

# Why risk efficiency is a key aspect of best practice projects

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## Abstract

This paper explains what ‘risk efficiency’ means, why it is a key part of best practice project management, and why it may not be delivered by common practice as defined by some guidelines. This paper also explains how risk efficiency can be addressed operationally using comparative cumulative probability distributions (S-curves). Further, this paper explains why risk efficiency provides a foundation for a convincing business case for:

- formal project risk management processes designed for corporate needs,
- embracing the management of opportunities as well as threats,
- measuring threats and opportunities to assist decision making,
- developing a more effective risk taking culture,
- taking more risk for more reward.

The argument uses linked examples from four successful cases: the first use of a designed project risk management process by BP for offshore North Sea oil and gas projects, the first use of a designed process by National Power for combined cycle gas powered electricity generation, a culture change programme for IBM UK concerned with taking more risk to increase the rewards, and a due diligence assessment of project risk management for a railway infrastructure project. The concepts and tools described are relevant to any industry sector for projects of any size.

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## 1. Introduction

Uncertainty which matters is central to all projects. It is not just a question of how long a project will take, or how much it will cost. Uncertainty which matters includes which parties ought to be involved, the alignment of their motives, the alignment of project objectives with corporate strategic objectives, shaping the design and resource requirements, choosing and managing appropriate processes, managing the underlying trade-offs between all relevant attributes measuring performance, and the implications of associated risk.

It might be argued that *formal* project risk management processes are not appropriate for all projects,

but making a choice not to apply formal processes requires a clear understanding of what *best practice* formal project risk management processes could deliver, and what this should cost, including associated uncertainty and risk. *Everyone* involved in making such choices needs to understand the implications. Moreover, even if formal approaches are not appropriate for some projects, informal approaches ought to reflect an understanding of the principles underlying formal processes. *Everyone* involved in projects ought to understand these principles, because they are the basis of simple rules of thumb that work in practice.

*Best practice* in project risk management is concerned with managing *uncertainty that matters* in an effective and efficient manner. To do so we need to understand *where* uncertainty matters, *why* it matters, what *could* be done about it, what *should* be done about it, and *who* should take managerial and financial

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responsibility for it. Best practice in project risk management also involves the elimination of dysfunctional ‘corporate culture conditions’, like ‘a blame culture’ which fosters inappropriate blame because managers are unable to distinguish between good luck and good management, bad luck and bad management. In the authors’ view best practice in this sense cannot be achieved without a clear understanding of the concept of ‘risk efficiency’, and its vigorous pursuit using a simple operational tool, cumulative probability distributions (S-curves) which compare alternative decision choices. This paper explains why the authors hold this view, and why this implies a general need for the project management community to understand risk efficiency.

A basic definition of ‘risk efficiency’ is simply

‘the minimum risk decision choice for a given level of expected performance’, ‘expected performance’ being a best estimate of what should happen on average, ‘risk’ being ‘the possibility of adverse departures from expectations’.

What this means and how it affects project management processes is more complex, the focus of this paper as a whole.

*Common practice* in project risk management involves a limited agenda relative to best practice. Common practice is largely focused on what we will call ‘risk events’, rather than the accumulated effect of all the risk events and all other sources of uncertainty which are relevant to decision choices. A ‘risk event’ in this sense is ‘risk’ as defined on page 127 of the 2000 edition of the PMBOK by the PMI [1],

‘an uncertain event or condition that, if it occurs, has a positive or negative effect on a project objective’,

with a directly comparable definition of ‘risk’ on page 16 of the 1997 edition of the PRAM Guide by the APM [2],

‘an uncertain event or set of circumstances that, should it occur, will have an effect on the achievement of the project’s objectives’.

The above PMI and APM definitions of ‘risk’ reflect and reinforce the common practice focus on ‘risk events’, as do many of the others covered in an extensive review of risk definitions by Hillson [3]. One of the exceptions in the project risk management area is that used in the RAMP [4] guide, which accords with that used in this paper, expressed slightly differently.

In the authors’ experience common practice in project risk management reflects important limiting characteristics which are linked to the PMI/APM views of risk noted above and its lack of compatibility with a ‘risk efficiency’ perspective on risk management. Understanding how risk efficiency is the key to moving from common practice to best practice has to begin by ‘un-learning’ the common PMI/APM definitions of risk noted above if they are part of the reader’s framing

assumptions, always more difficult than just learning something new.

Risk efficiency is a basic concept in financial economics, central to understanding risk management in terms of financial portfolio decision making models, and the basis of most explanations of the way financial markets work. In this context it is widely seen as ‘useful theory’, in the sense that it provides an essential conceptual framework to make experience operational, to explain basic ideas like ‘do not put all your eggs in one basket’, and to refine rules of thumb like ‘keep X% of your portfolio of investments in cash, Y% in equities, and so on’. Its direct application in terms of usable operational tools is problematic, because of practical operational difficulties using a Markowitz [5] mean–variance quadratic programming framework, but understanding the concept is an integral part of a financial economics education, and it is widely recognised that this understanding should underlie the use of all associated tools and rules of thumb. Markowitz was awarded a Nobel Prize for Economics for his seminal work in this area, and the basic ideas he developed are generally understood by anyone with a degree in economics, finance, accounting, or business studies. Texts like Brealey and Myers [6] provide a modern financial perspective on risk efficiency and related subjects like the appropriate discount rate to use when evaluating projects which most people with an MBA will understand, and some involved in project management may find useful reading.

Risk efficiency is also central to understanding the relationship between portfolio theory and decision theory, the two key conceptual frameworks for managing uncertainty and risk in terms of making decision choices any context [7]. In simple terms, basic portfolio theory [5] is about continuous variable allocation of resource choices, while basic decision theory [8] is about making discrete either/or choices, using ‘stochastic dominance’ notions directly comparable to risk efficiency. Features provided by a decision theory framework which are particularly useful include multiple stage choices portrayed by decision trees, statistical dependency portrayed by probability trees, and a range of approaches to multiple attribute choices. In practice both frameworks need to be integrated, embedding one in the other [7].

A number of organisations which have been particularly effective users of project risk management have seen risk efficiency as central to holistic project management for decades, and best practice project management has to be holistic. For example, risk efficiency was central to the published [9] project risk management process for offshore North Sea projects which BP introduced in the late 1970s and adapted for use world wide by the early 1980s. Risk efficiency was an integral part of all the cases described in [10] and associated underlying papers. And risk efficiency was central to a

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