Chapter 6
Model Validation by Using Monte-Carlo Simulation

One of the biggest disadvantages of the proposed model based on influence diagrams is deterministic nature of input parameters. Each parameter in the network is set on the basis of the weighted mean of values obtained in the process of elicitation, not reflecting the diversity of experts' opinion. For this reason, the same mathematical model was implemented using Microsoft Excel and Oracle Crystal Ball software. The base values of the input variables are set in the same way as the parameters of the influence diagram, however, for each input parameter is defined as a random variable. That means each variable is represented not only by the mean value but also using entire distribution obtained in the elicitation process. Figures 1, 2, and 3 show distributions for all three input variables related to the change management.

Using described methodology, the stochastic equivalent of the influence diagram was made. The main goal of this modeling approach is running Monte-Carlo simulations. The first simulation was run without optimization, just applying the distribution obtained by elicitation. Each simulation has had a total of 10 000 trials and some of the results are shown in Figures 4, 5 and 6.

The graphs, presented on the Figures 3, 4, 5 and 6 show the stochastic nature of availability prediction. If there are 13 variables, which can affect the availability and which are not at the best practices level, it is not possible

DOI: 10.4018/978-1-5225-2268-3.ch006

Figure 1. Probability distribution of investments cost in the change management
Source: Author's Illustration

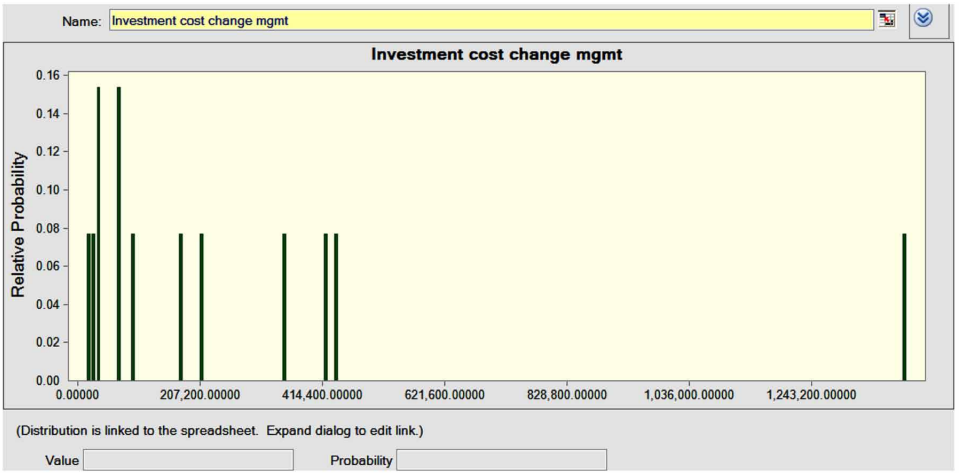

Figure 2. Probability distribution for the state of the change management
Source: Author's Illustration

to precisely determine the time and the effect that this weakness may cause. Thus, it is not possible accurately to predict the IS availability percentage, rather, it is possible to predict that availability will be inside the predicted range with particular certainty level. According to the results of the simulation, authors got the IS availability range from 98.33% to 99.76% with 90% confidence for the case in which best practice are not applied. Mean and