
Modelling Qualitative Information in a Management Simulation Game

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1 Management Simulation Games and the Importance of Qualitative Information

Management simulation allows students to apply their theoretical knowledge in a safe, feedback-learning context. The quality of the simulation model is important for the achievable learning effect. A model always simplifies reality, but should still strive for a realistic implementation of key factors and relationships of the modeled situation. Vague information and qualitative relationships have a great significance in practical business. In management games, however, such qualitative aspects are often excluded from the simulation as it is difficult to model them adequately [1]. Concepts like "competence", "image" and "credit rating" are meaningful to business, but difficult to grasp with conventional simulation modeling. In our contribution an approach based on fuzzy sets is presented to help overcoming these difficulties.

2 Background of the Management Simulation Game FuSi

The educational goal of our development activities is to offer students of business computing a computer-based general management simulation game as part of their practical education. We extend previous work from the first author's prior research group at the University of Göttingen [2]. Three components make up the practical game: a) the players that take periodical management decisions based on feedback information from the simulation, b) the game leader who adapts the simulation, starts and supervises the game, discusses the final results with the participants, and c) the simulation model itself that takes the players decisions and converts them to market results (feedback) at the end of each playing period. The feedback to the players comes in the forms of electronic reports. Figure 1 gives an overview of the main components and relationships in the simulation model of our management game FuSi (**F**uzzy **S**imulation). A company is represented by a group

of players who take the position of the company’s management. During each playing period they take decisions in the following business areas: procurement (raw material and machines), production (volume, maintenance, environmental investments), sales (price, marketing, customer service), personnel (employment, dismissal at different levels of qualification), finance (credits, cash management).

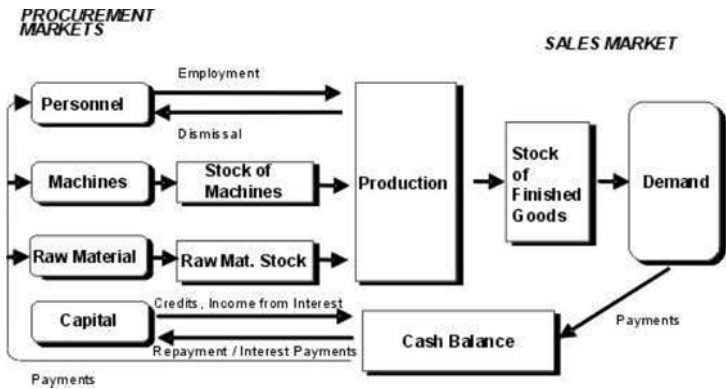


Fig. 1. Overview of simulation model in management game FuSi

Technically, the simulation model consists of two components. One represents the quantitative parts of the model, implemented with mathematical equations in VisualBasicTM under MS AccessTM. The other incorporates the qualitative parts and is realized with the tool Fuzzy Control ManagerTM in the form of a rule-based system. Both parts of the model communicate via the Dynamic Data Exchange (DDE) protocol. Finally, all results of the simulation are integrated in the VisualBasicTM framework for a consolidated output to the participants of the management game.

Many business figures, such as price, sales volume and production costs have a quantitative character and can, therefore, be modeled with traditional equations. Others, like the product image or the credit rating of the company are of a qualitative nature. Also many important relationships are vague and difficult to model with traditional approaches, such as the influence of employee qualification on product quality and scrap volume, or the connection between product image and sales. Fuzzy sets offer an elegant way to model such qualitative information as is outlined in the following section in the context of credit rating.