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PROJECT

KNOWLEDGE INSTITUTE OF TECHNOLOGY

TEAM 8

DATA ANALYTICS-RETAIL STORE STOCK INVENTORY ANALYTICS

LITERATURE SURVEY

Role of inventory and transportation costs in determining the optimal degree of centralization

This paper presents a formal analysis of the inventory centralization decision in a wider perspective. Expressions for various elements of total system cost are developed and their individual and combined effects on centralization are analyzed using an optimization model. The major thrust of the paper is on the optimal degree of centralization as a tradeoff between inventory and transportation costs. It considers five scenarios each representing a different role of inventory and transportation in the total supply system. Examples of how each scenario may arise in practice are given and the best degrees of centralization for the scenarios are compared and illustrated with secondary data.

Inventory, transportation, service quality and the location of distribution centers

A crucial question in the design of efficient logistics systems is the identification of locations for distribution centers (DCs). However, the optimization of these location decisions requires careful attention to the inherent trade-offs among facility costs, inventory costs, transportation costs, and customer responsiveness. This paper presents a modeling approach that provides such an integrated view, and illustrates how it works in the context of a specific example involving the distribution of finished vehicles by an automotive manufacturer.

Emerging Market Retail: Transitioning from a Product-Centric to a Customer-Centric Approach

In this study, we examine the impact of the COVID-19 pandemic on food retail supply chains (SCs) and their resilience. Based on real-life pandemic scenarios encountered in Germany, we develop and use a discrete-event simulation model to examine SC operations and performance dynamics with the help of any Logistic digital SC twin. The computational results show that food retail SC resilience at the upheaval times is triangulated by the pandemic intensity and associated lockdown/shutdown governmental measures, inventory-ordering dynamics in the SC, and customer behaviors. We observe that surges in demand and supplier shutdowns have had the highest impact on SC operations and performance, whereas the impact of transportation disruptions was rather low. Transportation costs have spiked because of chaotic inventory-ordering dynamics leading to more frequent and irregular shipments. On bright side, we observe the demand growth and utilization of online sales channels yielding higher revenues. We propose several directions and practical implementation guidelines to improve the food retail SC resilience. We stress the importance of SC digital twins and end-to-end visibility along with resilient demand, inventory, and capacity management. The outcomes of our study can be instructive for enhancing the resilience of food retail SCs in preparation for future pandemics and pandemic-like crises

Food retail supply chain resilience and the COVID-19 pandemic: A digital twin-based impact analysis and improvement directions

In an environment with digital disruptions, retailers must adopt a customer-centric approach to survive and compete effectively. Retailers need to be agile and forward-looking in adopting the relevant analytics and performance metrics to bring a customer-centric approach across upstream and downstream activities in the retail value chain. However, retailers in emerging markets (EMs) need clarity on the specific analytics and performance metrics in the value chain that will enable them to transition from their current product-centric state to the desired customer-centric state. Employing a triangulation approach (i.e., literature review, marketplace evidence, and managerial interviews) in the fragmented retail landscape of EMs, this study provides an organizing framework that explains: (i) the need for a customer-centric approach across the retail value chain, (ii) the specific performance metrics that need to be adopted across upstream and downstream activities in the retail value chain to enable EM retailers to achieve their desired customer-centric state, and (iii) the role of analytics in providing insights to achieve these performance metrics and improving monetary and non-monetary firm performance outcomes. We also provide firm-specific and macro-level conditions that can influence the EM retailers' adoption of relevant analytics and explain the different paths retail formats can follow to adopt analytics. We present a strategy matrix that enables retail managers to identify the appropriate analytics to be adopted at different retail value chain stages to achieve desired performance metrics. We also highlight future research opportunities in retailing in EMs.

RFID Application Strategy in Agric-Food Supply Chain Based on Safety and Benefit Analysis

Agric-food supply chain management (SCM), a management method to optimize internal costs and productivities, has evolved as an application of e-business technologies. These days, RFID has been widely used in many fields. In this paper, we analyze the characteristics of agric-food supply chain. Then the disadvantages of RFID are discussed. After that, we study the application strategies of RFID based on benefit and safety degree.

Optimal inventory management for a retail chain with diverse store demands

Item demands at individual retail stores in a chain often differ significantly, due to local economic conditions, cultural and demographic differences and variations in store format. Accounting for these variations appropriately in inventory management can significantly improve retailers' profits. For example, it is shown that having greater differences across the mean store demands leads to a higher expected profit, for a given inventory and total mean demand. If more than one inventory shipment per season is possible, the analysis becomes dynamic by including updated demand forecasts for each store and re-optimizing store inventory policies in midseason. In this paper, we formulate a dynamic stochastic optimization model that determines the total order size and the optimal inventory allocation across no identical stores in each period. A generalized Bayesian inference model is used for demands that are partially correlated across the stores and time periods. We also derive a normal approximation for the excess inventory from the previous period, which allows the dynamic programming formulation to be easily solved. We analyze the tradeoffs between obtaining information and profitability, e.g., stocking more stores in period 1 provides more demand information for period 2, but does not necessarily lead to higher total profit. Numerical analyses compare the expected profits of alternative supply chain strategies, as well as the sensitivity to different distributions of demand across the stores. This leads to novel strategic insights that arise from adopting inventory policies that vary by store type.