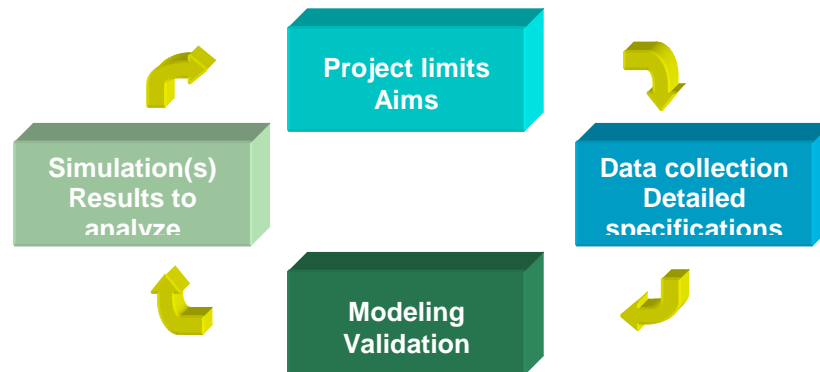# The success of a simulation project

Whether you want to achieve internally a simulation project, or prefer to have it developed by a third party, its success depends primarily on a good anticipation of the various steps it is made of.

Steps in a study

Each step has its own traps, and must be dealt with care and method.

The first step is to **identify the study**, and formulate which questions it will answer … and will not! For it is not efficient to try and include everything into a project: the model will be very intricate, which means long to build and difficult to use. It is better to conduct two well aimed smaller studies, one after the other, rather than start with something big and very global.

The second step will be used for gathering data until writing **detailed specifications** that will explicitly list everything that is part of the study. It is a serious and concrete analysis task, requiring a real know-how about modeling implications, formalization of heterogeneous information, extracting and implementing control rules. Already at this stage, without even getting close to a computer, the simulation approach will have changed your vision of the system, and will turn out to be a precious catalyst for ideas among the involved team.

The third step for **modeling and validation** will reflect the quality of the specs. The model will be straight and easy to build if the description of the system was done with adapted methodology. The quality of the resulting model (being robust, evolutionary, legible) will also depend on the expertise with the modeling tool.

Lastly comes the simulation step, that is, **exploiting the model** by testing options, and analysing the corresponding results. This stage can last longer than expected, especially if the « designs of experiments » were not correctly prepared, or if the results (statistics, graphs, animation, figures) are scattered everywhere.

Already with step 2, it is common to observe some changes in the project and its goals: one question is abandoned; an alternative and new options are added on another section. And this is quite normal: simulation is an iterative approach, that gets fed by what it reveals, and adjustments will be all the more important as the experience is low. On the other hand, beware of unstable projects with no characteristic aims.

Do not built the first model alone

The current available simulation tools, accessible both technically and financially, make it possible to consider developing some internal simulation competency. It implies having one lasting person that has been trained and that will be able to devote many hours to simulation projects, from time to time. A simulation study cannot be made from extra hours or week-ends!

Whatever the context, the first simulation project puts up with all teething problems: first use of new software, initial confrontation to the stages of a study, modelling situations that were never met.

An expert at your side will help avoid many problems:

- he will help circumscribe the questions and will choose the most adapted precision level (beginners will have a tendency to build a heavy model with too many details),
- he has a « flow vision », and will specify how to formulate the questions about the system, and how to transcribe the answers,
- he will have a neutral point of view on modeling (will take nothing for granted), as much as on possible solutions.

A simulation study done by service providers does not imply excessive costs: an expert works fast, with tools he has a perfect knowledge of, and he is committed to respect specifications and delays.

For a first experiment, this will limit drifts (costs, delays, consistency) common in a study entirely realized internally. The reason is that it could turn out to be costly: software licence, training, assignment of a person.