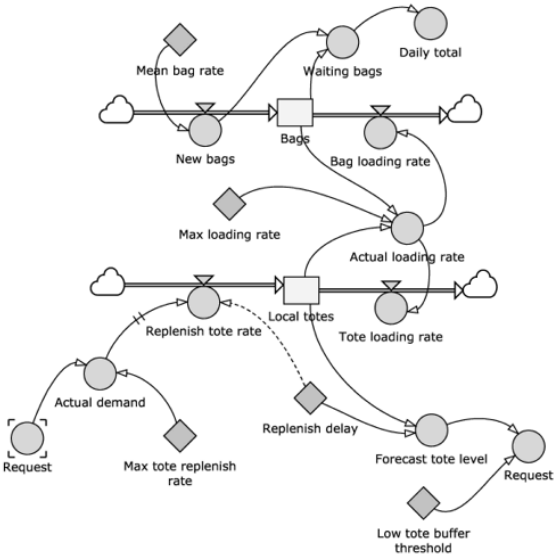
ANALYTICAL DECISIONS

Operational Analysis



New strategies in a controlled, safe environment

The main tools and techniques used by Analytical Decisions fall into four categories:

- analytical
- modelling
- simulation
- emulation

In fact, we generally look for solutions in this order. Assignments for clients also tend to follow this order, as ideas that are initially unpolished are tested and refined in increasing detail.

Analytical approaches, modelling, simulation and emulation all offer a common benefit: the ability to try out new ideas and strategies in a safe, controlled environment, without risk to the organisation or business.

Analytical approaches

Analytical approaches are characterised by great economy in formulation, fast turnaround times and fundamental insights. When possible, they are extremely powerful. For example, for British Airways we were are able to take large quantities of measured data about the way passengers check-in at an airport and produce a simple, analytical expression with only two parameters that encapsulated this behaviour.

$$f(\alpha,\beta,t) = \frac{\beta^{-\alpha} x^{\alpha-1} e^{-\frac{x}{\beta}}}{\Gamma(\alpha)}$$

The real benefit to the airline, however, came from the ability to vary these parameters to represent passengers' behaviour when using non-traditional check-in methods. This approach was used in a study to examine the impact of e-tickets and self-service check-in.

Modelling

Modelling solutions arise where the complexity of the situation is simply too great to be dealt with analytically. This is often the case in real life. However, the aim of a modelled solution is to encapsulate the significant factors in a problem while avoiding low value-added factors. Modelled solutions require more investment in initial development, but can also provide fast turnaround times. By concentrating on the significant factors, modelled solutions are very appropriate for strategic problems.

System dynamics is a well known tool in the development of policy and strategy. Analytical Decisions has extended its use to complex, real-world engineering applications, providing quick results that capture the dynamic nature of the scenario.

Simulation moves another step towards a virtual reality. Simulations aim to represent processes and systems in great detail. Simulations can require considerable investment in development. The real strength of simulations is in providing a thorough testing of the underlying system and processes. In fact, the process of developing a simulation is often an acid test of the maturity of the concept.

Using advanced discrete event simulation tools we can create high fidelity, visually helpful models.

Emulation is the final step, just short of reality. This is where a simulation actually makes use of real equipment and actual software. Emulation can offer early evidence of how the actual, delivered components of a system will perform.