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## Uncertainty analysis – Methods

Concept report No 12

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### **Methods for uncertainty analysis**

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#### *Summary:*

This report is a collection of different methods for uncertainty analysis with a subsequent collocation. The report is divided into three main parts:

- Description of methods from literature.
- Description of methods used by project owners, consultants and others directly involved in projects.
- Collocation of methods and evaluations and comparisons, according to a set of corresponding success criteria.

One of the intentions with this report is that the description of the different methods should give the reader ideas for improvement of their own method. This will hopefully give synergy effects leading to development of improved practise.

The material analysed show that the similarities in different methods are evident. There is a lack of explicit systematic analysis of the upside potential. This may indicate a 'risk culture' in analysing uncertainty. Further work is needed to balance the culture with more 'opportunity thinking'.

The report concludes with some reflections on what we consider to be important elements worthy of further research:

1. How to ensure relevant and reliable input
2. How to ensure better 'guesstimates' about future needs and demands and considering the way we in total deal with uncertainty in project work:
3. Develop uncertainty management to include opportunity management, and become a part of the philosophy of management in both project and corporate settings.

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# Summary

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## **Uncertainty analysis - Methodology**

Concept Report No. 12

The report is intended to be of support in performing uncertainty analyses. The content is divided into three parts:

- Descriptions of methods found in literature. The methods that are selected have been developed by internationally recognised people or organisations, or from other methods that are commonly used.

We will find descriptions of some methods for complete analysis. The most well-known in this respect are 'The Shampu method' by Chapman & Ward, PMI's 'Uncertainty Analysis in Projects', and representative of the Scandinavian mainstream, 'The Successive Process'.

In addition to the 'total' analyses, the report contains descriptions of methods designed to meet special requirements in uncertainty analyses:

- Descriptions of methods which are in practical use, and more or less are developed by project owners, consultants and others that are performing uncertainty analyses. These methods are mostly derived from methods described in literature and adjusted to certain portfolio profiles on business areas.
- "Collocation of the methods, and evaluations and comparisons to a set of corresponding success criteria.

The entirety of the analyses is important, and the methods of analysis are described as completely as possible. This is done in spite of the main conclusion from the comparisons being that the similarities of the methods are evident.

Particular specialities from the different methods are highlighted, with the purpose of identifying conditions which contribute to complete the performance of uncertainty analyses. One of the purposes of this report is to give readers new ideas for improving their current methods. Hopefully, this will give synergy effects and contribute to better practice.

Most of the methods for uncertainty analysis lean upon various forms of group processes. Typical for all methods is that they establish a qualitative scenario model which is a basis for subsequent quantification.

In all the descriptions of methods examined there is a lack of an explicit systematic analysis of the upside potential. We believe that in general there is what we call a 'risk culture' when project staff think about uncertainty. Further work is needed in order to 'balance' the culture with more 'opportunity thinking'.

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Reading about the methods, we sensed a slight difference between what we call a Scandinavian tradition, represented by the Successive Method, the described methods used by consultants, and the more Anglo-Saxon methods represented by Shampu, PMI and Hydros PRM. The biggest difference seems to be in the way of securing input. The Scandinavian approach seems to be more direct and uses subjective estimations, while, for instance, Shampu and PMI seek to make their way of gaining input 'scientific' via the use of statistical tools.

The report concludes with some reflections on what we consider to be important elements, worthy of further research.

We still observe, especially in public projects, uncovered needs for methods to meet the uncertainty, implied by the fact that it is rarely the same project that is planned and calculated today that will be built in 10, 15, or 20 years from now.

Among elements from the analysis that imply great potential for improvement, is generally everything affecting the veracity of input. Among particular elements can be mentioned stakeholder analysis, correlation analysis and communication of uncertainty.

There is a lot to be gained by improvement of uncertainty analyses, but the greatest potential to be realised lies, after all, in how we deal with the results from the analysis, and how the uncertainty is managed throughout the whole project. The elements listed below are considered most important, and they are selected based on the perspective of 'the big picture'.

The first two points are connected to improvement of the analysis:

- How to assure relevant and reliable input.
- How to ensure better guesstimates about future needs and demands.

The last point is about how we in total deal with uncertainty in the project work:

"Enhance uncertainty management to include opportunity management, and to be a part of the philosophy of management in both project and corporate.

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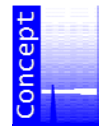
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