



ABSTRACT

Investigations into the decision-making behaviour of managers are carried out in this thesis with the help of a system dynamics based game. The game, based on a text-book system dynamics model, depicts dynamic fluctuations in the quality of an electronic component. A framework is laid out and used for the development of the game. The interactive game has a transparent model, is flexible and versatile because of its database-orientation, captures the within-period dynamics of the real system, and includes user-friendly reports, plots, and utilities. Performance benchmarks are also created with the help of the policies designed for the original system dynamics model.

The game is played with groups of students, research scholars, and practising managers under various control environments. These environments are created by providing to the subjects (a) complete and partial causal information, (b) mid-plan review facility, and (c) decision support systems. The effects of these environments on the decisions made and performance achieved by the subjects are studied by a content analysis of the subjects' comments, a qualitative analysis of the game results, and by statistical tests of hypothesis. A framework is laid out and used to build and evaluate the optimization model based decision support systems. Decision-making behaviour of the high-performers is analyzed in detail with the help of multiple regression and bootstrapping simulations.

The investigations reveal that without complete causal information, decision makers tend to make ad-hoc decisions without a definite strategy. Mid-plan review of decisions, although attractive to a decision maker, is not very effective. When the complete causal information is available, the decision makers build simple decision heuristics based on universally known principle of anchoring and adjustment and try to consistently follow them. The investigations also reveal that optimization models forming the core of decision support systems, should be built and evaluated on the basis of system dynamics based games for their effectiveness.

Keywords: Decision Making, Gaming, System Dynamics, Causal Information, Database-Orientation, Optimization.