Development of e-Marketing Contract Structure Based on Consumer-Generated Contents and Its Optimal Strategy

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Abstract

A new e-Marketing contract structure is proposed, where the contract would be exchanged between an e-Marketing company, named Company X, and a manufacturing company, named Company Y, which is to promote Product Z within a group of SNSs (Social Network Services). Company X promises Company Y to generate $Q$ positive comments about Product Z within SNSs, and then hires $K$ bloggers, asking them to experience Product Z and write comments about it. They are expected to play a role of pumping water so as to fulfill the contract. Each of such bloggers is paid by $\$c$. For this service, Company Y pays Company X by the amount of $\$Q$. Should the actual number of positive comments exceed $Q$, the additional payment of $\$b$ for each positive comment beyond $Q$ would be paid to Company X by Company Y. For controlling the risk of the actual number of positive comments to appear within SNSs falling below $Q$, Company X pays the penalty of $\$\gamma$ for each shortage below $Q$. The problem for Company X is then how to determine $Q$ and $K$ so as to optimize its objective. Two types of problems are considered, where the first problem is to maximize the expected profit of Company X while the second problem is based on the VaR (Value at Risk) approach to minimize the probability of the profit of Company X falling below $v_0$ subject to having the expected profit above $v_1$. Although this problem has a flavor of the classical news vendor problem, it is more difficult because of its two dimensional nature. For the first problem, the exact optimal solution is derived apart from the integer constraints and an algorithmic procedure is developed for computing the optimal solution. For the second problem, it is shown that the distribution function of the profit of Company X can be given explicitly, thereby providing a computational foundation for solving the problem. Numerical examples are given, illustrating the stochastic structure of the e-Marketing contract and the differences of the optimal strategies for the two problems.