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Supply Chain Capacity Planning for Printing Circuit Board Based on Demand Forecasting for Computer Products

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Capacity planning (CP) and demand forecasting (DF) are two critical and related issues necessary to achieve successful supply chain management. C Prefers to determining the maximum output of resources (e.g. raw materials, labor size, equipment, etc.)that a firm can handle to match dynamically changing demands for its products. DF usually relies on either qualitative schemes (e.g. panel consensus, historical analogy, market research) or quantitative techniques (e.g. statistical regression, time series, machine learning). In practice, efficient DF can support data driven decision-making for effective CP, such as aggregate planning, production scheduling, and inventory control. In this research, a novel framework is presented as follows. First, vector auto regression (VAR) and Granger's causality tests are applied to identify the significant computer products that can well predict global shipments of PCB (printed circuit boards). Second, autoregressive integrated moving average (ARIMA) is used to construct time series to achieve efficient DF for the downstream computer products (i.e. smartphone, tablet, desktop, laptop, and panel display).Finally, support vector machine (SVM) is conducted to achieve effective CP and sensitivity analyses for the upstream PCB. Experimental results show that this framework can help PCB firms successfully accommodate seasonal variation and demand uncertainty. More importantly, the dynamics between the upstream PCB and the downstream computer products have been captured and incorporated into collaborative forecasting.

Keywords: predictive analytics, capacity planning, demand forecasting, supply chain.

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