



Design a last mile delivery (Model for e-commerce firm)

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Abstract

In the era of e-commerce becoming a pervasive integral part in different retail business sectors, last-mile delivery is now a major problem across urban areas globally. Supply chain customers are increasingly demanding their orders to be sent home. The increase in truck traffic causing traffic jams, emissions, and health problems associated with the incessant presence of delivery vehicles in city centers is a matter of growing concern. As a result, interesting new conceptions of the last mile delivery come as no wonder and arise in last thirty years.

Unmanned aerial vehicles (drones) and autonomous pods for parcels are the most prominent inventions of robots directed to the kindest modification of parcel deliveries. This paper offers an extensive review of for-public last-mile delivery types and operations in terms of decision making. The review will pay a special attention to the process of establishing and operating last mile delivery types. Achieving this goal will require us to systematically present the various delivery concepts, organize them using a concise notation scheme, and discuss problems pertaining to the decision-making process while considering existing research findings relating to operations research methods that were used toward the solving of these problems. Additionally, we also consider possible layouts for upcoming research, focusing on the directions for future investigation in this particular area.

Keywords: *Transportation, Smart cities, Last mile delivery, Census.*

Introduction

A well-known issue is last-mile delivery, which fuse the logistics operations at the back end and provide shipments to urban households at the front end. Urbanization and the trend of growing e-commerce platforms require an ever-increasing provision of warehousing and shipping services. It is estimated that with the growth of urban population by 50 percent by 2050, a higher figure is expected for e-commerce. Due to the fact that parcel volumes break recordings resulting in more congestion, environmental issues and costs. Initiatives meant to drive and create sustainable conditions coupled with regulations from the government making it evident that environmentally friendly operations are required.

Besides old age labor shortages and periodical response times to the demands being faced, the aforementioned issues create hurdles which the businesses have been struggling to combat. Innovations like self-driving vehicles, drones and delivery robots have arisen in practice-life as well – from current perspective like cargo bikes to futuristic-possible concepts like airborne warehouses.

The present paper is structured around the viewed and future last-mile concepts in delivery. I characterize the operational research point of view. It describes a notation scheme used to definite operational systems sequentially, categorizes concepts of different time frames, reviews relevant literature as well as research on future prospects. By doing so the model provides equipment choice for the firm are operational settling which leads to the growth down of last mile logistics.

Related Work

The last-mile logistics (LML) concept has several operational and management challenges and furthermore, technological breakthroughs require special consideration to address the potential changes. The saying "last mile" dates back to the telecommunications business initially meaning the last segment of a network. In the present jargon, LML stands to be the final stage in a delivery process which invariably is the most costly, the least effective segment of supply chain laden with multiple environmental risks. Initially, the LML concept was viewed as a way in which shopping via a module could be expanded at a grassroots level through direct delivery to the consumer at home. Simultaneously, there are different terms like end-mile distribution, last-mile, shop-to-door, business-to-consumer, and grocery home delivery which are being used to mean the same phase.

Although in the exiting ambiguous semantics of LML (the last leg of delivery) capturing its essence as the last leg of delivery is getting close, the emergence of e-commerce leveled up the complexity. This is not an uncommon occurrence in urban planning. Several key elements are left out of the equation, such as ignoring the location of the last mile, not considering in-store order fulfillment processes, and overlooking the fact that people can choose where they want to have the orders delivered at, which can be either a home, collection delivery point (CDPs) or a locker.

It is necessary to tackle the specified deficiencies, so that we suggest the solution in the form of a complete literature review of the existing terminology and develop a refined LML definition. Overall with this definition there is an introduction of a "penetration point order," which one can refer to as the inventory location where the order is formed and the fulfillment process is triggered. The first stop is the neighborhood's CFM, where short-haul transportation becomes the point of purification. This also applies to the choice of the last-mile destination point, including a home/office, RB (reception box), or CDP (customer delivery point) that the customer puts on the consignee's order, as the final destination of the last-mile.

Methodology

Objectives Of Study

Objective 1: Review LML literature, from history to e-commerce relevance.

Objective 2: Analyze e-commerce influence on LML, identifying key variables.

Objective 3: Develop structured LML design framework, guiding practitioners and research.

Sample Size

In September 2019, an online poll analyzed last-mile e-commerce in Noida via active Facebook groups of young residents. 237 respondents provided valuable data on consumer behavior and preferences.

Sample Unit

The study's sample includes 237 respondents from active Facebook groups of young Noida residents, offering insights into end-consumer behavior and preferences for last-mile e-commerce delivery in Noida.

Sample designed

The study utilized convenience sampling, targeting active young Noida residents on e-commerce platforms via Facebook groups. 237 respondents completed the survey, offering insights into last-mile delivery preferences.

Collection of Data

Primary data: An author-published online survey collected from 237 Noida respondents covered consumer backgrounds, online shopping experiences, behaviors, concerns, and suggestions regarding last-mile e-commerce delivery.

Secondary data: Complemented by literature, reports, and statistics, providing additional context and insights into e-commerce, last-mile delivery, and consumer behavior in Noida.

Experimental Results Analysis And Data Interpretation

The collected data from the electronically analysis are processed & displayed in a some forms of Charts may be created using MS excel, sheets and etc.. These are divided in some themes which have 4 themes .

Consumers' background

- General online shopping experience
- Behaviours toward different last-mile delivery scenarios
- Problems and suggestion from the consumer's perspective

The discussion will examine how many factors influence the behaviour of e-commerce end-consumers in Noida, as well as their perceptions of local last-mile delivery options.

Customer backstory

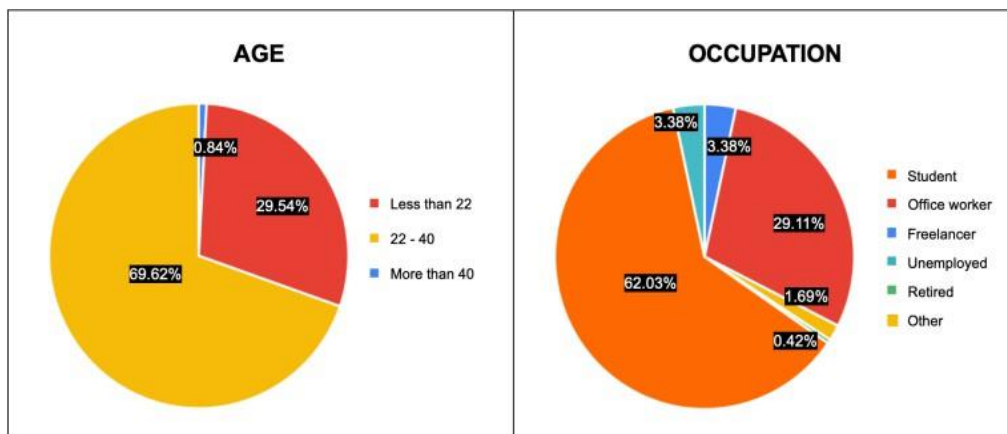


Figure 26 Responder from general backstory

Above figures are the details the population breakdown of 237 members, with 99.16% under 40. Majority are 22-40 years old (69.62%), followed by those under 22 (29.54%). Students represent 62.03%, office workers 29.11%, and retirees over 40 just 0.42%. These demographics may not fully represent the broader population.

General online shopping experience

In this section, the first question evaluates respondents' online activity. Figure 27 displays five purchase frequency options. Data shows 67.09% make less than four monthly internet transactions, while 0.84% rarely make any.

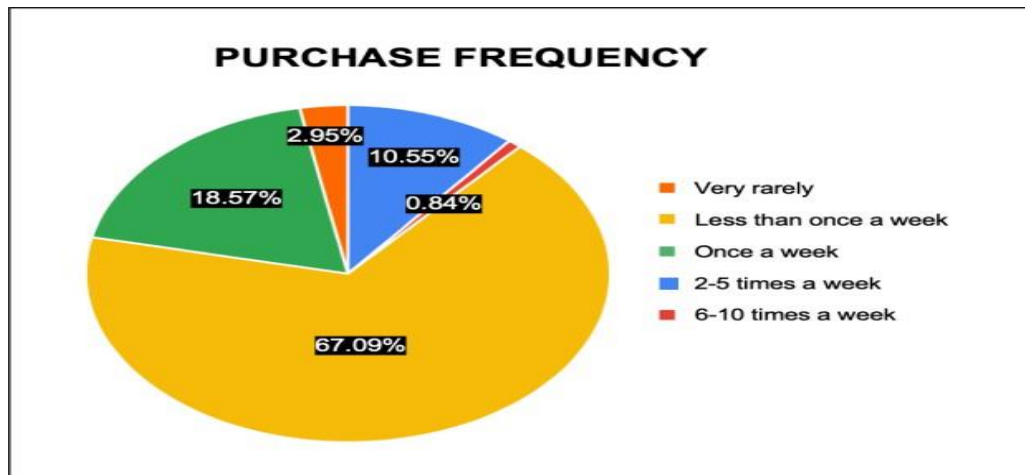


Figure 27 Respondents' purchase frequency

The poll examines online purchasing habits based on transaction frequency, with a focus on handling needs. Four options were considered: luxury products, decomposable things, massive products, and

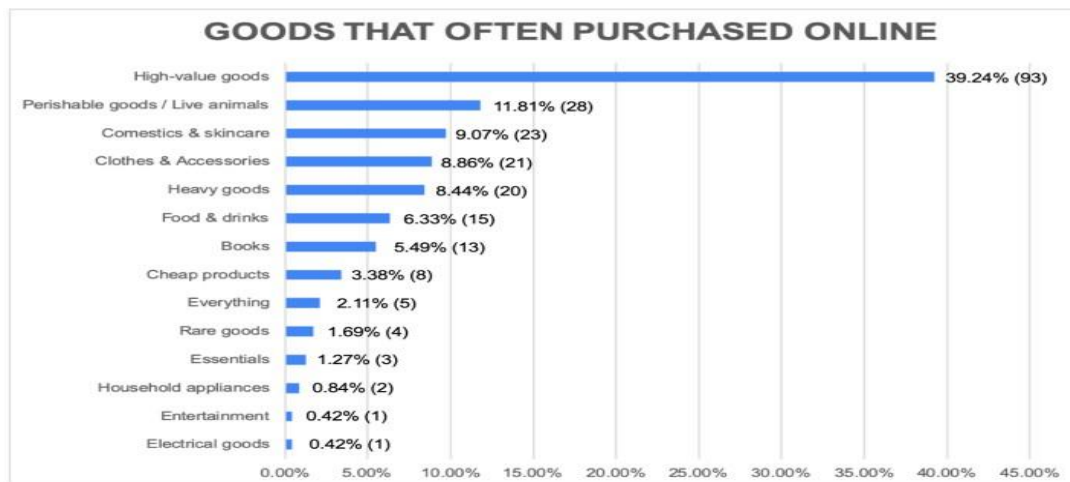


Figure 28 What respondents usually buy online

others, revealing unexpected diversity in consumer preferences.

High-value commodities tend to account for the highest percentage (39.24%). Perishable products/live animals rank second with 11.81%, followed by cosmetics/skincare, clothing/accessories, and heavy items with 9.06%, 8.86%, and 8.44%, respectively. Overall, these numbers are insufficient to draw thorough assumptions. However, it appears that e-Commerce and delivery processes have won customer trust. Online shoppers expect reliable delivery, particularly for high-value purchases.

On the other hand, delivery time is a crucial consideration for the execute procedure. In the below picture it shows average wait time for parcel delivery among consumers.

arriving on the same day as the order. Although same-day and next-day deliveries are not yet popular, they nonetheless hold their own market share.

The next two questions ask participants about their awareness and preferences for various delivery modalities. Figure 30 shows that home/office delivery is the most popular way for e-commerce shipments. 75.53% of respondents recognize this model, with 73.00% ranking it as their preferred type of delivery. Although collection places such as post offices, convenience stores, and petrol stations are widely recognized (40.93%), only 16.88% of respondents choose them as their first option. However, the models of welcome box, delivery box, and retailer's B&M shops have medium recognition levels. But, these have an less use for distribution types for the difficulties and underdeveloped framework.

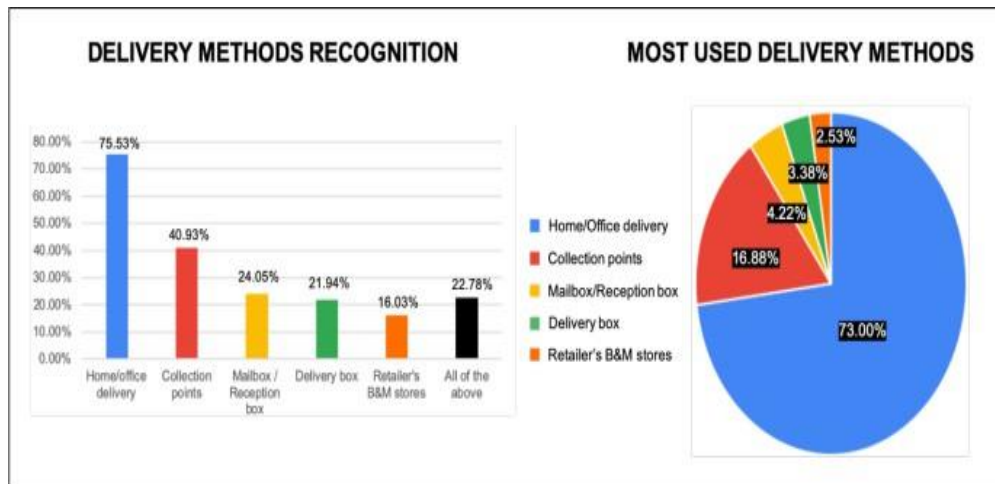


Figure 30 The recognition and popularity of different delivery methods in Noida

Figure 31-36 depicts five scenarios with five statements each to analyze respondents' behavior in various settings. Respondents are asked to rate their opinion towards each situation on a scale of 1 (strongly disagree) to 5 (strongly agree).

Figure 31 shows that 121 out of 237 respondents are happy with the latest delivery. The majority of E-commerce consumers are pleased with their present logistic model, with grades over four (4) accounting for 71.40% of all responses. However, 68 individuals rated their experience as three (3) or lower. Additional data analysis will be conducted to prove the explanations behind these results.

You are satisfied with the delivery service of recent shipments.

237 responses

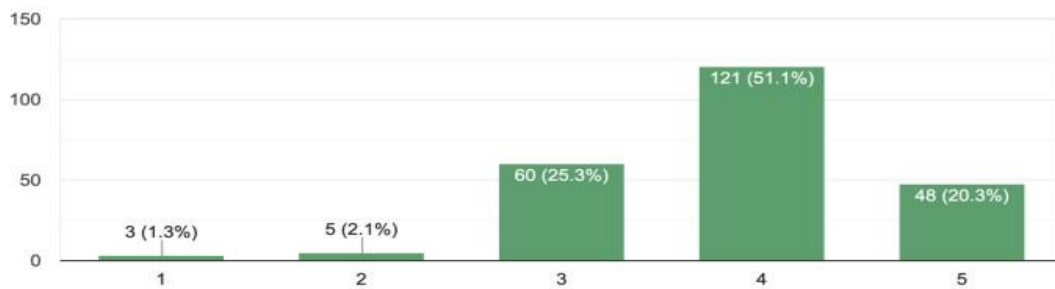


Figure 31 Satisfaction of recent deliveries

Figure 32 polls if the respondents are willing to use collection point to collect their parcels.

The disparity among five options are not as much as in the previous question. 61 people,

Approximately 25.7% of respondents are ambivalent about traveling to the collecting place. Figure 32 shows that there is no clear trend among e-commerce consumers regarding pickup point delivery. Many people feel comfortable going to convenience stores or post offices to pick up their purchases. However, many individuals are still unsure about the matter. This presents a tremendous challenge, but also an opportunity for industry leaders to redefine customer mindsets.

You are not afraid of going to a collection point (Post offices / Convenience stores / Gas station) to collect your parcels.

237 responses

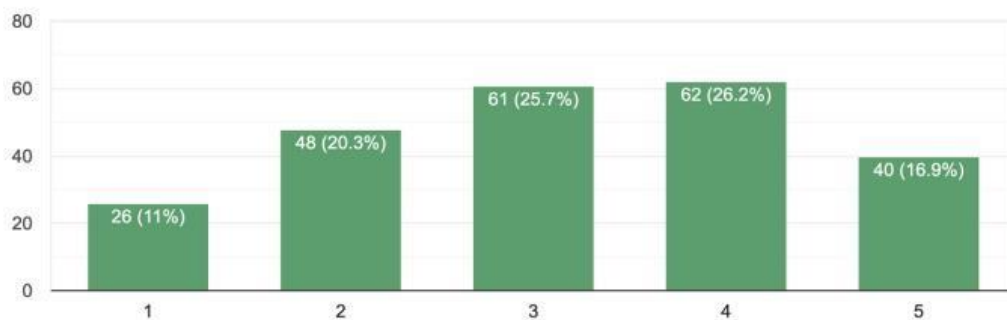


Figure 32 Respondents' attitude toward collection point model

The study asks customers if they want to be served by brand staff during pick-up at collection points or retailer's B&M stores to better understand their attitudes towards alternative delivery methods.

Figure 33 shows that the author provided recommendations to help respondents understand the services offered at collection points and B&M shops.

You want to receive your parcels with assistance from brand's personnel (after-purchase services, assistance during installation, etc).

237 responses

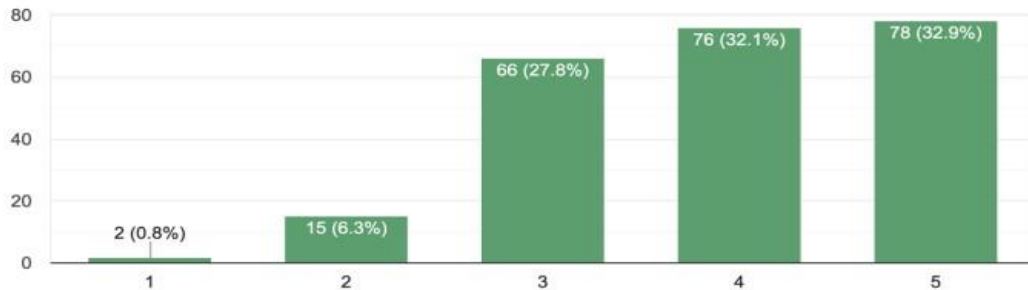


Figure 33 Respondents' attitude toward delivery assistance services

The majority of e-Commerce users have high expectations on this issue. Approximately 65% prefer to be supported, 27.8% are neutral, and only 7.1% are unwilling to get more services. This research highlights a striking trend among e-commerce users. After-sales services may have a significant impact and even change the game.

Figure 34 depicts how consumers choose a delivery partner.

You choose the logistics provider carefully by considering delivery time, price, credibility, popularity...

237 responses

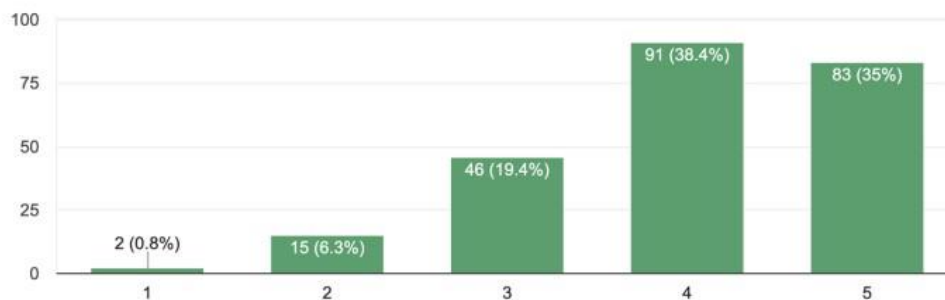


Figure 34 Respondents' attitude in choosing logistics provider

The preceding bar chart demonstrates a strong . Not less than responders which are 73.4% responded confidently towards assurance. Logistics companies should focus on improving delivery speed, pricing, trust, and popularity to increase orders and leverage their company.

The author's last question focuses on Noida consumers' commitment to logistics companies. Figure 35 shows that the majority of respondents (63.7%) are unlikely to replace their present shipping company without a justification. Logistics suppliers should prioritize customer happiness to ensure long-term success.

Once you are comfortable with a logistics provider / delivery company, you don't want to try another solution.

237 responses

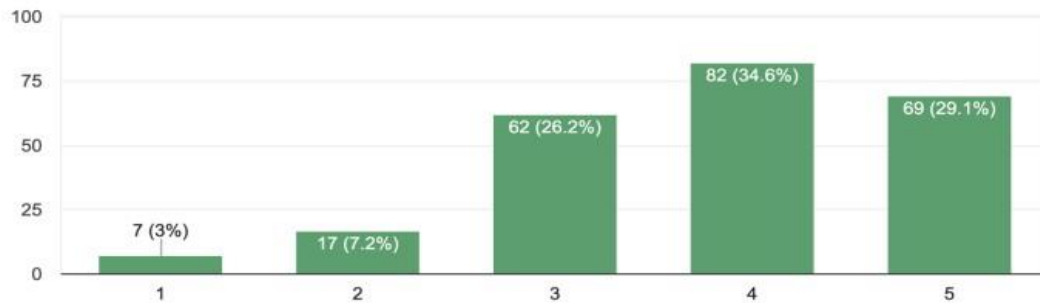


Figure 35 Respondents' attitude of changing logistics provider

Problems and suggestion from the consumer's perspective. The process on the last mile is the most difficult component of e-Commerce in Noida regarding the present scenario as well as the future challenges. The examination of problems and consumers' feedback is the most crucial factor. With a

view to running wide and deep through those topics, the questions in this part are specially designed to ask them. The answers of the question: Last-mile delivery problem of "What disturbs you most?" should consider this category and display it in Figure 36.

Delays in delivery are the most common issue, with 40% of respondents picking this option. Careless handling, missing items, and excessive expenditures accounted for 17.72%, 15.61%, and 11.81%, respectively. The third group includes security, privacy, and uninvited shippers. These difficulties mostly concern interpersonal factors, such as privacy and attitude. The last group discusses missing tracking features and other issues.

The last question invites respondents to offer ways to enhance the last-mile delivery experience, confirming their top concerns. Figure 37 shows the results.

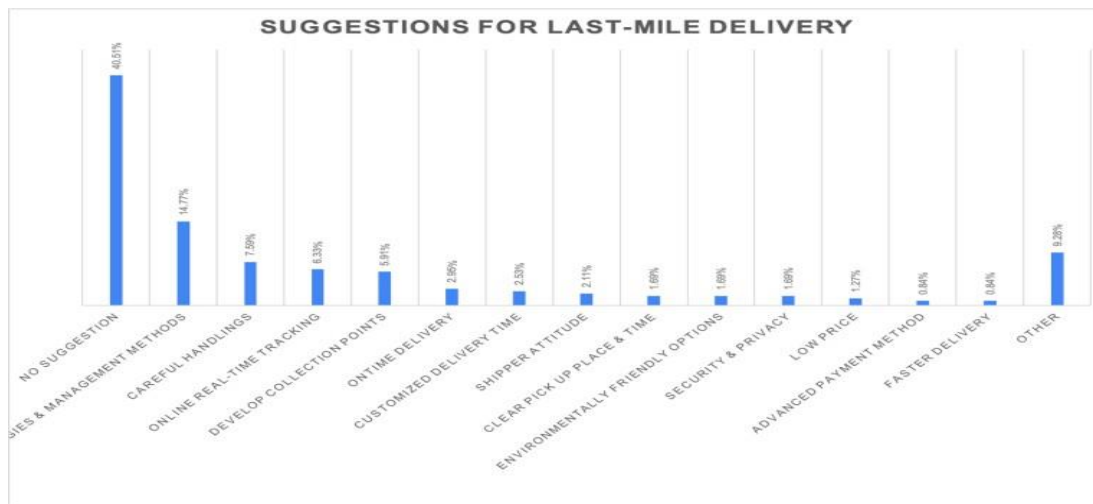


Figure 37 Suggestions to improve last-mile delivery from customer's perspective

40.51 percent of responders express satisfaction or have no suggestions. Among the remainder, 14.71% advocate for adopting new technologies and management methods, citing examples like DHL and Grab. Challenges include inexperienced service providers and infrastructure issues.

Results

Findings from the online poll highlight the demographic profile of Noida e-commerce users, positive attitudes toward online shopping, satisfaction with delivery methods, and concerns regarding delayed delivery and pricing.

Discussion And Conclusions

Answers to research queries

1 : These are the key feature of E commerce in Noida?

Noida's e-commerce features rapid internet growth, high mobile use, and a rising user base, despite trust issues, COD dominance, and infrastructure challenges.

2 : These are the important features of afar delivery for E commerce in Noida?

Noida's e-commerce last-mile delivery is small but expanding rapidly, reaching nationwide with frequent small shipments, yet hindered by attended home delivery.

3 : The present condition of the E commerce last mile delivery in Noida?

Last mile e-commerce delivery emerged in Noida during the 2010s, experiencing significant growth, leveraging opportunities from the young demographic and rising internet usage.

4 : E commerce coustomer of Noida what they do?

5 : Noida consumers prioritize on-time delivery, careful handling, reasonable prices, customized services, real-time tracking, advanced payment methods, and eco-friendly practices.

Noida's last-mile delivery suffers from immature service providers and clients, relying heavily on attended home delivery and COD payment methods.

6 : Is there any possible difficulties for the growth of the last mile delivery in Noida?

They are primary challenge in Noida's e-commerce last-mile delivery is bridging high customer expectations with the market's immaturity.

Validity and reliability

The thesis extensively covers E Commerce and last mile logistics theories, supported alongside high-quality second hand data. Primary data from an online poll of Noida residents ensures alignment with study objectives and enhances credibility.

Suggestions for future research

The thesis acknowledges its limitations in participant scope and suggests future research on a broader scale to explore last-mile delivery issues across diverse markets.

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