Supply Chain Optimization of Hyperlocal Delivery Startups

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Abstract - *The process of delivering items directly from a vendor to a customer is known as hyperlocal delivery. It's the activity in which a courier agent picks up things from a vendor and then delivers them directly to the customer's address.*

In India, the hyperlocal delivery industry has been growing in recent years. Consumers prefer to have their groceries and other goods delivered to their homes after covid, thus the increase has been particularly rapid. As a result of the increased demand, the hyperlocal delivery area has become quite competitive, with businesses attempting to win market share by reducing delivery times. Delivery apps such as zeptonow guarantee delivery in under 10 minutes.

Through this research paper, We aim to forecast the demand of groceries and goods depending on the location of people primarily driven by geographies and further aim to reduce delivery time by optimizing delivery path.

***Key Words:** Hyperlocal delivery, supply chain, delivery optimization*

1. INTRODUCTION

Hyperlocal Companies fall under a specific category of E- commerce. The E-commerce segment is divided into 4 major segments

Different verticals of E-Commerce Industry

Vertical	Example
Aggregator Platforms	Zomato, Flipkart
B2B E-commerce	Alibaba, Udaan
B2C Retailer Platform	Amazon
Hyperlocal E-commerce	**Grofers, Big Basket, Dunzo, Swiggy, Instamart**

For the purpose of this study, we will focus on the Supply Chain of Hyperlocal E-commerce segment as it is one of the most important and talked about segments in the current scenario.

Based on a study by Bengaluru based market research firm RedSeer:In India, the total potential market for quick e-commerce is $45 billion, with metropolitan areas driving the sector on the backs of middle-to-high-income consumers. India being one of the most essential markets worldwide is expected to lead the e-commerce industry in the upcoming future which is also the reason for such high competition in India amongst major e-commerce industry giants. Apart from this, previous decade and this decade is also seeing lots of new startups which are creating revolutionary impact in the quick e-commerce industry.

The process of delivering items directly from a vendor to a customer is known as hyperlocal delivery. It's the activity in which a courier agent picks up things from a vendor in nearby proximity and then delivers them directly to the customer's address.

The COVID-19 epidemic pushed every vertical and industry to go digital overnight, resulting in the quick rise of hyperlocal delivery models in the logistics sector. Hyperlocal delivery players stepped forward to help businesses adapt to digital solutions and continue operating during the lockout in order to meet customers' needs. Furthermore, customers' busy

lifestyles and the desire to have everything delivered to their homes have aided the expansion of hyperlocal delivery firms in the industry.

Hyperlocal delivery are making inroads into Tier II and III cities, in addition to urban areas. These delivery approaches are overcoming every obstacle in the way of the sector's growth, including omnichannel e-commerce issues.

In 2021, 52% of the consumers received one or more than 1 order in one week from online grocery retailers. In India, the number is poised between 9-11% and as the mobile internet penetration is going higher and mean income level is also increasing, the demand of goods through hyperlocal delivery startups is going to increase exponentially.

2. LITERATURE REVIEW

Hyperlocal E-Commerce:

The concept of hyperlocal business came into the mainstream after 2010 but the hyperlocal as a concept was not new to the world.

Hyperlocal businesses are designed in such a way that they leverage the existing resources within particular geography and use technology to enable people to use their services. Though technology is a great enabler, the supply chain is hugely dependent on the manual workforce present in warehouses, delivery units etc.

These businesses act as mediators between the users and existing local resources like grocery stores, spas etc.

Hyperlocal E-commerce is broadly classified into two categories:

Hyperlocal Delivery	Hyperlocal Service
Hyperlocal delivery is referred to when the e-commerce platform provides ready to use items	Hyperlocal Service is referred when an aggregator platform provides a certain kind of service in a localised area

3. SUPPLY CHAIN OF HYPERLOCAL DELIVERY STARTUPS:

Hyperlocal Delivery startups follow a very simple supply chain on the large scale. Depending on the geographical conditions, consumer preferences, demand for products etc., hyperlocal delivery startups can have supply chain models. There are three major types of Supply Chain Models:

1. **Inventory Led Model** - In this model, the hyperlocal delivery company sets up small logistic centers/warehouses to fulfill orders of a particular zone. Setting up of warehouses ensures the availability of larger stocks of products in demand and timely delivery to the customers. This ensures cost-effectiveness and optimized delivery speed. In the inventory led model, there is an internal supply chain that works. Internally, the goods are procured from different companies which are packed and shipped then as per order. The logistics and goods both belong to the player in the inventory-led model. Blinkit is currently following this model.

2. **Aggregator Model** - In this model, the hyperlocal delivery player aggregates different local players online and fulfills the orders by setting up its supply chain. This model is very similar to Zomato's model. in the aggregator model, the company fixates its expertise on setting up a supply chain and leaves the retail part. This model is successful in some areas where the local players have a strong presence.

3. **Hybrid Model** - This model is a mix of hybrid and aggregate models. Depending on the zone and demand, the company decides to have a warehouse for addressing major demand and then the variable demand is solved through an aggregate model. This model saves the logistical costs of setting up warehouses. The Logistical Supply chain is still managed by the company.

Pic 1: Supply Chain of Hyperlocal Delivery startups

## 4. MACROECONOMIC TRENDS THAT AFFECT THE QUICK E-COMMERCE SEGMENT:

1. *Increased Internet penetration*: Internet penetration has been increasing worldwide and similarly has been increasing at a rapid pace in India as well. India is expected to have 900 Million active internet users by the end of 2025. This has been a big boost for Hyperlocal delivery startups since internet is the enabler of such markets

2. *Mainstream Adoption of Aggregator platforms:* Some of MNC's working on aggregator model have become very popular in India like Amazon, Flipkart, Zomato, Ola etc. to name a few. These companies have now become household names due to which aggregator model in hyperlocal market is also rapidly gaining traction and becoming popular day by day.

3. *Growing Urban Population:* 35% of India's total population is expected to reside in Urban areas by the end of 2025 which would increase the demand for such companies as India's urban population spends very little time in purchasing groceries and by such hyperlocal startups, they can get the desired groceries delivered according to their convenience.

5. CHALLENGES IN THE HYPERLOCAL DELIVERY SUPPLY CHAIN:

1. Last-mile delivery is the biggest cost driver in the supply chain: In order to be profitable, the companies have to be cost-efficient and currently last-mile delivery is one the biggest cost-incurring process, attributing to almost 41% of the costs out of the total costs.

Last Mile delivery cost is attributed due to following reasons:

a) Fast Delivery doesn't allow the logistic partner to aggregate orders and then deliver.

b) Cost of fuel for the delivery rider due to short driving distance and oftenly closed ways

c) Payment of delivery partners and costs incurred in their insurance.
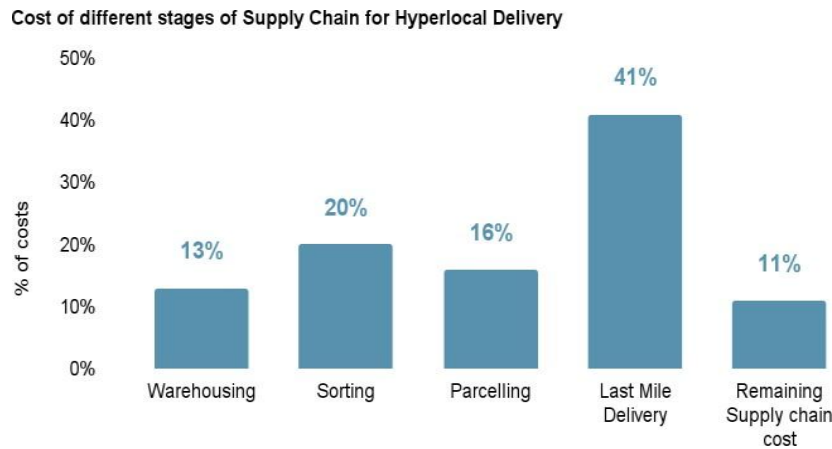
Source: Capgemini Research Institute, Last-mile deliveryexecutive survey

2. Inability to gauge right Demand: Many of the products stocked by hyperlocal delivery startups are perishable. Since they are unable to gauge the right demand, they end up stocking more which leads to corrosion of items hence causing losses. Alongside this, in case they underestimate thedemand they might be not able to deliver optimally and items would be shown stock out irrespective of the demand.

6. OBJECTIVES OF THIS RESEARCH PAPER:

To solve for inbound and outbound supply chainchallenges of the hyperlocal delivery startup.

1. Inbound Supply chain challenges can be addressed by forecasting the demand according tothe zone, seasons etc.
2. Outbound Supply chain challenges can be addressed by solved by addressing the costproblem of the supply chain.

In short, our objectives are to:

- Demand Forecasting for Hyperlocal deliverystartups
- Delivery optimization

7. FORECASTING OF DEMAND:

The demand for various items order through hyperlocal delivery applications has been gauged by collecting the data of 3000 individuals residing in and around Rohini, Delhi.

8. DELIVERY OPTIMIZATION:

Delivery optimization is the process of determining the shortest possible routes to reach a location. With hyperlocal delivery services trying to minimize the delivery time to gain market share, delivery optimizationis the need of the hour. That is why this methodology is gaining popularity in the hyperlocal delivery industry.

Delivery optimization reduces the time spent on travellingthereby reducing the incurred cost in the process.

This is done in two ways:

A. By keeping the in-demand products in such a sorting order that they are easily accessible to the sorting counter
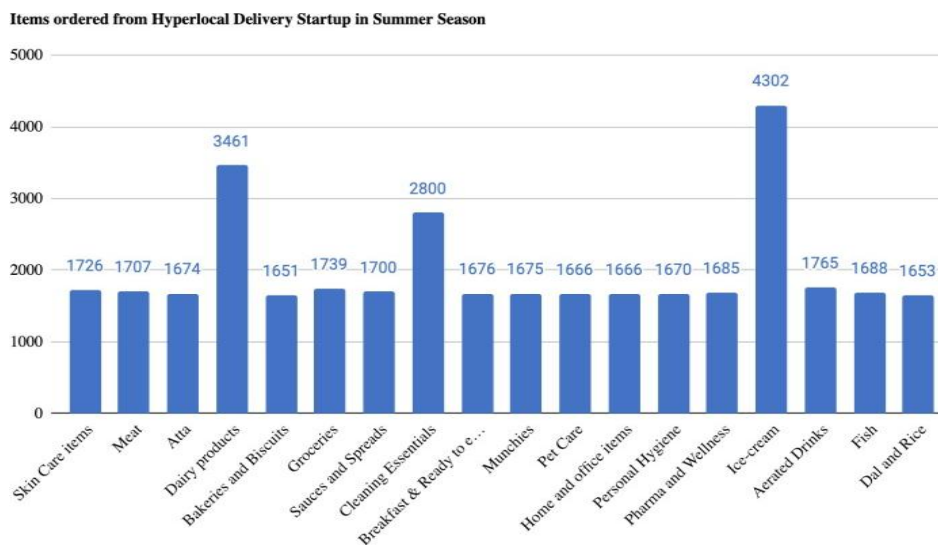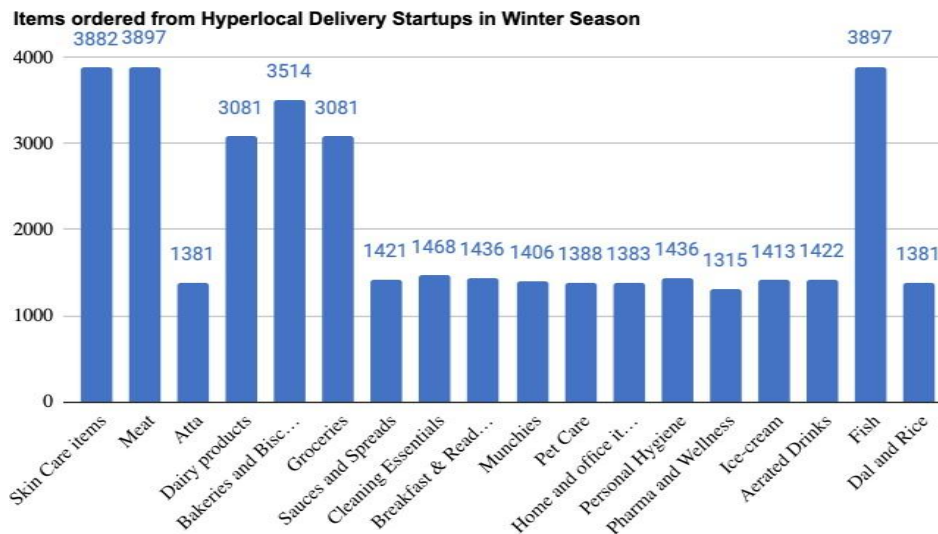
Methodology:

To reduce the sorting time, the items should be stacked in such a way that the most in-demand products/categories should be kept first in sorting order followed by sequentialdemand.

Since the demand for different categories of products varies with seasons, the sequencing varies according to season. To gauge the demand for different categories of products, we collected data set of around 3000 individuals residing near Rohini and office complexes and analysed the data to find the most in-demand products in different seasons.

Description of Dataset:

In order to collect the data, we shared a google form with 15 categories of products to select from and allowed people to select multiple categories according to different seasons.

Results:

Items ordered from Hyperlocal Delivery Startups in Winter Season

Items ordered from Hyperlocal Delivery Startup in Summer Season

In winter season, the most in-demand products were Skin Care Items, Fish, Meat and they should be given first priority in stacking order followed by Bakery products, groceries and Dairy products.

Similarly, in summer season, the most in-demand products were Ice-Cream, Dairy products and cleaning essentials and they should be given stacking priority in warehouses of companies to reduce the sorting time and increase efficiency.

B. By reducing the time taken by the delivery rider in delivering the goods

Methodology:

The hyperlocal delivery partners generally have to deliver multiple orders (in most cases 2-3) after picking the order items from the warehouse. Our aim is to minimize the time taken for the delivery partner to deliver all the items to the

respective buyers and return to the warehouse for the next set of deliveries along with ensuring the safety of the riders. To optimize the time, the delivery partner would be provided with the optimal route to follow in order to complete the deliveries in the minimum possible time. The algorithm that would be used is the travelling salesman algorithm. This algorithm is discussed in the next section.
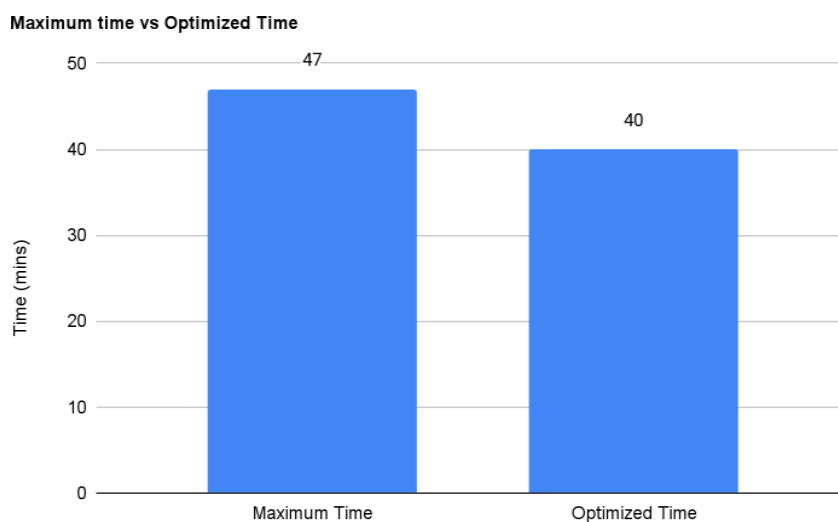
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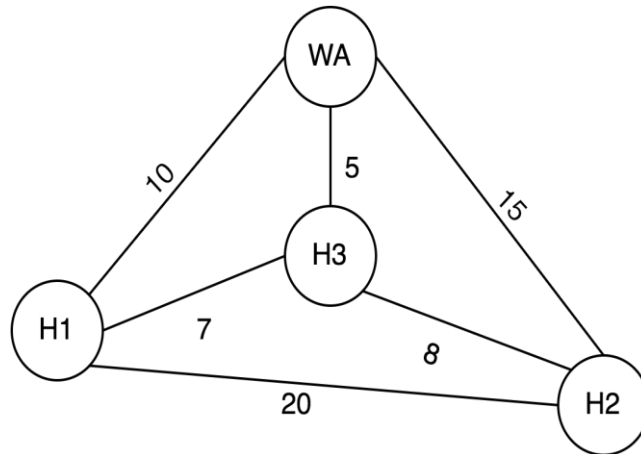
The figure shows a situation that the driver-partner wouldencounter on a daily basis. The partner has to take the goods to be delivered from the warehouse (marked as WA) to the destinations (marked as H1, H2, H3). The algorithm would calculate the expected time it would take for the driver to complete all the deliveries using all the possible combinations (3! Combinations are possible in this case) and the path that requires the least possible time would be shown to the delivery partner on his app.

This algorithm would not only help to reduce the time todeliver and the costs incurred but also at the same time ensure the safety of the drivers as the expected time of arrival can be exactly shown to the buyer and the driver- partner would not have to be in a hurry to deliver orders.

In the figure, we can see that the driver-partner would take the maximum time (47 minutes) if he follows the route (WA – H3 – H1 – H2 – WA) and the minimum time (40 minutes) if he takes the route (WA – H1 – H3 – H2 – WA). So, the driver would save 7 minutes in one round trip if he follows the path suggested by the algorithm. The graph below diagrammatically shows the time saved by using this algorithm.

9. RESULTS:

According to the research conducted and algorithm applied the result and conclusion is optimized delivery time came out to be less than maximum time by 7 minutesand also the fuel consumption will be less and safety precautions were ensured

10. FUTURE AND OPPORTUNITIES:

- India is currently drawing investment in hyperlocal startups across a multitude of sectors, including grocery, pharmaceuticals, and logistics. Such enterprises typically respond to client demands quickly, normally in less than an hour, owing to the development of logistical capacities enabled by technology advancements. Given the inherent restrictions on mobility and physical accessibility that now the COVID-19 epidemic hasimposed, the emergence of such services is accelerating.

- Nowadays people often order groceries online. Sometimes there might be a case when a particular grocery item is not available at the store, in that scenario the delivery guy may have to shop at other grocery stores, which can cause the delivery to be delayed. This problem can be solved with the use of Internet of Things(IoT). Thedelivery guy does not have to visit one store after another if we can create a platform which can integrate the partner grocery retailers and equip their premises with IoT sensors.

- **Predictive logistics** is a method of anticipating and satisfying supply chain requirements before they exist. While it is currently being explored mainly with industries that transport a big number of things, modest hyperlocal delivery may become possible in the near future. Deep learning advances and the collecting of massive volumes ofdata about client requests may be enough to create a predictive system that can supply orders before they are needed.

- Optimization in adaptive path planning is anothertechnique to reduce the cost of hyperlocal delivery while increasing profit margins. Becauseof its universality, this technique appears to be more promising. Machine learning might be the means of providing route optimization solutions. Its effectiveness in supply chain optimization andfood delivery has already been proven.

- Drones for local delivery might be a viable alternative that could disrupt the hyperlocal delivery market. Drones, unlike delivery robots, are unaffected by road surface condition and are capable of delivering items in shorter time constraints. Consider the following scenario: a consumer placed an order. A warehouse's machines quickly begin preparing an order, and adrone is ready to deliver it to your home. However, it is possible that something even more spectacular may occur in the future.

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