

LGPP-CIRRELT

Summary of Master project

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Study and simulation of the dynamics of competition between Supply Chains on a common market

Gaëtan Rey, Microengineering Section

Professors: Glardon Rémy, Montreuil Benoit

The XBeerGame, developed in the CIRRELT at University Laval, Quebec, is an extension of the beer game developed at MIT in the 1960s. Its use was so far limited to a single supply chain on one market and it was impossible to investigate a competition between several supply chains.

The goal of this project is to develop an algorithm of demand distribution that allows simulating several supply chains in competition on a common market. The modeling of the demand distribution between several supply chains is based on an estimation of the behavior expected from a purchaser faced with variable performances of his/her suppliers

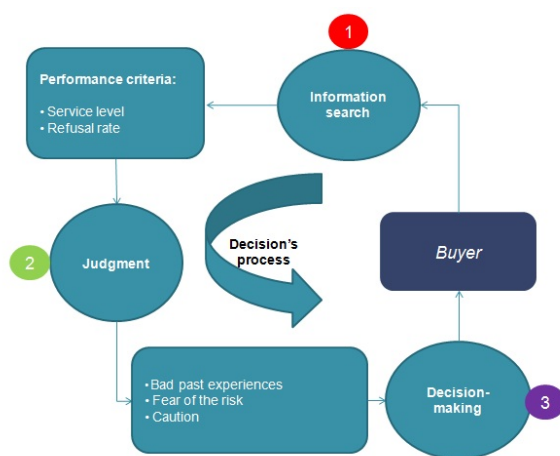
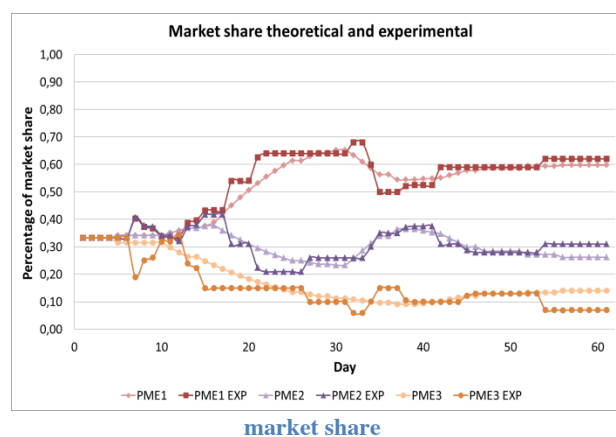


Figure 1: buyer decision's process

This behavior is divided into three main phases: Information search about supplier performances, judgment of the suppliers and final decision-making.

Using the XBeerGame platform, a series of tests are performed with human players to validate the developed algorithm. Each player takes the role of a purchaser faced with fluctuating performances of the suppliers and modifies accordingly their market shares.

Figure 2: Theoretical Market share and experimental



An optimization of the algorithm variables applied to each tests allows achieving satisfactory results with a mean absolute percentage error (MAPE) of about 22% and a mobile MAPE of 17%.

The algorithm seems to model adequately the potential buyer's trends. It opens up promising prospects in modeling competition between supply chains on a common market.