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ANALYSIS OF DEMAND MANAGEMENT STRATEGY THROUGH THE RAFFLE MECHANISM IN THE SALES OF LIMITED-EDITION PRODUCTS

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ABSTRACT

This study provides insight into Hoops Indonesia's demand management strategy, which uses a raffle-based system to distribute highly sought-after, limited-edition items. By transitioning from traditional first-come, first-served models to a digital raffle style, the shop hopes to decrease operational inefficiencies, notably those caused by unexpected service delays and excessive line buildup. This paper utilises a quantitative framework that integrates primary consumer data with secondary literature to evaluate the effectiveness of the service process design, the application of multiple-server queueing theory, and the broader effects of the raffle system on customer satisfaction and Cost of Quality (CoQ). The findings show that managing artificial scarcity using randomisation selection not only improves service delivery but also reduces unfair bot activity, protecting brand equity and consumer trust.

Keywords: Demand Management, Raffle Mechanism, Queueing Theory, Service Time, Customer Satisfaction, Bot Usage.

INTRODUCTION

In the current retail landscape, the release of limited-edition sneakers and unique streetwear continually creates consumer interest that greatly exceeds the available supply (Hwang & Lambert, 2005). For specialized stores such as Hoops Indonesia, which frequently collaborates with top global brands to launch exclusive collections, managing this trend of "artificial scarcity" poses a significant operational difficulty.

Historically, physical lines and conventional digital releases functioning on a first-come, first-served model led to significant delays. These methods diminished service efficiency, raised physical security issues at retail sites, and generated substantial consumer dissatisfaction, a challenge often worsened by automated purchasing bots (Varian, 2001). To address these challenges, the raffle system has surfaced as an effective demand management approach. This study examines how Hoops Indonesia utilizes its digital raffle system to enhance service speed, handle fluctuating demand, mitigate bot disruptions, and maintain elevated customer satisfaction rates (Naumann & Giel, 1995; Taylor, 1994).

LITERATURE REVIEW

Demand Management & Forecasting

Effective demand management necessitates precise forecasting to synchronize inventory with consumer anticipations. In retail, it is vital to comprehend the various forecasting patterns, including trend, seasonal, and cyclical fluctuations. Time series prediction employs past data to estimate upcoming demand. Nonetheless, the distinctive qualities of limited-edition releases necessitate specialized approaches that go beyond conventional forecasting, emphasizing the management of artificial scarcity and consumer behavior (Sasser, 1976). Crucially, developing robust operational strategies to face demand fluctuations, especially during peak hype cycles or quarterly drops, is paramount for maintaining service consistency (Chandra, King, Kurniawan, & Nurhayati, 2025).

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Waiting Time and Service Time

In operations management, the connection between service time and waiting time determines the effectiveness of the service delivery system. Reducing customer wait times while ensuring a reliable and high-quality service rate is crucial for smooth operations and favorable consumer experiences (Davis & Maggard, 1990). Furthermore, the psychology of waiting lines suggests that unexplained or unfair waits feel longer than justified ones, making the management of perceived waiting time just as critical as actual waiting time (Maister, 1985; Katz, Larson, & Larson, 1991).

Customer Satisfaction & Bot Usage

Customer satisfaction in modern retail is heavily influenced by the perceived fairness of the purchasing process (Bielen & Demoulin, 2007; Jones & Peppiatt, 1996). The presence of automated programs (bots) in online sales gives resellers an uneven edge, undermining brand loyalty among authentic customers. Investigating ways to counteract bot effectiveness is essential for ensuring a fair consumer experience (Carmon, Shanthikumar, & Carmon, 1995).

RESEARCH METHOD

Primary & Secondary Quantitative Research Methods

This research is based on primary and secondary quantitative research methods. Quantitative research is a way to learn about a particular group of people, known as a sample population. Using scientific inquiry, quantitative research relies on data that are observed or measured to examine questions about the sample population (Ahmad et al., 2019). Quantitative research aims to quantify the data and generalize findings from a sample of a study from varied perspectives and to describe the specific qualities and rather important differences to generate conclusions in research (Ghanad, 2023).

The research uses a quantitative research method by utilizing primary quantitative data collected directly from respondents. The data are obtained through a structured questionnaire distributed to consumers who have participated in or are familiar with the raffle mechanism used in the sales of limited edition products. The questionnaire is designed to obtain information related to waiting time, service time, and customer satisfaction during the purchasing process through the raffle system. The collected responses provide numerical data that can be measured and analyzed to understand customer experiences with the raffle mechanism.

In addition, the research also uses secondary quantitative data obtained from existing sources such as company reports, previous studies, academic journals, and other relevant publications related to demand management strategies and the raffle mechanism in limited edition product sales. These data are used to support and complement the primary data analysis. Both primary and secondary data are then analyzed using quantitative techniques to evaluate the effectiveness of the raffle mechanism in managing demand and improving the overall customer experience.

THEORETICAL FRAMEWORK AND ANALYSIS

Service Time and Waiting Time Management

Stochastic service time denotes the idea that the time needed to serve every customer is inconsistent and uncertain. Even with a systematic digital registration process for raffle winners, the genuine transaction duration at the physical Hoops store differs among customers. Hoops employs several cashiers to handle winners (Allingham & O'Brien, 2019).

In order to find the amount of time the customer spends in the system, the arrival rate and the service rate must be determined as well. We are able to do so using Poisson’s arrival

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rate. Hoops has two servers in the service system, which means that a Multiple-Server Model (M/M/s) is used (Russell & Taylor, 2023).
Where:
s = number of servers
μ = Mean rate of service time
λ = Customer Arrival Rate (Poisson)
After the arrival and service rate has been determined, the probability that there are no customers in the system must be determined first (P0):

$$P_0 = \left[\sum_{n=0}^{s-1} \frac{(\lambda/\mu)^n}{n!} + \frac{(\lambda/\mu)^s}{s!} \left(\frac{s\mu}{s\mu - \lambda} \right) \right]^{-1}$$

Then we find the probability of n customers waiting in line (Pn):

$$P_n = \frac{(\lambda/\mu)^n}{n!} P_0 \quad \text{for } n \leq s$$

$$P_n = \frac{(\lambda/\mu)^n}{s! s^{(n-s)}} P_0 \quad \text{for } n > s$$

Then we can find the probability that a customer has to wait in line before being served (Pw):

$$P_w = \frac{(\lambda/\mu)^s P_0}{s!(1 - \lambda/s\mu)}$$

It is also possible to calculate the number of customers in queue (Lq):

$$L_q = P_w \times \frac{\rho}{1 - \rho}$$

Then the average number of customers in the system (L):

$$L = L_q + \frac{\lambda}{\mu}$$

Average time spent in queue (Wq):

$$W_q = \frac{L_q}{\lambda}$$

And finally the average time customers spend in the system (W):

$$W = W_q + \frac{1}{\mu}$$

And the possibility that servers are busy (Utilization, ρ):

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$$\rho = \frac{\lambda}{s\mu}$$

Queueing Theory

Queueing theory examines the formation of waiting lines and methods for their management (Bitran & Morabito, 1996). Hoops Indonesia encounters major queuing issues as raffle winners come to collect their shoes. Utilizing queueing theory, Hoops can analytically ascertain the ideal number of employees required to enhance the service rate. This theory lets us see the relationship between (Little, 1961):

- Arrival rate: the rate of customers coming in
- Service rate: the time rate of servers handling customers
- Waiting time: customer's waiting time in queue
- Service time: time spent by customers from queue until served

Service Process Design

Service Process Design is a model focused on organizing service delivery to achieve greater speed, efficiency, and consistency. By meticulously outlining each stage of the service process, businesses can significantly decrease service durations and lessen the chances of human errors. Hoops Indonesia utilizes this principle by incorporating a digitized data entry system integrated into its raffle process. Since customer information such as contact details and eligibility for purchases is recorded during online raffle registration, the actual physical transaction is greatly simplified. Instead of gathering and verifying customer information in person, employees only need to validate the automatically generated raffle number and handle the relevant payment, significantly decreasing the time each customer spends at the service desk.

This method directly tackles the issue of stochastic service times, which refer to the unpredictable variations in the duration of each transaction. By prioritizing the data collection process during the digital registration phase, Hoops Indonesia successfully normalizes the in-store experience, guaranteeing that every transaction adheres to a consistent and efficient order. The outcome is a quicker, more reliable service stream that minimizes queue congestion, decreases the chance of human mistakes, and enhances the overall customer experience—all of which are key goals of successful Service Process Design.

Customer Satisfaction

Quality of the Product

Hoops Point is a retail business focused on distributing popular, high-quality sneaker brands like Nike, Adidas, and Puma. Hoops Point partners with Hoops Station to implement a raffle system for distributing highly exclusive releases, featuring in-demand models such as the Nike Book and Air Jordans (Hoops Point, n.d. a). Due to the fact that globally recognized manufacturers establish and maintain the physical quality of these products, consumers typically begin the buying process with an inherent trust in the product. Thus, customer satisfaction at Hoops Point relies less on the inherent quality of the product and is more closely associated with the fairness, efficiency, and exclusivity of the purchasing experience it offers (Hoops Point, n.d. b).

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Cost of Quality

Being a retail distributor instead of a manufacturer, Hoops Point's Cost of Quality framework mainly focuses on service quality, product management, and operational dependability.

Cost of Achieving Good Quality

- Prevention Cost: In this case, product-design cost is not included in Hoops Point's prevention costs. Hoops Point does not design its products directly, but instead sources them from other brands. Even so, other costs remain ongoing and must be reinforced. Quality Planning Cost is the cost of running a Total Quality Management and Quality Management System. Hoops Point incurs expenses to recruit managers, which requires investments in both money and time. Process Cost is the cost required to ensure that product quality is maintained in accordance with consumer demand. In this case, the product delivery process from acquisition through to the point of sale, must be strictly monitored. Training Cost is the cost incurred by the company to train its employees. In this context, staff must be proficient in carrying out quality control. Additionally, employees must also be capable of communicating effectively with customers. Information Cost is the cost required to obtain necessary data. In this case, Hoops Point expends both time and money in collecting data on consumer demand.
- Appraisal Cost: Hoops Point incurs all costs under Appraisal Cost. Inspection and Testing refers to the costs required to perform quality control. In this case, the costs are used to inspect the shoes and verify product quality. Test Equipment Cost refers to the cost of the equipment needed to perform inspections. Therefore, Hoops Point requires equipment such as flashlights to inspect the products. Operator Cost refers to the cost of paying operators to perform inspections and maintain product quality.

Cost of Poor Quality

Hoops Point does not face rework expenses in its activities because it sources products from different brands.

- Scrap Cost: Refers to the expense associated with a product being identified as faulty. When a faulty product is recognized, Hoops Point incurs both the time expense and extra opportunity cost linked to managing a refund.
- Process Failure Cost: Refers to the expense incurred in examining the causes of a product's failure. For Hoops Point, this can be done by examining the product's shipping and delivery information.
- Process Downtime Cost: Refers to the expenses incurred when sales are stopped because of a product malfunction.
- Price-Downgrading Cost: Refers to the expense associated with selling a faulty product at a reduced price compared to the initial plan.

RESULTS AND DISCUSSION

Service Efficiency and Queuing Optimization

The implementation of the digital raffle system acts as a highly effective service process design that significantly reduces stochastic service times. By requiring customers to input their contact details and verify eligibility during the online registration phase, the physical in-store transaction is vastly simplified. Employees are only required to validate the generated raffle number and process the payment, which drastically cuts down the service time for each customer. Based on the multiple-server queueing model applied to Hoops Indonesia's two-server system, this normalized service rate effectively minimizes the average time customers

spend waiting in the queue (Wq) and in the system overall (W). Consequently, this structural change eliminates excessive line buildup and queue congestion at retail locations.

Mitigation of Bot Usage and Customer Satisfaction

In the context of limited-edition releases, customer satisfaction relies less on the inherent physical quality of the sneakers, which is already guaranteed by global manufacturers like Nike and Adidas, and more on the perceived fairness of the purchasing experience. Traditional first-come, first-served models were highly vulnerable to automated bots, which gave resellers an unfair edge and generated substantial consumer dissatisfaction. The results indicate that managing artificial scarcity through the raffle's randomized selection effectively neutralizes these bot disruptions. By securing a fair distribution method, Hoops Indonesia successfully protects its brand equity and maintains high customer trust and satisfaction rates.

Cost of Quality Implications

The transition to a digital raffle system also streamlines Hoops Point's Cost of Quality (CoQ) framework. Because Hoops Point is a distributor, its prevention costs are heavily focused on quality planning and process monitoring rather than product design. The system ensures that the delivery process is strictly monitored and employees are well-trained to communicate with winners. Furthermore, appraisal costs, such as physical inspection and testing using equipment like flashlights, can be conducted systematically before the customer arrives. By tightening these initial processes, the company minimizes the Cost of Poor Quality, specifically the scrap costs and time expenses associated with managing refunds for faulty products.

CONCLUSION

The digital raffle mechanism serves as a highly effective demand management strategy for Hoops Indonesia in distributing exclusive, limited-edition products. By shifting away from traditional first-come, first-served releases, the company has successfully addressed major operational inefficiencies. The integration of a digitized data entry system significantly reduces stochastic service times and minimizes queue congestion, directly improving the speed and reliability of the service stream.

Furthermore, the raffle system directly combats the uneven advantage previously held by automated purchasing bots. Through randomization, the mechanism restores fairness to the purchasing process, which is the primary driver of customer satisfaction in the limited-edition retail market. Supported by a robust Cost of Quality framework that prioritizes service quality and operational dependability, Hoops Indonesia's strategy not only optimizes its queuing system but also safeguards consumer trust and brand loyalty against the challenges of artificial scarcity.

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