IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

The Technology Behind Dark Stores And Micro Fulfillment Centers

[1]Mr.A.David, [2]Ms.B.Dhanya, [3]Mr.M.Harish

[1]Assistant professor, [2]Student, [3]Student

[1]Bcom Professional Accounting,

[1]Dr.N.G.P Arts and Science college, Coimbatore, India

Abstract: Dark stores and micro fulfillment centers are innovative retail concepts designed to optimize supply chain efficiency and enhance the customer experience. Both dark stores or retail spaces repurposed exclusively for online order fulfillment and micro-fulfillment centers, which are smaller, localized warehouses designed for swift order processing, leverage advanced technologies to streamline operations. This study examines key technological components such as automated inventory management systems, robotics, and artificial intelligence (AI), which enhance operational efficiency and accuracy. This paper provides a comprehensive overview of how dark stores and micro-fulfillment centers are reshaping e-commerce logistics and setting new standards for efficiency and service quality in the retail sector. It also addresses the challenges associated with integrating these technologies, including high initial investment costs, system integration complexities, and the need for continuous technological updates**.**

Key words **-** Dark stores, Micro-Fulfillment Centers, E-commerce logistics, Automation, Robotics, Supply Chain Optimization, Customer service.

I. INTRODUCTION

Dark stores and micro-fulfillment centers are innovative solutions in the field of retail and e-commerce logistics, aimed at optimizing the fulfillment process to meet the growing demands of online shoppers. Dark stores are physical retail locations that resemble traditional stores but are not open to the public for in-person shopping. Instead, they are solely dedicated to fulfilling online orders. The term "dark" refers to the lack of foot movement from customers. In dark stores, employees focus on picking items from shelves, packing them for shipping, and coordinating with delivery partners to ensure timely delivery to customers. Micro-fulfillment centers (MFCs) are small, well-planned facilities that are positioned close to cities with the goal of streamlining the order fulfillment process for online retailers. These centers effectively pick, pack, and ship online orders with a focus on speed, accuracy, and cost-effectiveness by utilizing automated technology and creative design.

Micro fulfillment centers are smaller than traditional large-scale distribution centers and can be positioned near end users or integrated into already-existing retail spaces. They play a crucial role in reducing last-mile delivery times and improving overall customer satisfaction by providing quicker and more convenient order fulfillment. To optimize each stage of the fulfillment process, these centers are outfitted with cutting-edge automation technologies, such as robotics, conveyors, and automated storage solutions. MFCs are able to precisely manage large numbers of orders because of automation, which also improves accuracy and scalability. Customers can place orders through the retailer's website or app, and the MFC processes and ships the order efficiently, often within hours of placement.

II. LITERATURE REVIEW

This study observes the following researches for reference**, Xuefei Yang and et.al (2024),** The study focuses on the first quick commerce business in retail business. As a result, the study concludes that networks have a variety of small MFCs and different MFC activities. The sizes and types of MFCs that are available affect picking productivity and replenishment operations; additionally, the MFC locations affect lead times and transportation distances to consumers. Therefore, the MFC network structure is essential to the long-term viability of any rapid commerce. To overcome these obstacles, quick commerce merchants must create an efficient network of micro-fulfillment centers (MFCs) close to their customers that is in metropolitan regions. **Ji-Hyon Hwang and Yong- Jin Kim (2023),** This study determines the potential negative effects of BMarts, a representative dark store in South Korea, from three perspectives: land use, transportation, and landscape. This study assessed whether dark stores may be created as long-term establishments by taking potential negative impacts into account. In this way, the study offers a foundation for the development of an institutional tool to address the issues with dark storefronts. **Satish Tiwari and et.al (2023),** The main aim of the study is to understand the dark store concepts. Dark Stores offers a wide range of resources to its consumers, including the possibility to purchase things online, have them delivered the same day or within a few hours, or pick them up in-store. This idea is not new, though According to the current statistical situation, a significant portion of the population is gravitating towards this online dark store system as their colonial areas and sectors are being modernized to accommodate all the amenities of the modern era. **Mr. A. Nikhil Francis and et.al (2023),** The main aim of the study is to examine the performance of last mile delivery operation to online customers. The study concluded that there is no significant correlation between gender and the length of time customers spend shopping online, suggesting that the customers' gender has no bearing on the length of time they spend shopping online. The researchers recommended that last-mile delivery drivers focus on getting the right products to the right place at the right time. This will eventually lead to organizational growth. Should last mile delivery businesses perform well in their operations and quickly attain consumer satisfaction, they may have greater prospects in the near future. **Matthieu Schorung(2023)** - The main aim of this study is to examine the foundations of the rapid commerce business model by placing the industry's advancements since 2019 in context. Furthermore, the study intends to examine the particulars of rapid commerce with regard to transportation services and logistics company. Quick commerce is a fast-growing sector that is set to become just another segment of online food consumption and convenience shopping, particularly in large, dense urban markets. some quick commerce players have made changes to their organization, clearly in order to develop good neighborly relations with local residents. The result of the study indicate that to make the organization of sustainable urban logistics in all its dimensions part of the local agenda and to adapt to the fast-changing patterns of urban shopping. **Lauren Kelly (2023)**- The study focuses on as demand for rapid grocery delivery surged during COVID-19 pandemic, Australia's supermarket duopoly changed labor relations, technology, and logistics to establish control in the expanding industry. This was due to the increased demand for quick grocery delivery. the supermarket becomes a powerful testing ground in which the logics of on-demand platforms are transforming conventional employment settings and practices. The study concluded that consumers may for now enjoy the low cost and high convenience of rapid grocery delivery, but the consequences warrant greater scrutiny.**Mr. Amit S. Khare (2022),** The study was attempted to find out the habituation of customers while ordering through a dark store and their preference. Dark store can be described as a business that delivers daily essentials, such as groceries, to the customer's doorstep using a virtual ordering interface. The majority of consumers order from the dark store because the deliveries are faster and they don't have to waste time physically visiting the store to make their purchases. In the current situation, many large corporations are entering this market and opening dark storefronts at an even faster rate. It might be argued that even though dark stores are a relatively new idea in supply chains, they are here to stay. **Shahryar Sorooshian and et.al (2022),** The study focuses on the challenges that limit the benefits of modern last mile delivery. The study concludes that it has been shown that AI-powered technology improves business and logistics by lowering costs, increasing efficiency, and creating new opportunities. Businesses with innovative technology integration in their business development plans outperform those without. Strong AI can help optimize routes, but it is often inflexible and does not adjust to a changing environment, making it outdated. **Eduardo Pintado and et.al (2022),** The main aim of the study is to investigate how a big Portuguese retailer company can reduce its dependence on refrigerated vehicles, simplifying operations and reducing the costs of transporting positive and negative cold food. The costs of transporting positive and negative cold foods were decreased, and substituting vehicles with room temperature transport reduced the need for refrigerated vehicles. **Aaron Shapiro (2022),** The study was an attempted to examine two business models that prominently in this swell of financial optimization such as

dark stores and ghost kitchens. The study concluded that how dark commerce is brought to its knees by the contradictory temporalities of logistical speculation: the vehicles' long-term durability and dependability are compromised by the platforms' current demands for logistical space, which are speed, flexibility, and configurability. **Jonathan Barros Vita and Julia Macedo Nogueira Nobre (2022),** The main aim of the study is to analyze the concept of dark store and their influences on urban law. Finally, the author concluded that Dark stores have both positive and negative externalities that need to be examined from the perspective of economic analysis of law in order to ensure that the principles of urban law and economics are in harmony. Due to the growth in the number of cars circulating to deliver products purchased online, dark businesses have an impact on urban planning difficulties in cities by creating an overflow on the road system. **Zhen-Hua Che and et.al (2022),** The study focuses on multi objective optimization mathematical model for investigating the planning of the location service area of smart parcel locker facilities. As a result, decision makers can give different objectives appropriate weights to make multi objective service area optimization outcomes more useful and the decision-making process more flexible. In order to keep resources from being underutilized, each facility should have a minimum utilization level set. **Ventola Alessandro and et.al (2022),**The purpose of the study is to offer a summary of this topic based on two research questions: How do MFCs impact the issues associated with last-mile delivery and certain design choices are essential when creating MFCs. In response to the growing difficulties in e-commerce, particularly e-grocery, this article introduces MFC. Order expectations from customers have recently shifted to include lower costs and shorter delivery times. The impact of MFCs on overall costs, transportation costs, and sustainability-related topics can be investigated in future research. The study concluded that MFC as a response to the rising challenges in e-commerce and specifically in e-grocery. Recently, the customer order expectations have changed towards more decreased delivery time requests with low costs. **Arkadiusz Kawa (2017),** The main aim of this paper is to present and analyze the fulfillment service in e-commerce logistics. Research was done by direct observation and primary and secondary source analysis. The primary materials were information gathered from fulfillment service providers in Poland and elsewhere, while the secondary materials included research, papers, and online resources. Using a fulfillment service might be beneficial, particularly during an e-business's period of rapid expansion. However, there are some drawbacks as well, like comparatively high costs, a lack of direct touch with the products, and a partial loss of process control. **Natacha Felix Chaves Quintans,** The study examines the development of operational indicators for logistics functions in a Dark Store and the growth of the E-commerce worldwide has been a disruptive factor in the way companies look at the market. The case of the national panorama has not been an exception to this tendency. The logistics models in the E-commerce area have been triggered from trial-error and represent a great challenge in terms of operational efficiency. DC Lisboa is organized into three logistics processes: replacement, picking and shipment. The study concluded that only the picking holds operating indicators capable of triggering process improvements.

III. OBJECTIVE OF THE STUDY

- To analyze dark stores and micro-fulfillment centers can provide a competitive advantage to retailers.
- To examine the market potential for micro-fulfillment centers and dark stores.
- To assess the factors that affect the retailers to adopt the dark store and micro fulfillment centers in their logistics services.

IV. RESEARCH METHODOLOGY

Research Design:

A descriptive research design is used in the Study.

Method of data collection:

The present study is based on secondary data. The data were collected from books, journals, and articles.

V. DARK STORES:

A dark store is just an ordinary street-side establishment that isn't open to the public. Employees gather online orders for pickup or delivery rather than making purchases inside. The reason it's termed "dark" is that consumers cannot just go in and shop there; it isn't lit up like a typical store.

In a dark store, the layout and design are optimized for efficient order fulfillment rather than for customer browsing. Products are typically stored on shelves or in storage systems organized by category or SKU (Stock-Keeping Unit), and workers fulfill orders by picking items from these shelves. The fulfillment process may involve manual picking by workers, automated picking using robotics or conveyor systems, or a combination of both.

DARK STORES MODEL IN INDIA:

The term "dark store model" in India is a retail idea in which real locations are converted into fulfillment centers that process and deliver online orders only, without providing walk-in customers with services. Instead, they serve as centralized hubs for picking, packing, and dispatching online orders received through the retailer's website or mobile app.

In India, the dark store model helps retailers to improve inventory control, expedite order fulfillment, and provide consumers with dependable and quick delivery services. In order to meet the increasing demand for e-commerce in India, it enables retailers to make the most of their current physical infrastructure.

A key focus of dark stores in India lies in the grocery and essential items segment, responding to the growing trend of online grocery shopping, which witnessed a surge during the COVID-19 pandemic. The customer experience remains paramount, with retailers offering services such as same-day or next-day delivery, flexible delivery slots, easy returns, and personalized recommendations tailored to individual preferences. The dark store business model in India is changing quickly to satisfy the expanding needs of internet customers and take advantage of the enormous potential created by the developing e-commerce sector in the nation.

WORKING PROCESS OF DARK STORES:

Dark stores typically operate as fulfillment centers rather than traditional retail stores. The following shows how they typically work,

Order Placement: Customers place orders online through the retailer's website or mobile app, selecting items they wish to purchase.

Order Processing: Once an order is received, it is transmitted to the dark store's inventory management system.

Picking: Staff members in the dark store are notified of the incoming order and proceed to gather the items from the shelves or storage areas.

Packing: Once all items are collected, they are brought to a packing area where they are carefully packed into boxes or bags, often with additional packaging materials to ensure protection during transit.

Quality Check: Orders may undergo a quality check to ensure accuracy and completeness before being labeled for delivery.

Delivery Preparation: Orders are sorted based on delivery locations and loaded onto delivery vehicles for transportation to customers' addresses or designated pickup points.

Delivery or Pickup: Customers receive their orders via home delivery or pickup at a designated location, depending on their chosen delivery method.

Customer Service: Dark stores may offer customer service support to address inquiries, issues, or returns related to online orders.

TECHNOLOGY USED IN DARK STORES:

To enhance product availability in dark stores, retailers can leverage various technologies. The following are some examples,

Barcode Scanners: Staff can use handheld devices that scan barcodes to quickly check and update inventory levels. This helps ensure accurate stock counts and makes it easier to find products.

Automated Reordering: Smart systems can automatically reorder products when they're running low, based on sales data and stock levels. This keeps shelves stocked and prevents items from running out.

RFID Tags: Retailers can use RFID tags on products to track them more efficiently. These tags make it easier to locate items in the store and ensure they're always in the right place.

Mobile Apps: Staff can use mobile apps that provide real-time updates on inventory levels and product locations. This helps them find items quickly and restock shelves faster.

AI Forecasting: Advanced algorithms can analyze past sales data and predict future demand for products. This helps retailers stock the right items in the right quantities, reducing the risk of overstocking or running out of popular items.

Dynamic Shelving: Smart shelving systems can adjust automatically based on demand, ensuring that popular items are always within easy reach. This improves the shopping experience for customers and helps staff locate items more quickly.

Automated Guided Vehicles (AGVs): Robots can be used to transport products around the dark store, making it easier to move items from storage to fulfillment areas. This saves time and reduces the risk of human error.

Robotic Assistance: Robots are increasingly being used in dark stores to assist with various tasks, such as moving goods within the warehouse, replenishing inventory, and even packing orders.

Cloud-Based Systems: Inventory management systems hosted in the cloud allow retailers to access data from anywhere. This makes it easier to keep track of inventory levels and manage stock across multiple dark stores.

Dynamic Shelving: Smart shelving systems can adjust automatically based on demand, ensuring that popular items are always within easy reach. This improves the shopping experience for customers and helps staff locate items more quickly.

Automated Storage and Retrieval Systems (AS/RS): AS/RS systems use robotics and automation to store and retrieve items from high-density storage systems. These systems can significantly increase storage capacity and retrieval speed while minimizing the need for manual labor.

Real-Time Location Systems (RTLS): RTLS technology uses RFID, Wi-Fi, or other wireless technologies to track the location of assets, equipment, and personnel in the warehouse, enhancing visibility and coordination.

Drones: Drones are experimented with for inventory management and order fulfillment, particularly in larger warehouses where aerial monitoring can be advantageous.

VI. MICRO FULFILLMENT CENTERS:

Micro-fulfillment centers (MFCs) are tiny warehouses located close to cities that rapidly pack and ship internet orders using technology. They facilitate quicker and more effective order delivery for shops, particularly in crowded cities.

A Micro-Fulfillment Center (MFC) is a compact, automated warehouse facility designed to efficiently fulfill online orders for groceries and other consumer goods. The layout and design of MFCs are optimized to maximize storage density and workflow efficiency.

Overall, micro-fulfillment centers represent a modern approach to order fulfillment that leverages automation, technology, and strategic location to meet the growing demand for fast and efficient e-commerce delivery services. As online shopping continues to gain popularity, MFCs are expected to play an increasingly important role in the supply chain ecosystem.

WORKING PROCESS OF MICRO FULFILLMENT CENTRES:

Micro-fulfillment works by using smaller, automated fulfillment centers located closer to customers to speed up the process of picking, packing, and delivering orders. The following are the overview of how it typically works:

Receiving Orders: Orders are placed by customers through online platforms or mobile apps. Order Processing: The orders are received and processed by the micro-fulfillment center's system. They are then sorted based on factors like location and delivery time.

Automated Picking: Robots or automated systems move around the center to retrieve the items needed for each order. They navigate through the shelves, picking up products according to the orders.

Packing: Once all items for an order are collected, they are brought to a packing station where they are assembled into packages. These packages are prepared for delivery.

Delivery Preparation: The packages are sorted based on delivery routes and schedules. They may be loaded onto delivery vehicles or prepared for pickup by third-party delivery services.

Last-Mile Delivery: The packages are then delivered to customers' doorsteps using various transportation methods, such as delivery trucks, drones, or couriers.

By locating fulfillment centers closer to customers, companies can offer faster delivery times and reduce the expenses associated with long-distance shipping. Additionally, automation helps streamline the fulfillment process, improving efficiency and accuracy while reducing the need for manual labor.

TECHNOLOGY USED IN MICRO FULFILLMENT CENTERS:

Micro-fulfillment centers (MFCs) rely on various technologies to automate and optimize the order fulfillment process. The following are some key technologies commonly used in MFCs:

Robots: Robotics plays a crucial role in picking, packing, and sorting operations in MFCs. Robotic arms are used for tasks such as item picking and placing items into bins or onto conveyor belts. These robots are often equipped with computer vision and machine learning capabilities to identify and handle items accurately. Machines that help move items around the center, making it easier to pick and pack orders.

Conveyor Belts: Conveyor belt technology plays a critical role in the operation of micro-fulfillment centers (MFCs), facilitating the movement of goods throughout the facility efficiently. Conveyor belts are used to transport items from various picking stations to a central consolidation area, where orders are assembled and prepared for delivery. Like in airports, these belts move items from one place to another within the center.

Augmented Reality (AR) for Order Picking: AR technology overlays digital information, such as picking instructions or item locations, onto the real-world environment. By equipping workers with AR-enabled smart glasses or devices, micro-fulfillment centers can streamline the picking process, reduce errors, and accelerate training for new employees.

Order Management Software: Advanced order management software is used to coordinate and manage orders, inventory, and workflows in MFCs. This software integrates with e-commerce platforms, inventory management systems, and other software solutions to ensure seamless order fulfillment

Pick-to-Light and Put-to-Light Systems: These systems use lights and displays to guide workers through the picking and packing process, indicating which items to pick and where to place them. They help reduce errors and increase productivity.

Last-Mile Delivery Optimization: MFCs are often strategically located near densely populated areas to minimize transportation costs and shorten delivery times. Last-mile delivery optimization software utilizes route optimization algorithms, predictive analytics, and geospatial data to plan efficient delivery routes, reduce fuel consumption, and enhance customer satisfaction.

On-demand Packaging Solutions: On-demand packaging machines automatically create custom-sized boxes or packaging materials tailored to the dimensions of each order. By eliminating the need for pre-made boxes and reducing packaging waste, on-demand packaging solutions improve shipping efficiency and sustainability while ensuring that products are securely packaged for transit.

Dynamic Pricing Algorithms: Dynamic pricing algorithms continuously adjust product prices based on factors such as demand, inventory levels, competitor pricing, and customer behavior. By optimizing pricing strategies in real-time, micro-fulfillment centers can maximize revenue, mitigate stock obsolescence, and maintain competitiveness in the market

Computer Vision and Machine Learning: Computer vision technology is employed for tasks such as inventory tracking, quality control, and robot navigation. Machine learning algorithms analyze data from cameras and sensors to improve accuracy and efficiency over time.

Voice-directed Picking: Voice-directed picking systems provide warehouse workers with verbal instructions via headsets, guiding them through the picking process hands-free. This technology increases productivity, accuracy, and safety by eliminating the need to consult paper lists or handheld devices.

VII. IMPACT OF DARK STORES AND MICRO FULFILLMENT CENTERS IN LOGISTICS:

Dark stores and micro-fulfillment centers (MFCs) have a significant impact on logistics, particularly in the domain of e-commerce and online grocery delivery. The following are some key ways in which these facilities influence logistics:

Optimized Last-Mile Delivery: Dark stores and MFCs are strategically located in urban areas or near population centers to facilitate quick and efficient last-mile delivery. By positioning these fulfillment centers closer to customers, logistics companies can reduce transit times and transportation costs associated with delivering orders to end-users.

Reduced Transportation Costs: By consolidating inventory and order fulfillment activities in centralized locations, dark stores and MFCs minimize the need for long-distance transportation of goods from distribution centers to retail outlets. This reduction in transportation distances results in lower fuel consumption, reduced carbon emissions, and overall cost savings for logistics companies.

Increased Delivery Speed: Dark stores and MFCs enable retailers and e-commerce platforms to fulfill orders more quickly, leading to shorter delivery windows for customers. The proximity of these fulfillment centers to customers allows for faster order processing and dispatch, resulting in speedier deliveries and improved customer satisfaction.

Customer Convenience and Satisfaction: Dark stores and MFCs contribute to enhanced customer convenience and satisfaction by offering faster delivery options and flexible fulfillment choices. Customers benefit from shorter delivery times, same-day or next-day delivery options, and convenient pickup locations near their homes or workplaces. The availability of multiple fulfillment options, including home delivery, curbside pickup, and locker facilities, caters to diverse customer preferences and enhances overall satisfaction.

Densification of Delivery Routes: Dark stores and MFCs enable logistics providers to densify their delivery routes by consolidating multiple orders for efficient delivery. By aggregating orders from nearby locations at these fulfillment centers, logistics companies can optimize delivery routes, reduce travel distances, and minimize delivery times. This densification enhances delivery efficiency and reduces the environmental footprint of transportation operations.

Optimized Labor Utilization: Dark stores and MFCs leverage automation and technology to optimize labor utilization in fulfillment operations. Automated picking and packing systems, along with advanced sorting and routing algorithms, minimize manual labor requirements and increase productivity in fulfillment

centers. By deploying labor resources more efficiently, retailers can reduce labor costs, improve order accuracy, and enhance overall operational efficiency.

Reduction of Out-of-Stock Situations: Dark stores and MFCs help retailers minimize out-of-stock situations by optimizing inventory management and replenishment processes. With centralized inventory storage and real-time inventory visibility, retailers can proactively monitor stock levels, identify low-stock items, and replenish inventory as needed to prevent stockouts.

Localization of Product Assortment: Dark stores and MFCs enable retailers to customize product assortments based on local demand patterns and preferences. By stocking products tailored to specific geographic regions or customer segments, retailers can increase the relevance of their offerings and better meet the needs of local consumers. This localization of product assortment enhances customer satisfaction, drives sales growth, and reduces inventory obsolescence.

Reduction of Packaging Waste: Dark stores and MFCs contribute to the reduction of packaging waste by optimizing order consolidation and packaging processes. With the ability to fulfill multiple orders from a single location, retailers can minimize the use of excess packaging materials and reduce the environmental impact of packaging waste. By adopting sustainable packaging practices and optimizing packaging sizes, retailers can minimize waste generation, lower packaging costs, and demonstrate their commitment to environmental sustainability.

Facilitation of Click-and-Collect Services: Dark stores and MFCs support the implementation of click-and-collect services, allowing customers to order online and pick up their purchases from designated pickup points or lockers. By offering click-and-collect options, retailers can provide customers with added convenience and flexibility in how they receive their orders. Dark stores and MFCs serve as fulfillment hubs for click-and-collect orders, streamlining the pickup process and ensuring a seamless customer experience.

VIII. SUGGESTIONS:

1. To Increase the use of robotics and automation to improve efficiency in picking, packing, and sorting processes. This reduces reliance on manual labor and enhances speed and accuracy.
2. To Utilize artificial intelligence and predictive analytics to optimize inventory management, demand forecasting, and route optimization for deliveries.
3. To Design facilities with modular layouts and flexible infrastructure to accommodate changing demand and scale operations efficiently.
4. To Offer multi-modal fulfillment options such as click-and-collect, curbside pickup, sameday delivery, and scheduled delivery slots to provide customers with greater flexibility and convenience while optimizing resource utilization and minimizing delivery costs.

IX. CONCLUSION:

The study concluded that dark businesses are generally set up for effective order fulfillment, with specialized employees and streamlined procedures meant to promptly and precisely complete online purchases. Retailers may enhance dark store operations, boost operation effectiveness, and provide an outstanding customer experience by putting these techniques into practice. Businesses can offer quick delivery times and lower the cost of long-distance transportation by placing fulfillment centers closer to clients. Automation also facilitates the fulfillment process, increasing accuracy and efficiency and decreasing the need for manual labor. Micro fulfillment centers may handle orders more quickly, cut down on errors, and maintain customer satisfaction by utilizing these technologies. Micro-fulfillment centers have a bright future in the changing e-commerce sectors and logistics sectors.

X. REFERENCES:

[1] Xuefei Yang, Manuel Ostermeier, Alexander Hubner - **"Winning the race to customers with micro-fulfllment centers: an approach for network planning in quick commerce",** ISSN 0377-2217, 2024.

[2] Ji-Hyon Hwang and Yong-Jin Kim - **"Challenges of Dark Stores and Urban Planning: A Case Study of B-Mart, Seoul",** 2023.

[3] Satish Tiwari, Shubham Mishra, Summy Kumar Verma, Venus Tanwar, Sreenu Banoth-**" Dark Store E-Commerce Website using Sentiment Analysis Prediction",** ISSN: 2321- 9653, Vol 11, Issue 5, 2023, pp-2614-2617.

[4] Mr.A.Nikhil Francis ,M.Ramya, Dr. A. Poomagal -**" A Study On Performance Of Last Mile Delivery Operators To Online Customers",** Vol 12, Issue 4,2023, pp- 8834-8842.

[5] Matthieu Schorung -**"Quick commerce: will the disruption of the food retail industry happen? Investigating the quick commerce supply chain and the impacts of dark stores",** 2023**,** pp-1-28.

[6] Lauren Kelly- **"Supermarket 'dark jobs' and rapid grocery delivery: Transformations in labour, technology and logistics",** 2023 ,Vol. 26(3), pp 1227–1248.

[7] Mr. Amit S. Khare - **"Dark Store – A Fresh Mushrooming Concept of Delivery at Door-Step",** ISSN 2581-9879, Vol I, Issue-2, 2022, pp 1-12.

[8] Shahryar Sorooshian, Shila Khademi Sharifabad, Mehrdad Parsaee, Ali Reza Afshari - **"Toward a Modern Last-Mile Delivery: Consequences and Obstacles of Intelligent Technology",** ISSN 2751-5577, 2022, pp 1-16.

[9] Eduardo Pintado, Lia Coelho de Oliveira, Jorge Esparteiro Garcia **-"Using EPP Boxes in a Dark Store: A New Approach to Simplify Food Retail ECommerce Deliveries,** ISSN 1847- 9375, Vol 13 , No 3, 2022 ,pp -130-143.

[10] Aaron Shapiro - **"Platform urbanism in a pandemic: Dark stores, ghost kitchens, and the logistical-urban frontier",** ISSN 2378-1815, Vol 0(0),2022, pp 1–20.

[11] Jonathan Barros Vita and Julia Macedo Nogueira Nobre **-"Analysis Of The Dark Store From The Perspective Of Urban Law",** ISSN 2317-7721,2022, vol 13, no 3,pp- 1373-1392.

[12] Zhen-Hua Che, Tzu-An Chiang, and Yun-Jhen Luo - **" Multiobjective Optimization for Planning the Service Areas of Smart Parcel Locker Facilities in Logistics Last Mile Delivery",** ISSN 0019-5588,Vol 10, 2022, pp-1-22.

[13] Ventola Alessandro, Tinor Mirko, Perotti Sara, Banu Y. Ekren, Hendrik Reefke **-" Micro-fulfilment Centres in E-Grocery Deliveries",** 2022, pp-97-104

[14] Arkadiusz Kawa **-"Fulfillment Service In E-Commerce Logistics",** ISSN 1895-2038, Vol 13 (4), 2017, pp 429-438

[15] Natacha Félix Chaves Quintans **-"Development of operational indicators for logistics functions in a "Dark Store",** pp-1-10.