



RISK DOCTOR BRIEFING

SEVEN STEPS TO MONTE CARLO



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Monte Carlo simulation is the most common way to analyse risk using numbers. But many people view quantitative risk analysis as too difficult, perhaps because it involves mathematics, statistics and computers. As a result, they miss out on the insights available from this powerful technique. The following seven steps make it easy to do Monte Carlo analysis properly:

1. **Define your purpose.** Why do you need to do this analysis? What is the scope? You might only be interested in one type of risk exposure, such as risk to cost, schedule, resource levels, profitability or cashflow. Or maybe you need an integrated view of overall exposure to several types of risk. The questions to be answered should be clearly defined at the start. For example, are we making a “go/no-go” decision, or working out how much contingency we need, or assessing what outcomes are possible, or trying to find the biggest risks?
2. **Develop your model.** The risk model might be built starting from an existing baseline like a project plan or budget, with added risks. Or it might look only at the risks themselves. Einstein’s advice to “*Make things as simple as possible, but not simpler*” is the key to a good risk model. It needs to reflect reality at a level that allows the effect of risk to be visible. A wide range of proprietary risk tools is available, or a risk model can be created in common office software, and we should use a tool that matches the level of analysis we are doing.
3. **Produce input data.** Now we need data to go into the risk model. These must reflect all relevant risks, including both *threats* and *opportunities*. We must include *variability* on known tasks (using ranges of values), as well as *ambiguity* (using stochastic branches). We also need to identify *dependencies* between risks (using correlation). Data are usually based on the current Risk Register, which provides an important audit trail.
4. **Validate model.** The completed model is then tested by running a large number of iterations. This allows us to check that the model is robust with no data input errors or false logic. Any errors should be corrected before we go any further.
5. **Run model with and without risk responses.** Next we produce a second version of the risk model that includes the effect of agreed risk responses. Comparing this with the first version shows how our planned actions will affect the overall risk exposure, and whether they are adequate or not.
6. **Produce and analyse outputs.** Monte Carlo analysis can tell us many useful things about risk exposure, including the range of possible outcomes, the likelihood of achieving our objectives and targets, the most influential risks, the main risk drivers, and the most effective actions.
7. **Decide on appropriate action and report results.** Now we need to think, and decide what to do next! Actions could include anything from adopting a completely new strategy to minor tactical adjustments. And we need to tell others what we’ve discovered about our risk exposure and what we’ve decided to do about it.

Monte Carlo simulation does not need to be complex and it should not be feared or avoided. Following these seven simple steps will ensure robust and realistic modelling, and allow you to gain the benefits of this powerful technique. Try it and see for yourself!