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Optimizing Last-Mile Delivery: A Case Study Analysis of the Dark Store Model

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Abstract: ***The last-mile delivery has emerged as a critical challenge in the e-commerce industry, impacting customer satisfaction and operational efficiency. The dark store model has gained traction as a solution to address these challenges by enabling faster order fulfillment and minimizing delivery times. This research paper presents a comprehensive analysis of the dark store model, its implementation, and its impact on last-mile delivery. Through a series of case studies and empirical research, this paper examines the key features, operational strategies, and performance outcomes associated with dark stores. Furthermore, it explores the implications of the dark store model for e-commerce businesses, logistics providers, and urban infrastructure. The findings of this study provide valuable insights for companies seeking to optimize their last-mile delivery operations and enhance customer experience in the digital age.***

Keywords: Dark Store Model, Last-Mile Delivery, E-commerce, Operational Efficiency, Customer Satisfaction, Logistics, Case Study Analysis.Dark store, supply-chain, perishables, commodities, supplies.

I. INTRODUCTION

The case offers the following educational opportunities to master's students in general and strategic management: To recognise the impact of macro-level environmental conditions that lead to organisational difficulties. To promote the idea of change management and the discovery of crucial success factors. To appraise the influence on the individuals involved and the efficacy of each action made, as well as the significance of responding to uncontrollably changing circumstances. The introduction section provides an overview of the challenges faced by e-commerce companies in last-mile delivery and introduces the concept of dark stores as a potential solution. It outlines the objectives of the research paper and provides an overview of the methodology adopted for the analysis.

A. Objectives of the study

The study's aims are as follows: 1. To comprehend the idea of a "dark store" in the supply chain for food and drink. 2. To determine the concept's level of awareness. 3. Case study of “Big Basket Dark Store Model “

II. LITERATURE REVIEW

The literature review section presents an overview of existing research and theoretical frameworks related to last-mile delivery, e-commerce logistics, and the dark store model. It examines the evolution of last-mile delivery strategies, the role of technology in optimizing logistics operations, and the benefits and challenges associated with dark stores.

Dark Stores Meaning: Dark stores, or conventional retail establishments converted into local fulfilment or distribution hubs or eCommerce warehouses, are the grocery retailing industry's wave of the future. Globally, dark stores are currently popular in the retailing of groceries, clothing, shoes, consumer durables, and home items. These D2C (Direct-to-Consumer) businesses offer same-day on-demand delivery, in-store and location pickups, and a dark store online ordering system to give the discriminating consumer a hassle-free shopping experience.

A potential customer can peruse the dark store online via electronic media and mobile-friendly programmes, which provide a nearly real-time view of the product shelves, even if these stores are not accessible to the general public. After that, he can make an online purchase using these digital shopping platforms, and the things will be delivered right to his house or picked up by him from a predetermined location. A dark store is typically located close to densely populated districts or other regions with high demand. Some retail categories, such as clothing, shoes, and durable goods, may even have locations outside of cities. The idea behind dark stores is to set up medium-sized local warehouses for order management, sorting, and storage. This will allow for easier automation and more efficient, rapid picking.

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A. *Dark Store Benefits*

Comparing dark stores to standard retail establishments, the following advantages are typically provided:

1) *Nearer to Clients, Easily Able to Serve Wider Areas:* Unlike regular retail stores, dark stores can serve multiple locations at once with high order densities. Increased availability and variety of products in stock: The dark store concept, which focuses on online order fulfilment, helps e-tailers plan ahead and work more efficiently by providing improved inventory visibility.
2) *Lower Operating Expenses:* Financially speaking, dark store theory makes more sense given the volatility of the grocery industry because it offers real-time visibility, space and time optimisation, and effective supply chain management.
3) *Effective Client Support:* Dark retailers have the necessary infrastructure to ensure that orders are fulfilled accurately, around-the-clock, and to the highest standards.

B. *Conceptual Framework*

The conceptual framework section outlines the key features and operational strategies of the dark store model, including location selection, inventory management, order processing, and delivery optimization. It provides a theoretical basis for understanding the mechanisms through which dark stores enhance last-mile delivery efficiency.

C. *Case Study Analysis*

The case study analysis section presents in-depth case studies of companies that have implemented the dark store model in their last-mile delivery operations. Each case study examines the implementation process, operational challenges, and performance outcomes of dark stores, providing insights into best practices and lessons learned.

III. BIG BASKET: OVERVIEW

Founded in 2011 by Hari Menon, V S Sudhakar, Vipul Parekh, V S Ramesh, and Abhinay Choudhari, Big Basket is a prominent online grocery hypermarket in India with its headquarters located in Bangalore. Currently operating in 30 Indian cities, the company is valued at $1.8 billion as of 2020. Fresh fruits, vegetables, food grains, oil, masala, packaged snacks, bakery goods, cakes, dairy products, beverages, household care, cosmetics, kitchenware, gardening supplies, fish, meat, and poultry, baby care, and medical supplies are just a few of the things available on the digital grocery platform. Its online portfolio features 1,000 brands and over 20,000 goods.

The Modified Business Model of Big Basket

From the standpoint of the business, Big Basket handles everything from procurement to supply chain management, logistics, consumer services through subscription-based delivery, and even the food-tech sector with some local stores selling specialty items. For end users, however, Big Basket is essentially just a delivery platform.

Therefore, Big Basket Dark Stores effectively employs a hybrid business model that combines a hyper-local procurement method with an inventory-led wholesale approach. Because of the high order fill rates and longer shelf lives of the products, the inventory led wholesale method has been implemented. Purchasing perishable goods in a just-in-time manner allows you to maintain cost leadership while maintaining product quality. This is where the hyper-local strategy comes in helpful. Big Basket's website and user-friendly mobile app account for over 70% of its sales. Other companies, such as lodging facilities, dining establishments, and physical retail brands, provide the residual income.

The Dark Stores Concept of Big Basket Big Basket came up with the idea for the dark store model back in 2015 when it chose to establish the concept in a number of tiny warehouses or dark stores across the nation in order to expedite order shipment for clients using its express delivery service. They may also advance into the smaller towns with the aid of these warehouses. Big Basket's plan was to open 10 of these warehouses in each of the network's major cities and 1 in each of the 50 smaller communities. Big Basket has attempted to penetrate smaller cities and towns with these dark stores.

Up until now, the massive e-commerce company funded by Alibaba has relied on an asset-light business model, in which it employs warehouses or dark stores instead of owning real retail locations. As a result, it collaborates with independent producers, distributors, and retailers in addition to offering private label goods in significant markets. These private labels are important inventory differentiators because they are less expensive than well-known brands.

The Delivery Framework for Dark Stores in India by Big Basket

Big Basket is now able to offer three different delivery options: express delivery, which takes 90 minutes; normal delivery, which takes the same day or the next day; and a third option, which delivers all items, regardless of quantity or size, in no more than three hours from the time the order is placed. This is made possible by the online fulfilment centre or dark stores business model. Smaller

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dark stores are used by the Express delivery model to fulfil orders for products like milk, fresh produce, and vegetables. All of the stock-keeping units (SKUs), which account for the majority of Big Basket's total online sales, are available under the standard order delivery model.

Big Basket has reinterpreted what a dark store is. Big Basket dark stores, which acquire their products from larger dark stores, can supply 90% of their inventory in two hours or three hours, according to co-founder and CEO Hari Menon, under the new delivery strategy. Big Basket's dark store has thereby grown from its original 3,000–4,000 square foot size to its current 25,000 square foot size. While delivery personnel in smaller dark businesses employ vehicles such as motorcycles, those at larger dark stores require both vans and bikes. More delivery slots translate into shorter delivery trip times, which reduces costs and accelerates the operational break-even point.

Big Basket, which started as a pilot programme in 2018, now regularly distributes in Tier-1 cities using this supply chain strategy.

BB Beauty Store, BB Daily, and BB InstantBig Basket has also introduced three new companies, BB Daily, BB Instant, and BB Beauty Store, since the middle of 2018 or thereabouts. Customers can subscribe to BB Daily for basic groceries such as bread, dairy, eggs, fruits, and vegetables, milk, and morning cereals. BB Instant targets tech parks, apartment complexes and business offices in Tier I cities using Big Basket's automated vending machines. For convenience, Daily and BB Instant are accessible through different mobile apps. The Big Basket main app offers a Beauty Store with premium skincare, cosmetic, and personal items.

Key characteristics of the BB delivery service include: On-time Guarantee, which guarantees a 10% return of the whole bill value in the event that delivery is delayed. Free shipping on orders over INR 1000. A "no questions asked" refund will be given for any returned items, and if any items are missing from the delivered order, they must be reported within 48 hours. Unquestionable refund and return policy. Refunds are made to the account within seven to ten business days.A large selection of gourmet and foreign goods available for expedited and scheduled delivery. Delivery fees: There are often no fees for orders over INR 200, but there may be a charge of INR 30 to INR 50 for orders less that amount. BB Star customers, however, are not charged for orders over INR.600

IV. THE FUTURE APPEARS BRIGHT

During the nationwide COVID-19 lockdown in 2020, Big Basket—which had over 10 million customers—became profitable. The company anticipates roughly doubling its revenues to $1 billion in the fiscal year that ends in March 2021. Big Basket is a member of the elite unicorn club and maintains its leadership position in the dark store industry in India despite fierce competition from rivals like Amazon, Grofers, Flipkart, and many other local digital supermarkets, all of whom have recently adopted the dark store model. Big Basket saw a 400,000 daily order volume during the pandemic epidemic, with a 45% first-time customer retention rate.

In 2020, the company's in-house brands had about 2,000 SKUs, and it anticipates growing that number.

V. EMPIRICAL RESEARCH

The empirical research section presents findings from empirical studies conducted to assess the impact of the dark store model on last-mile delivery performance. It includes quantitative data analysis, survey results, and interviews with industry experts to evaluate the effectiveness of dark stores in improving delivery speed, reducing costs, and enhancing customer satisfaction.

A. Discussion

The discussion section synthesizes the findings from the literature review, conceptual framework, case study analysis, and empirical research. It identifies key success factors and challenges associated with the dark store model and discusses its implications for e-commerce companies, logistics providers, and urban infrastructure.

VI. OBSTACLES AND CRUCIAL TASKS FOR ONLINE GROCERY RETAILING SUCCESS

A. Obstacles

1) Buying groceries is a routine purchase, thus it requires little effort.
2) Low gross margins are the outcome of price sensitivity.
3) It is expensive to ship groceries, especially perishables.
4) Supermarkets are competitive and effective businesses.

B. Crucial Tasks

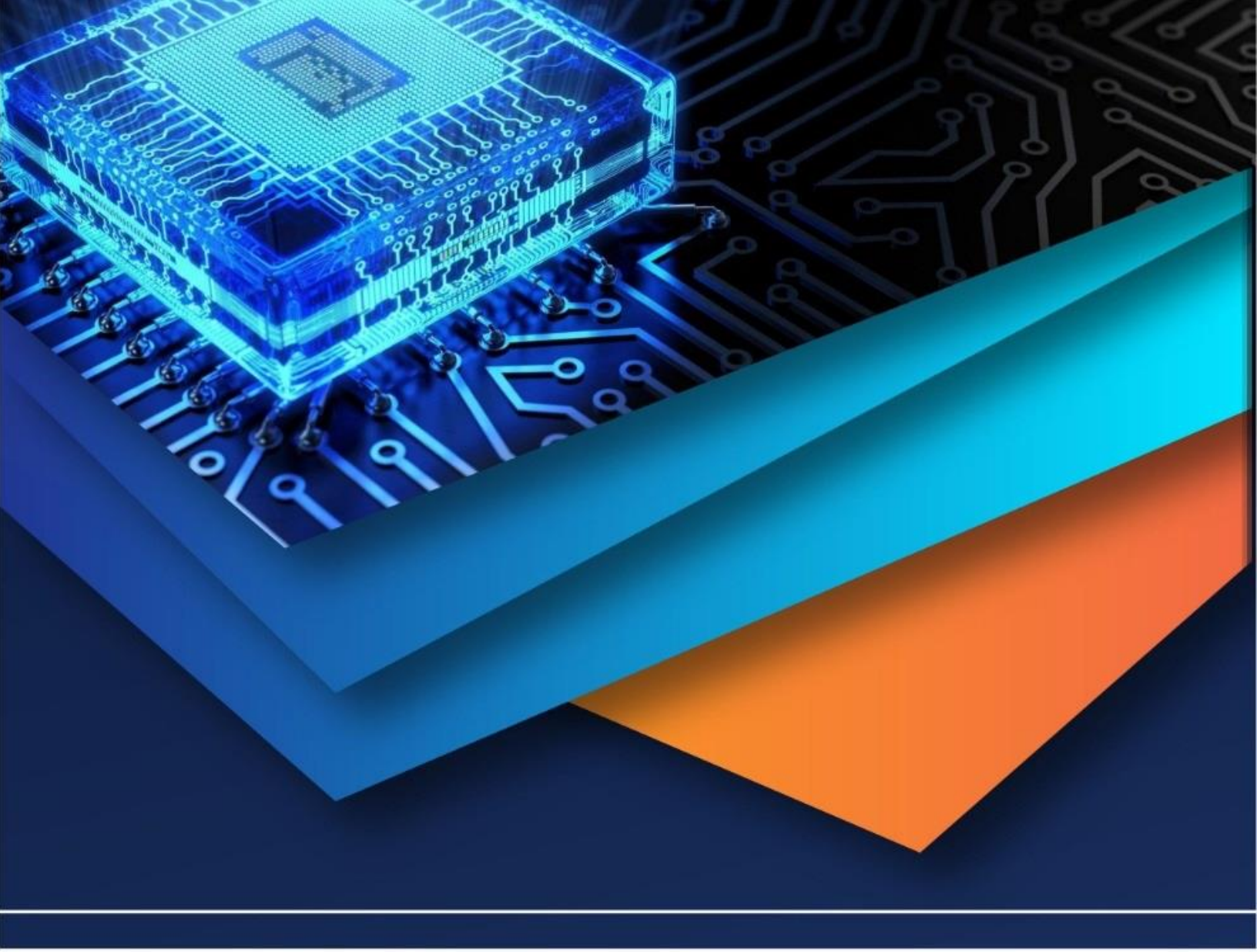
1) *Focus:* Managing the increase in daily requests for fresh, perishable, and other products necessitates managing both delivery and supply.

2) *Efficiency:* Waste minimization, sorting, and procurement. implies improved backend operations for dark storage, transshipment hubs, and warehousing. SaaS and AI technologies are currently being used for last-mile route optimisation.
3) *SCM:* supply chain integration, with a focus on backward integration to genuinely become "farm-to-fork" while maintaining the highest standards of quality and affordability.
4) *Branding:* building a brand via brand alliances to manage the internet growth channel.

VII. CONCLUSION

In conclusion, this research paper highlights the potential of the dark store model to optimize last-mile delivery and enhance customer experience in the e-commerce industry. By leveraging strategic location planning, efficient inventory management, and advanced technology, dark stores offer a promising solution to the challenges of urban logistics. Moving forward, further research and experimentation are needed to refine dark store strategies and maximize their impact on last-mile delivery efficiency.

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