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# Integrating perishables' short life into assortment optimization

Retailers'product mix selection is a key determinant of market share, profitability, and long-term success. While a broader assortment increases the likelihood of meeting diverse customer preferences, it raises inventory-related costs and stockout risks, ultimately affecting operational performance and customer loyalty. This challenge is amplified for perishable goods, where limited shelf life narrows the selling window and increases spoilage risks. Despite extensive research on assortment optimization, existing models fail to integrate perishability dynamics. The few studies that consider shelf life treat it as a constraint rather than a factor influencing substitution patterns and retailers'profitability. However, ignoring perishability can lead to suboptimal product selection, excessive waste, and lost revenue. This study introduces an assortment optimization framework that integrates remaining shelf life into decision-making. Unlike conventional models, it accounts for shelf-life-sensitive demand and substitution effects, helping retailers balance waste reduction, profitability, and service levels. Using historical data from a European grocery retailer, we assess the framework's effectiveness and quantify the profitability and waste gap. Our findings highlight the importance of shelf life in assortment planning, introduce new heuristics for perishable product selection, and offer actionable insights to improve retail efficiency, sustainability and financial performance.

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