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Impact of the Pandemic on Online Grocery Delivery: Taking Instacart Company as an Example

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Abstract: The Pandemic has had an unprecedented impact on online grocery shopping; the worldwide lockdown has made online grocery shopping a rigid demand for citizens. During the global pandemic, many online grocery shopping companies grew up rapidly to the enormous demand. Especially Instacart, the most developed company in online grocery shopping, gained huge success in late 2019. This article analyzes Instacart's strengths, such as the three algorithms, its weaknesses, and how it can grow sustainably after Covid-19.

Keywords: online grocery shopping, Instacart, Covid-19, intelligence algorithm

1. Introduction

Since the first case of Covid-19 was diagnosed in late 2019, the global pandemic has been unstoppable. The virus spread and mutated at a breakneck pace, and soon, people worldwide started to realize the seriousness of this big spread and started shopping online [1]. As a result, the coronavirus has been a significant driver of online grocery shopping. While stores remain the critical channel for most grocers, online grew dramatically during the pandemic, with many retailers adjusting their offerings and operations to meet consumer demand. According to the statistics, Online Grocery Sales in the US Annualized Market Size Growth 2017–2022 is 17.6% [2], and the size of the online grocery of the US market reached a staggering $32.7 billion [3].

Additionally, the most surprising thing is that between 2019 and 2020, the first year of the epidemic, online grocery shopping grew from $66.5 billion to $109 billion, more than fifty percent growth [4]. Online grocery shopping reminds people of one company called Instacart. Instacart was founded in 2012 by Apoorva Mehta. He saw the need for an app that headed only to grocery shopping. The great turning point came with the COVID-19 pandemic, which increased online grocery shopping demand [5]. This article will focus on Instacart's Intelligence algorithm and how it has been successful.

2. Changes in Online Shopping before and after the Covid-19

Before Covid-19, although E-commerce was growing at an average pace, not most people liked to use this new method to purchase groceries. Some citizens love shopping in-store, which can relieve their pressure. The Covid-19 forces changed everyone's shopping habits, both for online and in-store shopping person; the pandemic altered many ways, especially for groceries. The most important thing people need at home is daily necessities; as people hurried to stock up on toilet paper and cleaning

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goods amid the global lockdown, grocery store inventories were swiftly depleted. As the lockdown wore on, supply chains tightened, cleaning materials became increasingly scarce, and everyone scrambled for basic food staples and requirements [6]. Online grocery shopping sales in the U.S. exploded from $66.5 billion in 2019 to $122.39 billion in 2021, as shown in figure 1; the online grocery market nearly doubled in two years, which shows the pandemic effect this industry a lot [7].

3. Advantages of Instacart

Instacart is convenient because it is not limited to regions and works with many warehouses so that most people can use it for their convenience. This section will analyze the reasons for its remarkable success during the pandemic.

3.1. Cooperation with Warehouse

Instacart has a relationship with dozens of stores, such as Aldi, Costco, CVS, Wegmans, and so on, and people can buy anything they want in those stores. There are 4,000 cities, and work with more than 15,000 stores around the United States and Canada work with Instacart. With those vast networks, Instacart has become the quickest grocery delivery service, and goods are delivered in less than two hours or picked up at local shops. However, looking at the main competitor of Instacart: Amazon fresh, it only services the city with Whole foods in a metropolis like New York City, Baltimore, Philadelphia, Boston, etc. Therefore, Instacart is more convenient for consumers than Amazon Fresh. Therefore, Instacart gives almost every user unfettered access to the convenience of the software.

3.2. Shopper Reward System

Instacart has a reward system for shoppers, which motivates the shopper's enthusiasm and efficiency. The shopper will get ten points when they finish the order, and those points can get discounts on the price of gas, which means they can make more money when they finish more orders. In addition, Instacart also made a policy of tips protection; they can receive extra money, which is tips, after they finish the order whether the customer gives them or not. Therefore, the shoppers get more encouraged to complete the orders on time, which is a win-win policy for both the shoppers and customers.

3.3. Making Use of Intelligence Algorithms to Improve the Effectiveness

Instacart uses intelligence algorithms like data algorithm, matching algorithm, and routing algorithm, as shown in figure 2, intelligence algorithm of Instacart. First, the data algorithm improves the accuracy of the warehouse stock and helps the customers' experiences. Customers only consider browsing the commodities they want and finding, paying for, and receiving them. However, those transaction seems easy, but behind these steps, the data algorithm helps a lot. Instacart has a relationship with more than 500 grocers and almost 40,000 physical shop locations in the United States and Canada. In addition, the pandemic brought explosive growth in orders and users, from 200,000 in March 2019 to 500,000 in late 2019. The Instacart company has a huge challenge to track billions of data points from 40,000 physical stores. Therefore, Instacart must forecast how many more than 50,000 customers will be online and accessible to work at any given time and location; they also must batch many orders from various consumers so that the authorized shopper can swiftly choose, pack, and transport them. Users will inevitably run into a situation when an item is sold out. To avoid this problem, Instacart collects product data from various sources and sorts it using automated, rule-based algorithms. Many shops offer us inventory data once every day, including pricing and item availability, but others submit updates every few minutes. For some users who book items, predicting the

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inventory of goods has become an essential thing because Instacart does not own or run its stores; they do not have a complete picture of what is on the shelves of any one store at any given time, let alone what will be there later that day or several days later [8]. Instead, we must make well-informed projections when we fill our virtual shelves. Data algorithms focus on shoppers' purchase history and how often a customer orders one commodity the most. For every product, Instacart will calculate a score between 0.0 to 1.0; a score of 0.7 means the shopper has 70 percent to find this product [9].

Furthermore, Instacart will update those scores in real time to help customers and shoppers match the possibility of finding the items. Due to this score, consumers will decrease the chance to purchase items that cannot find by shoppers [10]. On the other hand, when a product is sold out, it will no longer show the store and prevent the customer from adding it to the cart.

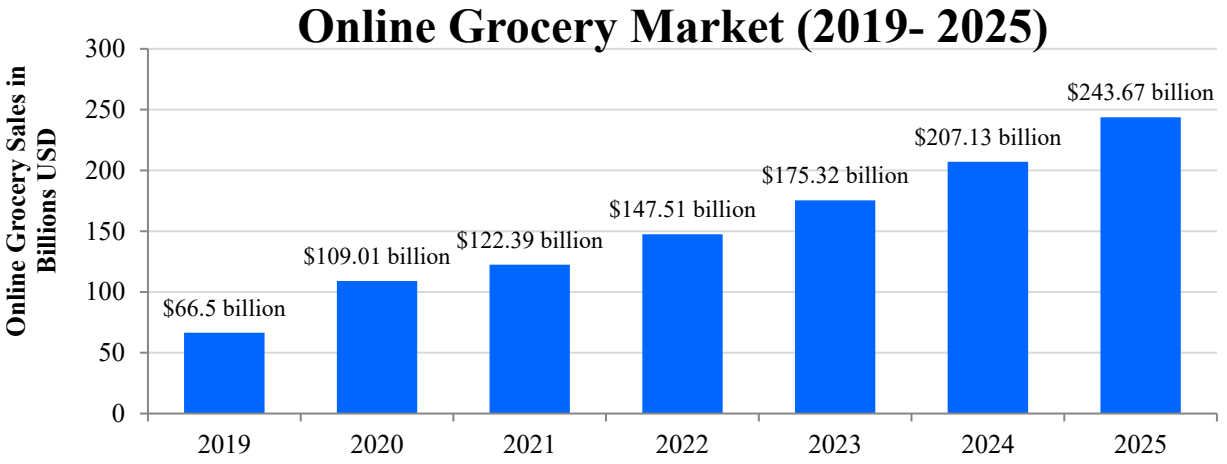

Figure 1: Online grocery market.

Secondly, the matching algorithm promotes the speed of processing the orders. When Instacart receives many orders at one store at the same time and deliveries near the exact location, especially in large cities, they group orders for simultaneous pickup on the shelf. When this happens, the matching algorithm comes into play, which balances the number of shoppers with customer demand. The more orders there are, the more options are offered; for example, if a shopper is not of age, they will not qualify for an order of alcoholic beverages. This not only improves efficiency but also increases the potential for error. It brings more benefits when more order comes in one specific area, and this algorithm gives more options and makes better decisions. Therefore, when new information comes, Instacart will rerun the matching algorithm every few minutes.

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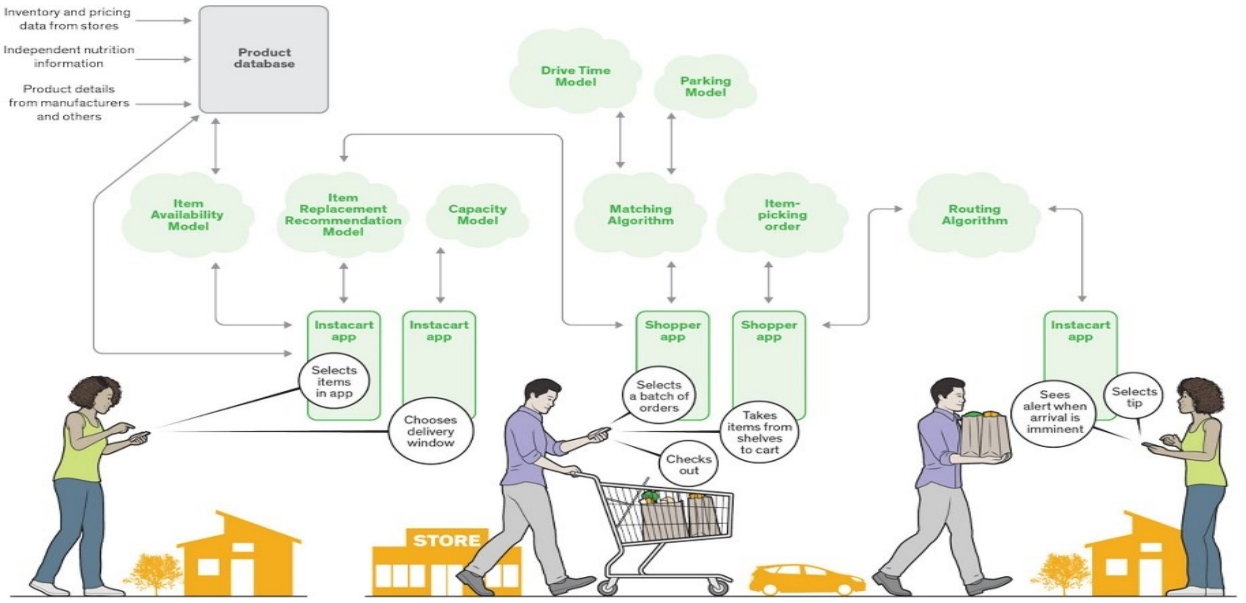

Figure 2: Intelligence algorithm of Instacart.

Thirdly, the routing algorithm is also important. Once the shopper is ready for delivery, this plays a crucial role in the optimal route from the store to the first destination and to the second and third destinations if one is to complete three different destinations. To finish the orders on time, the routing algorithm uses a real-time route to help shoppers hand in the commodities to the customers. The figure shows the estimated time for the shoppers to deliver the commodities plan and ensure the customer can get them on time.

The figure shows how the intelligence algorithm works when customer order merchandises, then the shoppers and shoppers pick all the things in the specified warehouse. After shopping, the routing algorithms help the shopper arrive at the customer as soon as possible, achieving on-time delivery.

4. Weakness and how to Improve

First, the dependency on the cooperators, some products out of stock will become a significant problem for Instacart. They dependent their retailers so much that they cannot control the stock and the quality of the commodities, which will affect the customer's experiences when they ask to change something similar due to the low inventory.

In addition, Instacart's sustainability will be challenged by the post-pandemic era. This company has proliferated because they have caught the chance of covid-19. When the epidemic recovers, people will be free to go out and shop, which means less reliance on delivery as a service, so there could be many layoffs of company employees.

As a result, Instacart needs to find ways to grow sustainably. They should get more relationships with other retailers like pharmaceuticals, pet products, and sporting goods. Otherwise, international expansion also is a good choice for Instacart to grow since they only operate in the United States and Canada. They still have opportunities to expand to other countries.

5. Conclusion

The epidemic not only brought a significant impact on online shopping but also boosted the growth of many companies, Instacart, has grown through its strengths, starting with its partnership with big supermarkets, expanding its range of business, and its intelligent algorithms. However, Instacart also needs to find ways to expand its scale to other countries and grow sustainably.

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