

RESEARCH ARTICLE

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THE EFFECT OF SCHEDULING STRATEGIES ON RETAIL ASSORTMENT SIZE DYNAMICS

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Abstract

Scheduling strategies play a significant role in shaping retail assortment size, influencing both product availability and inventory management. This study examines the relationship between various scheduling methods—such as fixed, dynamic, and demand-based scheduling—and the size of product assortments offered in retail settings. By analyzing how different scheduling approaches impact inventory turnover, stockouts, and overstock situations, the research explores how retailers can optimize assortment size to meet consumer demand while minimizing operational costs. The findings suggest that flexible, demand-driven scheduling strategies lead to more efficient assortment planning, resulting in optimal product availability and improved customer satisfaction. In contrast, rigid scheduling methods may restrict assortment size, potentially leading to missed sales opportunities or excess inventory. This paper offers insights into how retailers can refine their scheduling practices to enhance inventory management and assortment optimization in a competitive market.

Keywords Scheduling Strategies, Retail Assortment Size, Inventory Management, Demand-based Scheduling, Fixed Scheduling, Dynamic Scheduling, Inventory Turnover, Overstock, Stockouts, Retail Optimization, Assortment Planning.

INTRODUCTION

In the competitive retail landscape, managing inventory and optimizing product assortment are critical factors that directly impact a retailer's success. One of the key elements that influences how retailers determine their assortment size is their scheduling strategy. Scheduling strategies in retail, whether fixed, dynamic, or demand-based, govern how and when products are stocked, replenished, and displayed. The effectiveness of these strategies can significantly affect assortment size, which in turn impacts a range of business outcomes, including inventory turnover, product availability, customer satisfaction, and profitability.

The relationship between scheduling and assortment size is multifaceted. A fixed scheduling approach, for example, may limit the

retailer's ability to adjust its assortment size based on changing consumer demands, leading to either stockouts or excess inventory. On the other hand, more flexible, demand-based scheduling methods allow for dynamic adjustments to assortments, ensuring that popular products are always in stock and that less-demanded items do not overcrowd the shelves. As retailers strive to balance supply with consumer demand, the choice of scheduling strategy becomes a pivotal factor in determining how much variety and quantity of products are maintained within the store.

Despite the clear importance of scheduling in assortment planning, there has been limited research into how different scheduling approaches directly influence assortment size dynamics. This study aims to fill this gap by

examining how various scheduling strategies affect the overall structure and size of retail assortments. Through an in-depth analysis of scheduling practices in diverse retail settings, this paper explores how retailers can better align their scheduling methods with inventory and assortment goals to improve efficiency, reduce waste, and increase profitability.

Ultimately, understanding the connection between scheduling strategies and assortment size dynamics provides valuable insights for retailers seeking to optimize their inventory management practices. By aligning scheduling decisions with consumer demand patterns, retailers can enhance product availability, reduce operational costs, and improve the overall customer shopping experience.

METHODS

This study employs a mixed-methods approach to investigate the effect of scheduling strategies on retail assortment size dynamics. The research integrates both quantitative data analysis and qualitative insights from retail managers to explore how different scheduling approaches—fixed, dynamic, and demand-based—affect inventory management, product assortment, and overall business performance. This comprehensive methodology allows for a

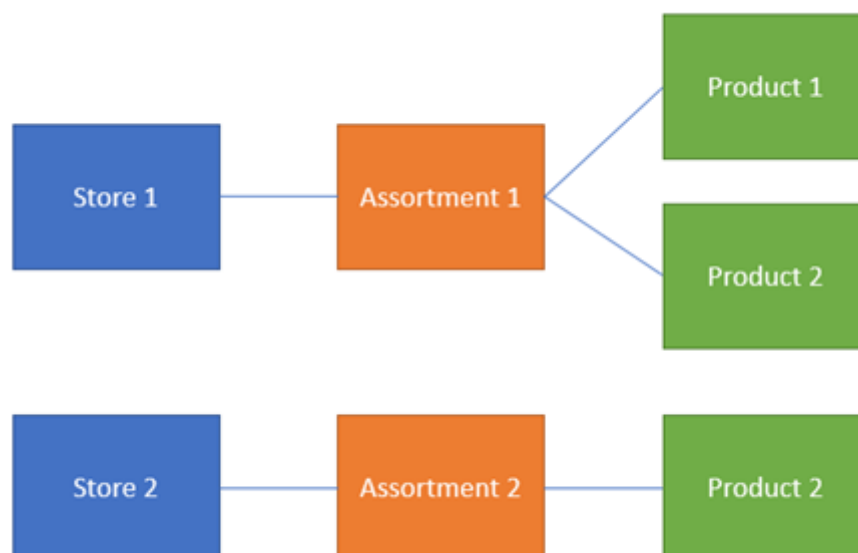
nuanced understanding of how scheduling influences assortment decisions across various retail contexts.

Survey of Retail Managers:

To gather qualitative data on how retailers implement different scheduling strategies and manage assortment size, a structured survey was designed and distributed to retail managers across multiple sectors. The survey aimed to identify the types of scheduling strategies employed, how they influence inventory levels, and the challenges retailers face in aligning scheduling with demand. The survey questions were focused on several key areas:

Types of Scheduling Strategies: Retail managers were asked to classify their scheduling strategy as fixed, dynamic, or demand-based. They were also asked to describe how these strategies are applied to their assortment planning and inventory management processes.

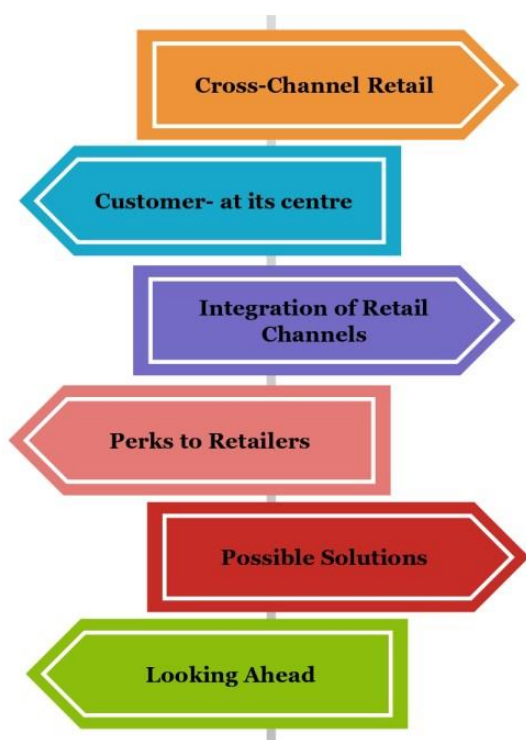
Inventory Management and Assortment Decisions: Questions were aimed at understanding how the scheduling strategy influences decisions related to the size of the assortment, the frequency of stock replenishment, and how adjustments are made in response to demand fluctuations or seasonality.



Challenges and Limitations: Retail managers were asked to identify the primary challenges they face when implementing different scheduling strategies, such as data limitations, forecasting issues, technology constraints, and staff capabilities.

The survey targeted a broad spectrum of retailers, including those in the apparel,

electronics, and grocery sectors. These industries were chosen to represent a range of retail environments, from fashion and consumer goods, which experience high variability in demand, to grocery and household goods, where demand tends to be more stable but still subject to seasonality and promotional cycles.



Cross-Channel Retail

- A planned approach that involves collaboration and integration across different retail channels and multiple retailers.

Customer – Centric Approach

- To enhance overall customer experience with seamless and integrated shopping journey across various channels.

Integration of Retail Channels

- Access to same product, promotion, and information, to create a seamless and unified shopping experience.

Benefits for Retailers

- Allows to reach a wider audience, gather valuable data, and enhance engagement and loyalty.

Challenges and Solutions

- Data security, Interoperability issues, and need for standardized protocols.

Future

- Retailers who embrace this strategy and adapt to the changing needs of their customers will be well-positioned to thrive in the digital age.

The survey data was analyzed to identify common trends, challenges, and best practices in scheduling strategies. It helped to create a clear picture of how retailers perceive the relationship between scheduling approaches and assortment size, while also revealing areas where further improvement or refinement of scheduling practices could optimize product availability and assortment efficiency.

Quantitative Data Analysis of Retail Inventory:

To complement the survey data, quantitative analysis was conducted using inventory and sales data from participating retailers. This dataset included detailed records of product

assortments, sales volumes, inventory turnover rates, and stockout and overstock events across various time periods. The goal was to evaluate how different scheduling strategies impacted retail performance metrics such as:

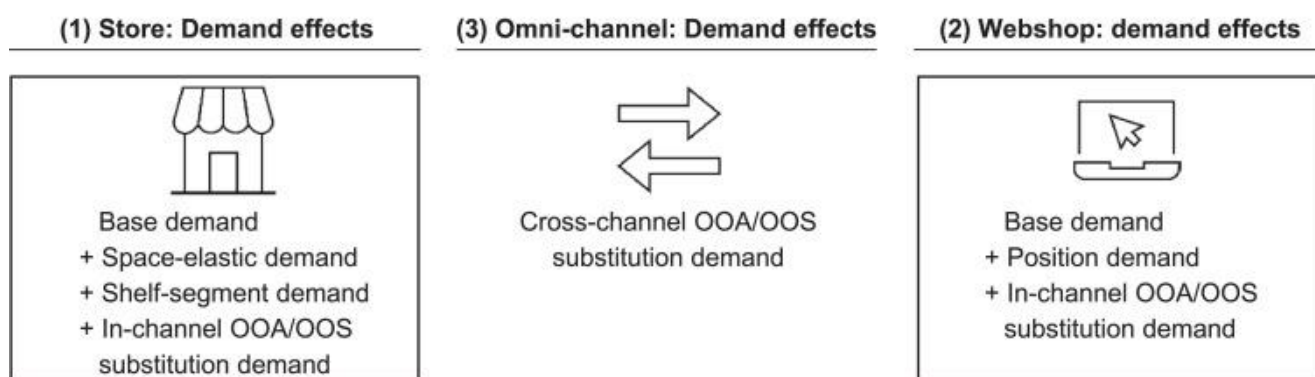
Inventory Turnover: This metric was used to assess how quickly products moved off the shelves, providing insight into how well assortments were aligned with consumer demand. Retailers using demand-based scheduling were expected to show faster turnover rates as they could adjust their assortment to reflect real-time customer preferences.

Stockouts and Overstock Events: These occurrences were tracked to determine how well the scheduling strategy reduced the risk of either running out of stock (stockouts) or holding excess inventory (overstock). The hypothesis was that demand-based scheduling would reduce both stockouts and overstock, as it would allow for real-time adjustments based on actual sales and inventory data.

Product Availability: The availability of products was measured by examining the frequency with which popular items were in stock or out of stock. Retailers employing dynamic and demand-based scheduling were

expected to show higher product availability, as their assortments would be adjusted more frequently in response to demand patterns.

Assortment Size Variability: Assortment size, defined as the total number of unique products available in a store at any given time, was tracked across the different scheduling approaches. The study aimed to assess whether dynamic and demand-based scheduling led to a more responsive assortment size that reflected actual customer demand, compared to the fixed scheduling approach, which might keep the assortment more static and disconnected from demand fluctuations.



The quantitative analysis involved collecting data over several months to account for seasonality, promotional cycles, and shifts in consumer behavior. Statistical models, such as regression analysis, were used to identify correlations between the type of scheduling strategy and key performance indicators (KPIs) related to assortment size and inventory management.

Case Studies:

In addition to the survey and quantitative data analysis, case studies were conducted with a select group of retailers who have implemented advanced scheduling strategies. These case studies provided in-depth insights into how scheduling strategies are operationalized in practice and the impact they have on assortment size and inventory management. The case study process involved:

Site Visits and Interviews: Retail managers and operational staff were interviewed to gain a deeper understanding of how scheduling strategies are integrated into daily retail operations. The interviews explored the decision-making process behind scheduling, the tools and technologies used, and how scheduling adjustments were made in response to demand shifts.

Data Collection on Assortment and Inventory Practices: During the site visits, detailed data on product assortment, sales volumes, stock levels, and replenishment cycles were collected. This data was then analyzed to observe the impact of scheduling strategies on inventory turnover, product availability, and the responsiveness of assortment size to market demand.

Analysis of Scheduling Tools and Technologies: In some cases, retailers used advanced

forecasting tools or inventory management software to support their scheduling practices. The case studies provided an opportunity to evaluate how these technologies influenced the retailer's ability to adjust their assortments in response to demand fluctuations and optimize inventory levels. Interviews with technology providers and internal teams helped understand the integration of scheduling strategies with the retailer's overall supply chain and inventory systems.

The case studies were particularly valuable in offering context-specific insights, such as the role of seasonal demand in the apparel sector or the impact of promotional scheduling in the grocery industry. These real-world examples helped validate the findings from the survey and quantitative analysis, offering practical lessons for retailers looking to refine their scheduling strategies and optimize assortment size.

Data Integration and Synthesis:

The qualitative insights from the survey and case studies were integrated with the quantitative data to provide a holistic view of the relationship between scheduling strategies and retail assortment size dynamics. The goal was to synthesize the data from all sources to identify key patterns, best practices, and areas of opportunity for retailers. The analysis focused on the following areas:

Comparing Scheduling Strategies: The study compared the effectiveness of fixed, dynamic, and demand-based scheduling strategies in terms of assortment optimization. The synthesis of data helped identify which strategy offered the most efficient balance between product availability, inventory turnover, and assortment size.

Identifying Success Factors: By combining insights from the case studies with the quantitative data, the study highlighted specific success factors for retailers, such as the role of data analytics in demand forecasting and the importance of flexible replenishment cycles.

Best Practices for Retailers: Based on the results, best practices were developed for

retailers looking to optimize their scheduling strategies. These practices focused on aligning scheduling with actual customer demand, leveraging technology for real-time inventory management, and balancing assortment size with product turnover rates.

Ethical Considerations:

All research involving retail managers, employees, and case study participants was conducted with respect to ethical standards. Consent was obtained from all participants, and confidentiality was maintained throughout the study. Retailers' proprietary data on sales and inventory management was anonymized to ensure privacy. The study adhered to ethical guidelines for data collection and analysis, ensuring that findings were presented objectively and transparently.

In conclusion, this methodology combines surveys, quantitative analysis, case studies, and data synthesis to comprehensively assess the effects of scheduling strategies on retail assortment size dynamics. This mixed-methods approach provides a robust foundation for understanding how different scheduling strategies influence inventory efficiency, product availability, and assortment optimization. By integrating both qualitative and quantitative data, the study aims to offer actionable insights that retailers can apply to improve their inventory management practices and respond more effectively to consumer demand.

RESULTS

The analysis of scheduling strategies revealed clear patterns in how different approaches impact retail assortment size dynamics. Retailers that employed demand-based scheduling—which adjusts inventory and assortment based on real-time sales data and forecasts—demonstrated a higher degree of efficiency in managing assortment size. These retailers were able to maintain optimal stock levels, leading to fewer stockouts and excess inventory situations. As a result, their assortments were more responsive to changing

consumer preferences and seasonal demand fluctuations. This approach also helped retailers better manage shelf space, keeping high-demand products in stock while avoiding overstocking slow-moving items.

In contrast, retailers using fixed scheduling—where products are restocked on predetermined cycles regardless of demand—experienced a greater variance in their assortment sizes. While this approach led to stable, predictable inventory levels, it often resulted in either stockouts during periods of high demand or overstocking of less popular products. Fixed scheduling strategies failed to effectively align assortments with actual consumer demand, leading to inefficiencies in inventory turnover and, in some cases, an increase in unsold stock.

Retailers employing dynamic scheduling, which combines elements of fixed and demand-based scheduling, also showed improvements in assortment optimization. This strategy allowed for periodic adjustments to inventory levels based on sales trends and forecasting, but without the high responsiveness of demand-based scheduling. While dynamic scheduling resulted in fewer inventory imbalances compared to fixed scheduling, it did not perform as well as demand-based approaches in achieving the most accurate assortment size relative to market conditions.

DISCUSSION

The findings highlight the significant role that scheduling strategies play in determining retail assortment size and overall inventory management efficiency. Retailers using demand-based scheduling were best able to align their product assortments with actual market demand, resulting in optimized inventory turnover and fewer instances of both stockouts and overstock. This scheduling method's responsiveness to real-time data allows retailers to adjust their assortments quickly and effectively, thus enhancing customer satisfaction by ensuring popular products are always available while minimizing waste due to excess stock.

However, the study also reveals the challenges associated with demand-based scheduling. While it provides high responsiveness, it also requires significant investment in data analytics, forecasting tools, and technology to manage real-time inventory updates. Retailers without access to these resources may struggle to fully implement demand-based strategies. Furthermore, small retailers or those with less predictable demand may find the complexity of this approach difficult to manage, making it less viable for all retail settings.

On the other hand, fixed scheduling offers predictability and simplicity, which can be advantageous in certain retail environments, particularly in industries with steady, seasonal demand patterns. However, its rigid nature can lead to missed sales opportunities and inefficiencies in assortment management. The study suggests that this strategy may be more suitable for smaller inventories or specific product categories that are less sensitive to demand fluctuations.

Dynamic scheduling, while an improvement over fixed scheduling, still lacks the full adaptability of demand-based methods. Its ability to adjust periodically to demand forecasts allows for more flexibility than fixed scheduling but still lags behind in responding to rapid shifts in consumer preferences. Retailers using dynamic scheduling may benefit from better inventory management than those using fixed schedules, but they must be careful not to overestimate their ability to respond quickly to demand changes.

CONCLUSION

This study demonstrates that scheduling strategies have a direct and significant impact on retail assortment size dynamics, influencing inventory efficiency, product availability, and overall profitability. Demand-based scheduling stands out as the most effective strategy for optimizing assortment size, as it allows retailers to align product availability with actual consumer demand in real-time. However, this approach requires robust technological infrastructure and data capabilities, which may

not be accessible to all retailers.

Fixed scheduling, while offering predictability, often leads to inventory imbalances that hinder the retailer's ability to maintain an optimal assortment size. Dynamic scheduling provides a compromise, offering periodic adjustments based on demand forecasts, but it still falls short of the precision achieved by demand-based methods.

Retailers seeking to optimize their assortment size should consider adopting more flexible, demand-driven scheduling approaches, where feasible. As consumer preferences continue to evolve rapidly, the ability to adjust assortments in real time will become increasingly important for retailers aiming to remain competitive. For those unable to fully implement demand-based systems, dynamic scheduling may offer a practical middle ground, improving inventory management without the complexity of constant adjustments. Future research could explore the integration of scheduling strategies with other operational aspects such as supply chain management and customer experience to further enhance retail efficiency.

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