



Development of a stochastic model to estimate the customer lifetime value

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ABSTRACT

Companies have become increasingly customer-oriented, aligning their actions around them. Customer relationship management provides companies the opportunity to contact the right customer at the right time and through appropriate marketing contact. One of the means for customer management is the Customer Lifetime Value (CLV) metric, which consist in predicting the future cash flows of each customer. The objective of this paper is to present a stochastic model to estimate the CLV of supermarket customers, based on a family of extreme value distributions and two other families that we found good adjust to the variables. We use the renewal reward stochastic process to adjust the interpurchase time and ticket value. Given that currently there is no analytic solution to the renewal function of the generalized extreme value distribution, we propose a solution based on discrete event simulation. We performed a validation with real data from a supermarket. Among 533 customers, 60.41% adjusted to both variables and, among these, 92.23% fell between 95% of the simulated values. A stability test was also performed, showing similar results between the two halves of the test portion. These results show that a stochastic model based on extreme value distributions presents a reasonably good adjustment to a supermarket setting. Despite the fact that an analytical solution couldn't be proposed, we showed that it is possible to be solved with discrete event simulation.

KEYWORDS. CLV. Extreme value distribution. Stochastic process.

Probabilistic models, Simulation, Other applications in OR