastically reducing its scope to handling outboard flights from a single concourse. About a decade after it was installed, the automated system was scrapped entirely because it was determined that a manual system could do the job at a lower cost.<sup>1</sup>

The importance of risk management to project and business success has become even more important in the years since this dramatic project failure. Projects are becoming increasingly more complex and costly, making it even more difficult to analyze and mitigate risks using informal methods. The weak economy creates slack demand which in turn greatly reduces the chance that cost and schedule overruns can be recovered through higher pricing. Credit constraints mean that project budgets are tighter than ever and reduce the possibility that additional capital can be allocated to compensate for unforeseen circumstances. Environmental factors, market shifts, unforeseen engineering challenges, improper planning, skilled talent issues and a wide range of other possible problems all have the potential to cause projects to financially underperform, incur delays and exceed budget.

Traditional risk management methods are not up to this challenge. "Many poorly performing companies don't have any formal risk management process," notes Bob Prieto, senior vice-president of Fluor Corporation. "They may discuss risk but it's more about contingency planning."<sup>2</sup> The traditional approach relies upon individuals to subjectively analyze risks. One typical approach is to build a standard contingency factor into the budget and schedule. This approach tries to estimate but not to identify, assess or mitigate the specific risks on a particular project. If there is a land mine hidden in this project that threatens its profitability, simple contingency factor estimation will do nothing to identify or mitigate it. Also, a contingency factor

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<sup>1</sup>Callear Consulting. "Case Study - Denver International Airport Baggage Handling System - An illustration of ineffectual decision making." 2008. <http://callear.com/WTPF/wp-content/uploads/articles/DIABaggage.pdf>

<sup>2</sup>Sarah Fister Gale, "Closing the Gap: The link between project management excellent and long-term success." Economist Intelligence Unit Ltd. 2009

that is not attached to specific risks may have a tendency to encourage inefficiency simply because it is available to be drawn upon.

## Benefits of a Standardized Approach to Risk Management

Risk management solutions enable a standardized approach for identifying, assessing and mitigating risk throughout the project lifecycle. A collaborative risk identification process helps create buy-in on project assumptions and spreads awareness throughout the organization. Risk analysis provides visibility into potential delays and cost overruns. Project managers can easily compare the effects of alternative responses in order to develop an optimal risk mitigation strategy. The result is better project outcomes including a greater likelihood of on-time and within budget delivery. Risk analysis also generates lessons learned that can be leveraged to improve the outcome of future projects. The latest generation of risk management solutions integrates with a range of scheduling tools. The integration of risk management with enterprise project portfolio management makes it possible to consider risk as an integral part of the project management process.

## A Standardized Risk Management Methodology

### Risk Planning

Identifying risk in the planning stage enables better project selection decisions and more accurate budgeting and scheduling. A standards-based risk register or risk tracker plays a key role by tracking information on all the risks associated with the project. The risk register includes information such as the risk owner, cause, effect, status, probability, impact of the risk on the project cost, schedule and customer. Users can configure the matrix to match their corporate standards, ensuring consistent use of standards throughout the organization.

During the planning stage, a schedule quality check feature can be used to evaluate how common scheduling problems can affect deterministic schedules. For example, if an activity is expected to take an extra 10 days if a risk event occurs, the quality check makes sure that the schedule is updated when the effect of the risk is measured. This approach delivers better quality schedules that adhere to industry best practices.

A leading multinational energy company with revenues of more than \$160B uses risk management to improve corporate governance of project risk and provide a standard risk management environment. Probabilistic schedules are created from repeatable risk registers, resulting in better project intelligence, reduced errors and replicable processes. As a result the company reduced unexpected delays and costs. The company improved collaboration among project team members, enabling more effective risk management and project intelligence processes. In addition, project consistency has been increased due to the centralized ownership

of the processes for risk identity, monitoring and reporting. One of the company's senior planning engineer notes that: "running risk scenarios helps us better identify potentially severe events and build contingencies that can be quickly implemented to mitigate impact."

## Risk Identification

The new generation of risk management solutions provides a consistent and methodical approach to identify risks. Users enter risks using pre-defined risk registers that incorporate company best practices and can also define risk registers on the fly. The risk register applies estimates in a consistent way each time while documenting the rationale, facilitating review and enabling other members of the project team to review estimates and provide input. The risk register automatically integrates identified risk events into the schedule by creating a risk event plan that users can then analyze to determine both key risk drivers and the cost-effectiveness of the identified mitigation strategies. Risk templates provide another method for modeling risk uncertainty against the schedule. Templates can be created to apply risk to activities based on a variety of attributes such as work breakdown structure (WBS), activity codes, user defined functions, etc. For example, weather risks such as ice windows, hurricanes and environmental risks can be modeled and incorporated into the risk plan.

A major global provider of engineering and infrastructure services uses risk management to identify risks or issues that may slow down project delivery. Users can identify subsets of work that need to be achieved to keep the project progressing. Project managers and supervisors have a snapshot view of the project's status in an easy-to-understand format. This capability reduces the risk of the project failing due to lack of communication between stakeholders and ensures that the company can take steps to keep the delivery moving if there are issues. For example, if the delivery of flooring for a building is delayed, project managers use the risk management system to determine how the setback is going to affect the project's schedule. A formal approach to risk management helps bring the project back into line and reschedule other work that may be affected.

## Risk Assessment

Risk assessment is critical to understanding the impact of risk and uncertainty on project schedule and cost. Simple three-point estimates do not distinguish between the reasons for different outcomes, making it very difficult to determine the probability for these outcomes. On the other hand, the industry-standard approach maps risks to tasks in WBS items and defines the impact each risk has on each task or WBS item to which it is mapped. Risk registers are thus able to quantify the schedule and cost impact of each risk on the project. Monte-Carlo based cost and schedule analytics realistically depict the probability of achieving a range of finish dates and costs.

For example, the analysis may show a 10% chance of finishing a month early and a 30% chance of finishing a month late. The analysis identifies key activities and risks that drive the schedule and have the potential to have the most impact on the schedule and cost of the project. Users

can also conduct risk analysis at the project portfolio level to make strategic decisions about project selection.

A major electric power generator uses risk management to improve the accuracy of risk assessments undertaken prior to power plant shutdowns for routine inspection and maintenance. The power generator identifies, quantifies and manages both probabilistic and unknown areas of risk and uncertainty throughout the entire project lifecycle. The company creates a full-risk matrix and a risk-adjusted schedule incorporating mitigation plans during the outage and return to commercial service. Multidimensional algorithms and contingency responses are used for risk control, scoring and schedule management. The risk management solution's intuitive tools predict the likelihood and impact of primary and specific risks, such as the actual physical condition of plant and machinery. Advanced computational modeling is used to assess the impact of secondary and generic elements, such as industrial action or bad weather on the duration and cost of shutdowns. The company reduces exposure to volatile energy prices by accurately determining the outage shortfall, making it possible to obtain replacement power at the best prices. According to a company spokesperson: "Oracle's Primavera Risk Analysis has given us a massive, immediate, and sustainable return on our investment." By using the solution they were able to complete an overhaul and return to service project five days ahead of schedule, increasing their profit by US\$1.6 million more than the initial plan. The company achieved a thousand-fold return on its software investment.

## Risk Response

Once risks are identified and assessed, the next step is to develop a response plan. Typical mitigation actions include adding time to the schedule, deploying more resources on the project, bringing in outside expertise, increasing the budget, etc. The risk register tracks the actions used to mitigate the probability and impact of risks using a mitigation plan and waterfall charts. Users can compare alternative mitigation scenarios and create and compare custom risk plans. The project team can then run another round of simulations to evaluate alternative approaches for reducing the impact of a risk event. With the project underway, the mitigation plan can be tracked against actual project data to evaluate its effectiveness and make course corrections if needed.

One of the largest integrated oil companies in the world implemented a full lifecycle risk management solution for a major drilling project. Risk management provides a comprehensive means of determining confidence levels in schedules together with quick and easy techniques for establishing contingency and risk response plans. Risk management provides more realistic scheduling that helps maximize the use of expensive resources such as drilling rigs. Pre-production activity and first oil production dates can be more accurately predicted, improving early resource planning in those phases. The accuracy of overall volume forecasts is also improved. More realistic scheduling of drilling rig use alone can potentially save many hundreds of thousands of dollars a day.

## Reporting

Reporting helps understand the impact of the various risks and how to prioritize the resources of the organization in addressing them. Reporting also helps to quantify the impact of risks on project cash flow and track and allocate schedule and cost contingencies. Histograms or distribution graphs show the range of possible outputs, for example the projected project completion dates considering all of the risks that have been modeled and applied to the schedule. Histograms can be used to determine confidence levels, probability schedules and schedule and cost contingencies. For example, histograms can report confidence levels with respect to finish dates, costs, float, internal rate of return and net present value. Tornado graphs help identify key risk drivers and pinpoint the task or event that is preventing the schedule or budget from performing as planned. Users can also use cost sensitivity reports to isolate the most cost critical tasks or risk events. Scatter plots can be used to determine the combined probability of achieving given budgets and completion dates as well as to perform what-if analyses by interactively varying cost and schedule thresholds to reveal the resulting chances of success.

A leading international facilities and infrastructure solution provider uses risk management to help improve corporate budgeting accuracy by incorporating risk-adjusted forecasts into budgeting for multiple business units. In addition, the solution enables them to calculate both the predictable and random elements of business activities to more accurately determine investment performance. As a result they are able to report accurate, real-time adjusted "best and worst" outcomes and "predicted versus actual" performance figures to the board and company shareholders. Ultimately, the company has benefited from the intelligence extracted from the solution to generate predictable, long-term returns from a diversified portfolio of investments. "Oracle's Primavera Risk Analysis increases our confidence in our ability to understand risk and deliver on our reported budgets," says the company's head of enterprise risk management.

## Conclusion

Every project has risks and the way that these risks are identified, assessed and mitigated plays a critical role in the project outcome. Risk management solutions, like Oracle's Primavera Risk Analysis, enable the implementation of a formal process for managing risk throughout your company's complete project portfolio. Analytical tools are provided to evaluate the impact of various risk scenarios and develop contingency and risk response plans. This approach substantially reduces the uncertainty of projects and portfolios, helping to ensure that mission critical initiatives come in on-time and within budget.



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