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Variability Risks and Event Risks
Practical Project Risk Management
by Martin Hopkinson

Practical Project Risk Management[1]

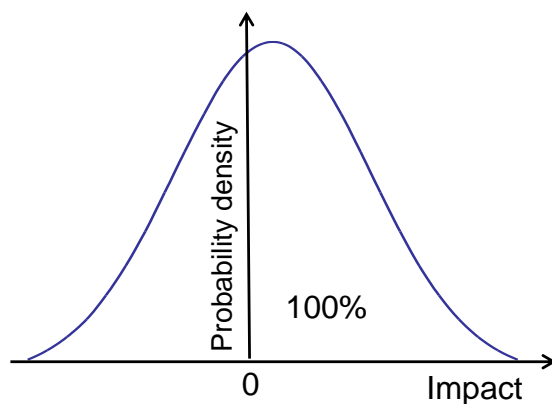# Variability Risks and Event Risks: A brief guide [2]

Purpose

Conceptualize risks so that they can be described, estimated and modelled appropriately.

Comparing Variability Risks and Event Risks

Variability Risk

Uncertainty concerning the eventual value of an important project variable e.g. as affecting duration and/or cost. Variability risks typically include both positive and negative outcomes.

Example: Uncertain scope of software rework identified by acceptance testing, which could be higher or lower than the planned rework.

Event Risk

Uncertainty concerning an event which, should it occur, would have an effect on the project objectives. Event risks are treated as being either threats or opportunities.

Example: The possibility that a requirement will later be identified that increases the scope of software to be developed.

PDF characteristics: All possible outcomes lie within the area enclosed by a continuous probability density function (PDF). The area enclosed by the PDF is thus 1.0 (100%). Zero impact represents the planned outcome.
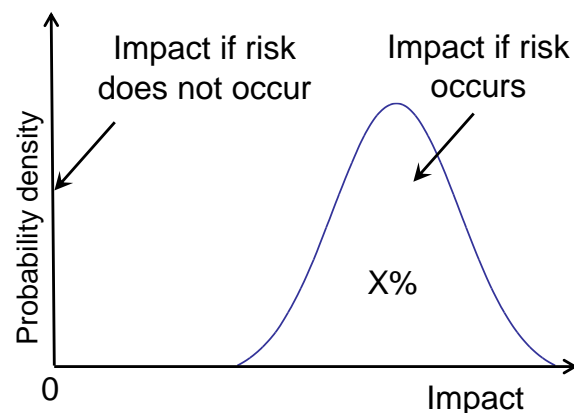
PDF characteristics: The PDF is split into two parts, one representing risk non-occurrence (zero impact) and the other the impact of risk occurrence. The area enclosed by the latter is equal to the risk's probability of occurrence.

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[1] This series of articles is by Martin Hopkinson, author of the books "*The Project Risk Maturity Model"* and *"Net Present Value and Risk Modelling for Projects"* and contributing author for Association for Project Management (APM) guides such as *Directing Change* and *Sponsoring Change.* These articles are based on short risk management guides previously available on his company website, now retired. See Martin's author profile below.

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A Key Issue for Risk Management Practitioners

Project risk management activities are often based on the use of a risk register, with a probability-impact matrix (PIM) being used for the purposes of risk prioritization. The PIM technique lends itself to **all** risks being described and assessed as being event risks. In practice, this usually results in one of the following two approaches to variability risks:

- Exclusion of variability risks from the risk register, or
- Inclusion of variability risks by making estimates that force-fit them to the PIM.

The first approach is a practice error since many variability risks can be managed successfully if the relevant sources of uncertainty are identified and acted on. Though not ideal, force-fitting variability risks may be the only practical choice for the process to address all significant risks.

Force-fitting a Variability Risk to a PIM

Estimate the area under the threat side of the PDF, to obtain the risk probability. Estimate the mean value within the threat side of the PDF to obtain the risk impact. If the larger part of the PDF lies to the left of zero impact, the risk could be estimated as being an opportunity using the equivalent approach.

Note the full PDF should be used if the risk is included in a risk model.
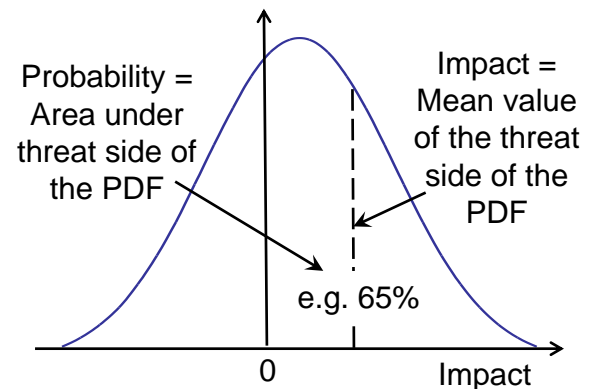
Alternatives to the PIM

If event risks and variability risks are estimated with only one impact attribute e.g. cost or duration, they can be prioritized using other techniques. For example, they can be prioritized in order of PDF standard deviation (include both parts of the PDF for event risks when calculating their standard deviations). Similarly, if the risks have been included in a quantitative risk model e.g. for the purposes of cost or schedule risk analysis, the outputs of modelling such as measures shown in tornado charts can be used for risk prioritization purposes. A wide choice of prioritization methods is described in *Prioritising Project Risks* (APM 2008).

Common Faults

1. Failure to manage variability risks e.g. because, with probability of occurrence is 100%, they cannot be mapped to a PIM or because they are labelled as being uncertainties.
2. Porting across risk estimates into a cost or a schedule risk model that have been produced in order to force-fit a variability risk into a PIM.
3. Using a PIM for risk prioritisation purposes when an alternative technique would be better.

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Martin Hopkinson, recently retired as the Director of Risk Management Capability Limited in the UK, and has 30 years' experience as a project manager and project risk management consultant. His experience has been gained across a wide variety of industries and engineering disciplines and includes multibillion-pound projects and programmes. He was the lead author on Tools and Techniques for the Association for Project Management's (APM) guide to risk management (*The PRAM Guide*) and led the group that produced the APM guide *Prioritising Project Risks.*

Martin's first book, *The Project Risk Maturity Model*, concerns the risk management process. His contributions to Association for Project Management (APM) guides such as *Directing Change* and *Sponsoring Change* reflect his belief in the importance of project governance and business case development.

In his second book *Net Present Value and Risk Modelling for Projects* he brought these subjects together by showing how NPV and risk modelling techniques can be used to optimise projects and support project approval decisions. (To learn more about the book, click here.)