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A b s t r a c t

Title	Stochastic demand forecast under seasonally cyclical fluctuation and the optimal investments by real options approach (季節性周期変動における確率的需要予測とリアル・オプション・アプローチによる最適投資)
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(800 words)

Demand forecasting prior to an actual demand is inevitable in supply chain. If there is a gap between them, friction against smoothing should be removed. However, the soft drink industry has been faced with technological and market uncertainties. The technological uncertainties, for example, arise from reasons as strengthen in food sanitation standard, wasteful use of resources short expiration date, and innovation in containers. The market uncertainties are such as daily demand which is known just on the day stating production, sudden cancellation of production contract, and product life cycle. Because of these uncertainties, an improved cooperative supply chain between buyer and supplier is required in order to build out the productive system for commercial production.

The focus of this study is to determine the appropriate demand forecasting in yearly and monthly units, and to respond to them from supplier's (producer's contract with buyer) perspective by using real options approach (ROA). The basic idea of ROA is to enable the investment for improved value of commodity or real assets through flexible decisions in the future. Here, real option is a right, but not an obligation, to exercise. In this study, ROA is applied to the matters, from not only long but also short terms, of concern about supply chain.

This study is mainly divided into three parts: (1) potential capital investment for long term sales, (2) potential capital investment in seasonal high demand for medium term sales, and (3) possible investment in the optimal production for daily sales.

First topic is potential capital investment for long-term sales. Annual demand is forecasted by autoregressive integrated moving average (ARIMA) model which is one of the methods for time series analysis. ROA indicates when, how much sales and how to respond to demand in cases of demand increase and decrease. If sales of soft drink are favored, the supplier can exercise the option to expand (American call option) and is expected to increase the sales. If the sales are