Case Study on Instacart and its Operations

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Executive Summary

Founded by Apoorva Mehta in 2012, Instacart has transformed the grocery sector by introducing a platform for online grocery shopping and same-day delivery. With a presence in over 14,000 cities, the company has partnered with 1,400 retail banners, encompassing 80,000 stores in the US and Canada. The overarching mission is to foster a world where everyone enjoys access to their preferred food choices, driven by a commitment to generous service and strategic partnerships with nonprofits (Instacart, 2023).

In the year 2022 alone, Instacart successfully fulfilled 262.6 million orders, totaling a transaction value of $28.8 billion. Having gone public in December 2021 with the NASDAQ listing CART and a current stock value of $23.53, the company encounters challenges in areas such as demand forecasting accuracy, inventory management, and ensuring the availability of shoppers.

To address these challenges, a recommended course of action has been outlined. This involves substantial investments in advanced data analytics and machine learning to enhance demand forecasting capabilities. Additionally, there is an emphasis on fortifying partnerships with grocery retailers to improve real-time inventory data sharing. Introducing incentives for shoppers during peak demand periods is also suggested. These strategic initiatives are designed to overcome challenges, fostering sustained growth, ensuring customer satisfaction, and establishing market dominance.

Instacart's dedication to technological innovation aligns seamlessly with industry trends, showcasing a proactive stance in investing in advanced technologies. Strengthening partnerships with grocery retailers is positioned as a crucial step to enhance supply chain resilience and refine

inventory management, ultimately reflecting a customer-centric approach. However, it is acknowledged that incentives for shoppers and potential collaborations may entail additional costs, demanding a meticulous financial analysis.

The proposed plan involves conducting a pilot implementation for demand forecasting, evaluating operational impacts for inventory management, and performing a comprehensive cost-benefit analysis for shopper availability initiatives. These strategic interventions, leveraging technology, fortifying partnerships, and incentivizing shoppers, are positioned to propel Instacart towards sustained success in the dynamic and competitive landscape of the grocery delivery industry.

Company Profile

Apoorva Mehta, drawing inspiration from his experiences of facing grocery challenges without owning a car and navigating cold bus trips during his upbringing in Canada, founded Instacart in 2012. After working as a supply-chain engineer at Amazon in 2008, Mehta transitioned to entrepreneurship, establishing Instacart at the age of 26 (Wikipedia, 2023).

In its early days, Instacart received an investment from Y Combinator in 2012, sparking its journey to revolutionize the grocery industry. The company's unique approach gained momentum, especially among busy professionals and individuals seeking convenience in grocery shopping.

Operating under the business name Maplebear Inc., Instacart has significantly impacted the grocery sector by offering a user-friendly platform for online grocery orders. Headquartered in San Francisco, it operates a comprehensive grocery delivery and pick-up service across the United States and Canada, accessible through both a website and a mobile app. Instacart acts as a

same-day grocery delivery and pick-up service, collaborating with various retailers, including national chains and local stores, to provide a diverse range of products to its customers.

Instacart's mission is to create a world where everyone can access the food they love. This mission involves reliable grocery deliveries, support for retail partners, and the provision of flexible earnings opportunities for shoppers. The company envisions building technology that powers every grocery transaction, guided by its core value of serving generously. The Instacart marketplace functions as a dynamic ecosystem, involving Instacart shoppers, local grocery stores, consumers using the app, and brand partners. The app facilitates seamless browsing, ordering, and prompt delivery of a wide array of products, including food, household essentials, beverages, and more.

As of April 2021, Instacart extended its reach to over 85% of U.S. households and 70% of Canadian households. By mid-2022, it secured a 3% share of the total grocery e-commerce market, witnessing substantial growth from 1% in 2019. While still a smaller player compared to giants like Walmart and Amazon in the overall grocery e-commerce market, Instacart commands a significant 75% share of the U.S. third-party grocery delivery market as of the end of 2022.

In terms of financial performance, the global online grocery market reached a valuation of $315.2 billion in 2022. Instacart, alone, fulfilled 262.6 million orders with a total transaction value of $28.8 billion in 2022, reflecting the growing trend of digital grocery shopping. The company, listed as CART on the NASDAQ stock exchange since December 2021, currently holds a stock value of $23.53. The below financial overview table, details revenue, profit, and operating expenses for the last four years, providing a comprehensive snapshot of Instacart's financial standing.

SUMMARY CONSOLIDATED FINANCIAL AND OTHER DATA

The summary consolidated statements of operations data for the years ended December 31, 2020, 2021, and 2022 have been derived from our audited consolidated financial statements included elsewhere in this prospectus. The summary consolidated statements of operations data for the six months ended June 30, 2022 and 2023 and the summary consolidated balance sheet data as of June 30, 2023 have been derived from our unaudited interim consolidated financial statements included elsewhere in this prospectus. You should read the following summary consolidated financial data together with the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and the related notes included elsewhere in this prospectus. The summary consolidated financial and other data in this section are not intended to replace our consolidated financial statements and the related notes and are qualified in their entirety by our consolidated financial statements and the related notes included elsewhere in this prospectus. The unaudited interim consolidated financial statements were prepared on a basis consistent with our audited consolidated financial statements included elsewhere in this prospectus, and, in the opinion of management, reflect all adjustments, consisting only of normal recurring adjustments, that are necessary for the fair statement of such data. Our historical results are not necessarily indicative of our results in any future period.

	Year Ended December 31,			Six Months Ended June 30,	
	2020	2021	2022	2022	2023
	(in millions, except share amounts, which are reflected in thousands, and per share amounts)				
Consolidated Statements of Operations Data:					
Revenue	$1,477	$1,834	$2,551	$1,126	$1,475
Cost of revenue[1]	598	608	720	357	366
Gross profit	879	1,226	1,831	769	1,109
Operating expenses:					
Operations and support[1][2]	324	262	252	130	128
Research and development[1][2]	194	368	518	243	257
Sales and marketing[1][2]	158	394	660	316	327
General and administrative[1][2]	278	288	339	153	128
Total operating expenses	954	1,312	1,769	842	840
Income (loss) from operations	(75)	(86)	62	(73)	269
Other income (expense), net	—	12	(8)	(2)	3
Interest income	5	2	17	2	34
Income (loss) before provision for (benefit from) income taxes	(70)	(72)	71	(73)	306
Provision for (benefit from) income taxes	—	1	(357)	1	64
Net income (loss)	$ (70)	$ (73)	$ 428	$ (74)	$ 242
Undistributed earnings attributable to preferred stockholders	—	—	(351)	—	(220)
Net income (loss) attributable to common stockholders, basic	$ (70)	$ (73)	$ 77	$ (74)	$ 22
Undistributed earnings reallocated to common stockholders	—	—	20	—	5
Net income (loss) attributable to common stockholders, diluted	$ (70)	$ (73)	$ 97	$ (74)	$ 27
Net income (loss) per share attributable to common stockholders:[3]					
Basic	$(1.21)	$(1.12)	$ 1.08	$(1.03)	$ 0.30
Diluted	$(1.21)	$(1.12)	$ 0.96	$(1.03)	$ 0.27

Source: https://www.sec.gov

Key facts surrounding the case

In 2013, Instacart introduced The Express membership program, later rebranded as Instacart+, offering customers unlimited free delivery for a nominal monthly subscription fee. The expansion continued in 2014, with Instacart reaching 10 additional major metropolitan cities, including notable launches in New York City, Los Angeles, and Portland. By 2017, the company achieved nationwide coverage by partnering with key U.S. grocery retailers and extending its services to Canada.

A pivotal moment in 2018 saw Instacart's acquisition of Unata, a Toronto-based tech platform driving grocery e-commerce websites. This move facilitated the launch of Instacart's first enterprise offering for retailers, including grocers. The year 2020 marked an expansion into new verticals such as beauty, electronics, and pets, concurrently growing the Instacart Shopper community to surpass 500,000 members across the U.S. and Canada.

The following year, in 2021, Instacart prioritized the nationwide integration of EBT SNAP payment options and bolstered its retailer technology offerings through the strategic acquisitions of FoodStorm and Caper AI. This period also witnessed the appointment of CEO Fidji Simo. In 2022, Instacart took a significant leap by launching the Instacart Platform, a comprehensive suite of end-to-end solutions empowering retailers to enhance their businesses. The company positioned itself as a pioneer shaping the future of grocery through technology, collaborating with retailers to navigate the digital transformation of their operations (Instacart, 2023).

Stakeholders

Stakeholders in Instacart's ecosystem include consumers utilizing the app for purchasing, shoppers responsible for purchasing and delivering goods, retailers stocking the items, and brand partners leveraging Instacart for targeted ads to high-intent shoppers. The company's product offerings revolve around three key pillars: Instacart Marketplace, Instacart Enterprise Platform, and Instacart Ads.

Challenges

Despite its achievements, Instacart faces below challenges.

Accuracy of demand forecasting

Accurately forecasting the demand impacts the overall supply chain efficiency. Overstock and understock instances in fulfillment centers contribute to increased operational costs, customer dissatisfaction, and missed revenue opportunities. The emergence of AI-based platforms and on-demand services has reshaped the industry, introducing new shopping and delivery paradigms.

Growth and Profitability

Growth and profitability pose ongoing challenges for Instacart, with the company acknowledging a history of losses and uncertainty about sustaining profitability or generating profitable growth in the future. The complexity associated with the company's scale makes it challenging to plan for future operations and strategic initiatives, emphasizing potential risks to its unit economics and customer acquisition cost-effectiveness.

Labor Disputes

Labor disputes constitute another challenge, as over 90% of Instacart's shoppers are independent contractors (gig-workers). Disputes over pay, working conditions, and benefits have been a source of friction. In October 2022, Instacart settled with the city of San Diego, agreeing to pay $46.5 million to address claims from Californian workers who asserted improper classification as independent contractors rather than employees.

Identification of the Key Issue

Operating as an intermediary linking customers with grocery stores, Instacart places significant emphasis on precise demand and supply forecasting to optimize its operations as a
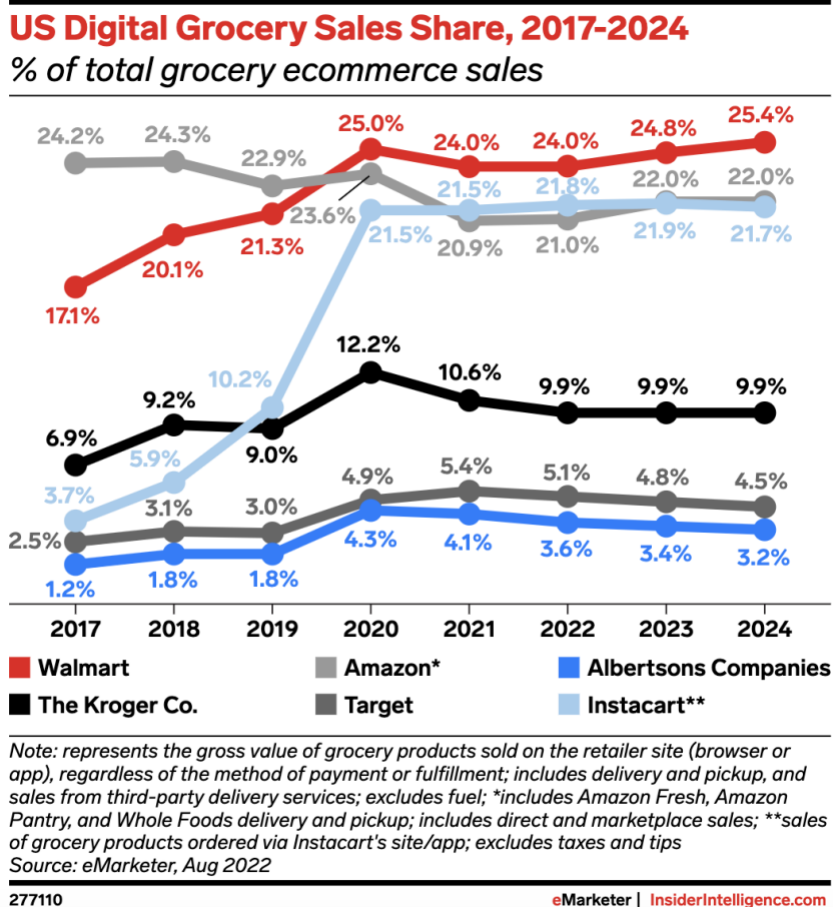
same-day grocery delivery service, ensuring the timely fulfillment of customer orders. Despite experiencing substantial growth through its extensive network of shoppers and partnerships with diverse grocery retailers, Instacart grapples with challenges in achieving accurate demand forecasting. Key areas of concern in demand and supply forecasting at Instacart include:

1. Demand Forecasting Accuracy: Instacart encounters notable fluctuations in demand, particularly evident during the volatile circumstances of the COVID-19 pandemic. These variations make it challenging to precisely forecast demand, hindering the effective allocation of resources.

2. Inventory Management: Collaborating with a diverse array of grocery retailers, Instacart contends with the impact of demand fluctuations on inventory levels and the availability of specific products. This variability can directly affect the company's capacity to meet customer orders promptly.

3. Shopper Availability: Instacart relies on a network of gig workers to fulfill customer orders, and demand fluctuations can disrupt shopper availability and capacity. This, in turn, leads to potential delays and order cancellations, affecting the overall service efficiency.

The inability to accurately predict demand and supply poses multifaceted challenges for Instacart, influencing supply chain management, delivery times, and shopper availability. These challenges contribute to diminished overall supply chain efficiency, escalated operational costs, customer dissatisfaction, and missed revenue opportunities. Addressing these intricacies in demand and supply forecasting is paramount for Instacart to enhance operational efficiency and deliver a more satisfactory customer experience.

The below multi-line chart is an example of how demand peaked between years 2019 to 2021 at Instacart in comparison with overall market share. The need for accurately predicting the demand and supplying the necessary products to customers on daily basis is very crucial for Instacart to retain customer trust and to sustain in the competitive market.

US Digital Grocery Sales Share, 2017-2024
% of total grocery ecommerce sales

Walmart: 17.1%, 20.1%, 21.3%, 23.6%, 25.0%, 24.0%, 24.0%, 24.8%, 25.4%
Amazon*: 24.2%, 24.3%, 22.9%, 21.5%, 20.9%, 21.0%, 22.0%, 22.0%
Instacart**: 3.7%, 5.9%, 10.2%, 21.5%, 21.9%, 21.7%
The Kroger Co.: 6.9%, 9.2%, 9.0%, 12.2%, 10.6%, 9.9%, 9.9%, 9.9%
Target: 2.5%, 3.1%, 3.0%, 4.9%, 5.4%, 5.1%, 4.8%, 4.5%
Albertsons Companies: 1.2%, 1.8%, 1.8%, 4.3%, 4.1%, 3.6%, 3.4%, 3.2%

2017 2018 2019 2020 2021 2022 2023 2024

■ Walmart   ■ Amazon*   ■ Albertsons Companies
■ The Kroger Co.   ■ Target   ■ Instacart**

Note: represents the gross value of grocery products sold on the retailer site (browser or app), regardless of the method of payment or fulfillment; includes delivery and pickup, and sales from third-party delivery services; excludes fuel; *includes Amazon Fresh, Amazon Pantry, and Whole Foods delivery and pickup; includes direct and marketplace sales; **sales of grocery products ordered via Instacart's site/app; excludes taxes and tips
Source: eMarketer, Aug 2022

277110   eMarketer | InsiderIntelligence.com

Source: research.contrary

Competitor Analysis

As per Chicory, 2021 survey, Instacart has gained the most reported online grocery users' year over year. Below table shows the percentage of how the amount of online grocery users shifted for each retailer year over year.

Table 1

Percentage of Online Grocery Users across Stores

Store Name	Percentage of Online Grocery Users
Walmart	+0.52%
Amazon	+8.52%
Kroger	+23.60%
Instacart	+47.90%
Shop & Shop/Giant Foods	+26.17%
Albertsons/Safeway	+7.80%

Comparative Analysis

Instacart operates as a notable player in the on-demand grocery delivery space. Unlike Uber Eats and DoorDash, Instacart focuses exclusively on grocery delivery. The platform collaborates with various grocery stores, allowing users to order from their preferred local stores. Instacart's widespread availability across the U.S. makes it a prominent choice for customers seeking grocery delivery services.

In comparison to Amazon and Walmart, Instacart offers a diverse selection of grocery items through partnerships with multiple grocery chains, providing users with a comprehensive range of options. While Amazon Fresh and Walmart Plus have their own perks for members, Instacart's model allows users to choose from various stores without requiring a specific membership.

Regarding the quick commerce segment, Instacart's model aligns more closely with Shipt, which provides membership-based free delivery for groceries. However, Instacart's approach extends beyond groceries, including alcohol and household essentials, making it a versatile option for users with diverse needs.

Considering Instacart's significant presence and role in the grocery delivery sector, it stands as a key competitor, offering a nuanced approach compared to the broader service portfolios of Amazon, Walmart, Uber Eats, and DoorDash.

Specify Alternative Courses of Action

To enhance its demand forecasting capabilities, Instacart can invest in advanced data analytics and machine learning technologies. Utilizing state-of-the-art algorithms, the company can analyze customer behavior and historical or real-time data to predict demand accurately and optimize supply chain management. A small-scale pilot implementation is recommended to assess effectiveness and resource implications before full-scale adoption, contingent on the availability and integration of historical and real-time data. While this technological investment aligns with industry trends and may lead to more accurate predictions, it poses a challenge as it is resource-intensive, potentially impacting cost and timeline.

In terms of inventory management, Instacart can collaborate closely with grocery retail partners to improve the availability of products for customer orders. The current practice of

offering replacement options or cash-back for out-of-stock items can be enhanced. The feasibility analysis involves evaluating potential operational adjustments, with pros including strengthened partnerships and improved customer satisfaction. However, operational adjustments may impact efficiency.

For shopper availability, Instacart can introduce incentives and bonuses to encourage gig workers to operate during peak demand periods. Collaboration with retail stores on stock management or partnerships with mobility services like Uber is also suggested. Feasibility analysis involves conducting a detailed cost-benefit analysis, and the effectiveness of incentives in improving shopper availability, along with collaboration feasibility. While the pros include improved workforce engagement and strategic collaborations, financial implications and potential additional costs require careful consideration.

To ensure successful implementation, Instacart should consider feasibility factors, conduct pilot programs, and undertake detailed financial and operational impact assessments. These steps are crucial for mitigating risks and ensuring the long-term success of Instacart's initiatives.

New Data Models for Alternative Solutions

Instacart runs on an asset-light grocery delivery model as shown in figure. It doesn't house trucks or maintain warehouses but instead leverages an existing network of grocery stores.
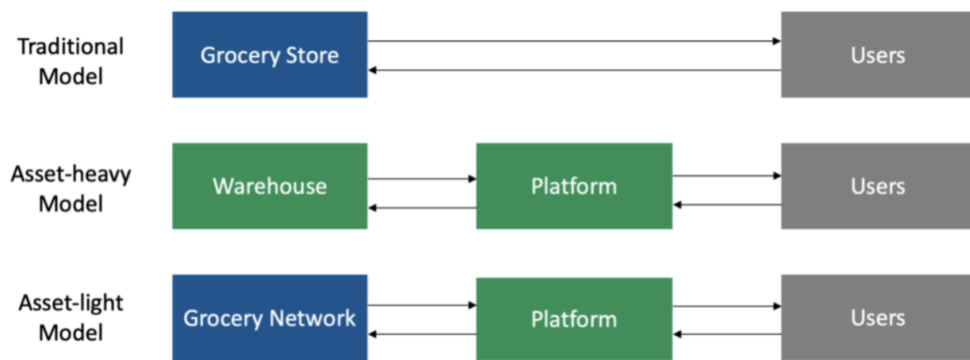
Source: Vendraminelli, L. (2019).

Instacart relies heavily on technology and ML models for its end-to-end supply chain operations as shown in Figure. In the below model, Instacart depicts a scenario of predicting the likelihood of an item being in stock by the time the shopper arrives to purchase it and saves customer preferences to identify backup products if the desired product is out of stock. The current application also personalizes recommendations based on a user's shopping history, location, and purchase patterns and predicts delivery times. To minimize wait times for consumers, it picks the best driver for the job to deliver grocery orders as quickly as possible

Source: https://research.contrary.com/reports/instacart
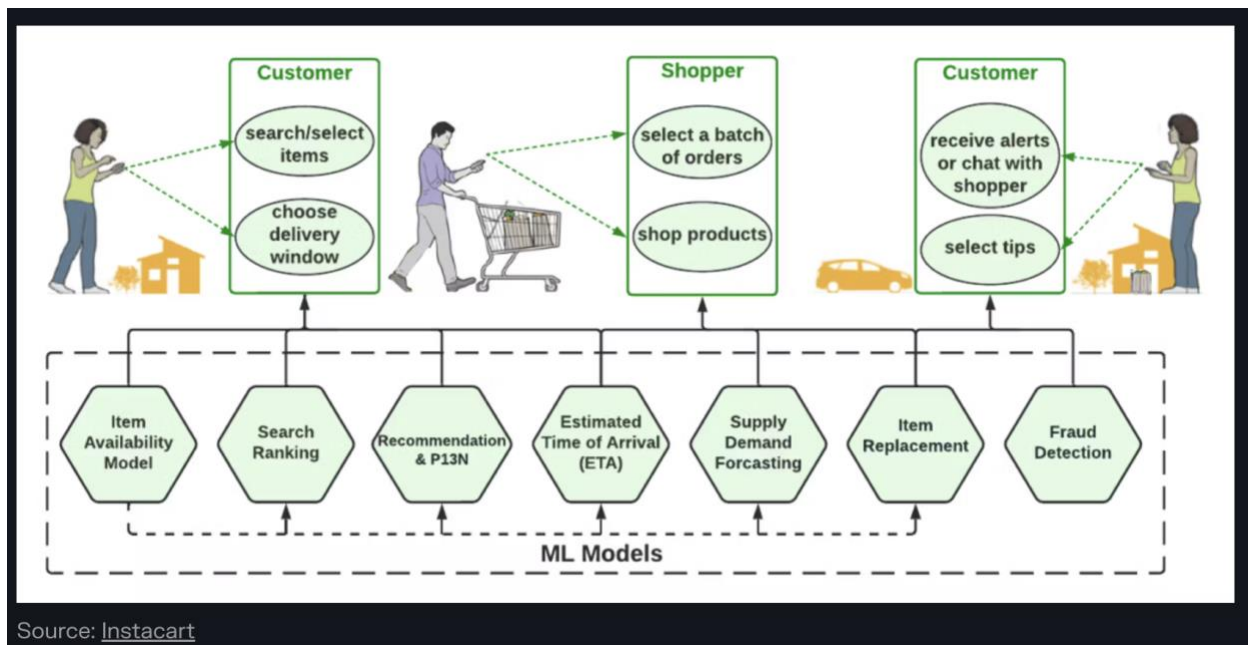
Improving the above Instacart ML model in Figure x to integrate with market response models reveal fluctuations in customer demand patterns that traditional forecasting models struggle to capture accurately. By understanding how the market reacts to changes in pricing, promotions, and other variables, provides businesses with a strategic advantage. Incorporating a market response model into demand forecasting enables businesses to predict consumer behavior more accurately, empowering them to proactively shape business strategies and demand planning based on anticipated market responses. Various Quantitative and qualitative models can be used for accurate demand forecasting, sales, and financial forecasting, understanding customer behavior, and improving customer experience.

Quantitative Models is for Numerical data types. It is divided into 2 categories: Time-series and Casual.

1. Time-Series (or reactive / one-dimensional methods): Techniques built on the premise that future sales will replicate the pattern(s) of past sales. Various classes of time series methods include (Chase, 2013): Naive or random walk, Moving averaging, Exponential smoothing, Decomposition, ARIMA (AutoRegressive Integrated Moving Average), XGBoost (Extreme Gradient Boosting).

2. Casual (or proactive / multi-dimensional methods): The basic premise of causal methods is that future sales of a particular product are closely associated (or related) with changes in some other variable(s). For example, changes in sales can be associated with changes in price, advertising, sales promotions, and merchandising. Therefore, once the nature of that association is quantified, it can be used to forecast sales. The most widely used causal methods are (Chase, 2013): Simple regression, Multiple regression, ARIMAX (AutoRegressive Integrated Moving Average with eXogenous variables), Unobserved components models.

Qualitative (Transformer / Foundation) models are for categorical / textual data types. It is broadly classified into:

1. Text and Sentiment Analysis: For applications like language modelling, text classification, question answering and machine translation (Miller, 2015).

2. Executive opinion: Opinions from experts, decision makers or customers

3. Delphi method and Sales Force estimates.

4. Consumer surveys: Pertaining to questions like would you purchase y or x product (Avercast, 2015).

5. Neural networks for text, object, image, and video classification. The most common types of neural networks are Feedforward Neural Networks (FNN), Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN)

6. Transformer Models: These are a powerful class of neural networks / deep learning models commonly used in Natural language processing (NLP) and other applications of generative AI. Transformer models are designed to learn the contextual relationships between words in a sentence or text sequence (DELL Technologies, n.d). Examples of such pre-trained transformer models are: OpenAI's GPTs (Generative pretraining transformers), Meta's LLaMA (Large Language Model Meta AI), Google's BERT (Bidirectional Encoder Representations from Transformers).

Evaluate Each Course of Action

Evaluation of each alternative in terms of cost, potential outcomes, scalability, compatability and the risks involved are discussed in this section.

Demand Forecasting

1. Cost: Significantly requires upfront investment in data analytics and machine learning.
2. Outcomes: Enhances supply chain management for streamlined operations.
3. Scalability and Compatibility: Adaptable to increasing data volumes; integrates with existing infrastructure.
4. Risks: Technical challenges, high operational costs, external factors impact accuracy.

Inventory Management

1. Cost: Involves negotiation and financial agreements with retail partners.

2. Outcomes: Enhances supply chain resilience, contributes to customer satisfaction and loyalty.

3. Scalability and Compatibility: Expands collaborations, integrates with existing systems.

4. Risks: Success depends on retail partners' cooperation; changes may disrupt processes.

Shopper Availability

1. Cost: Includes incentives for shoppers and potential financial agreements with mobility services.

2. Potential Outcomes: Improves gig worker availability; enhances customer experience.

3. Scalability and Compatibility: Expands partnerships and incentives; aligns with existing interfaces.

4. Risks: Increased operational costs, potential inadequacy of incentives, competition impact shopper retention.

Recommend the Best Course of Action

Given Instacart's emphasis on technological innovation and a commitment to enhancing customer experience, my recommendation is to prioritize the implementation of Accurate Demand Forecasting. While this initiative requires a substantial initial investment, the potential outcomes align seamlessly with Instacart's strategic goals. The promise of improved accuracy and operational efficiency not only reflects the company's dedication to innovation but also positions it as a market leader in the dynamic and competitive landscape of grocery delivery services.

The proposed integration involves leveraging Generative Artificial Intelligence (AI) capabilities, utilizing state-of-the-art algorithms powered by LLM. This approach stands to optimize demand predictions by analyzing historical data, deciphering customer behavior patterns, and considering external factors. The deployment of real-time data analytics dashboards, driven by advanced forecasting models, signifies a commitment to adaptability, enabling Instacart to respond swiftly to evolving demand patterns. This not only streamlines communication but also establishes a robust data exchange framework with partner grocery stores.

Furthermore, the integration of Generative AI into Instacart's platform introduces a unique and customer-centric feature. Enabling customers to make inquiries in everyday language enhances the user experience, providing valuable insights and recommendations. This innovation has the potential to set Instacart apart from its competitors, establishing a distinct competitive advantage in the market.

For supply chain analysts, the implementation of an AI-powered demand forecast analyzer offers a comprehensive solution. The ability to drill down into various product categories, generate forecasts based on current stock levels, and receive clear recommendations enhances decision-making processes. The proposed system's integration within Instacart's servers not only ensures effective management of data but also provides transparency into the forecasting models, fostering trust among analysts.

In addition to prioritizing advanced technologies, I recommend expanding Instacart's retailer network to address inventory management challenges, attract a broader customer base, and boost sales. Advertising and attracting local niche retailers without a digital presence can be

a strategic move, positioning Instacart as a platform that not only caters to customer needs but also supports local businesses.

In conclusion, the recommendation to prioritize Accurate Demand Forecasting, alongside the proposed integration of Generative AI and the expansion of the retailer network, sets a comprehensive strategy for Instacart. These initiatives not only align with the company's vision but also position it for sustained success, ensuring operational excellence, heightened customer satisfaction, and a prominent position in the competitive grocery delivery industry.

Conclusions

In conclusion, Instacart stands at a pivotal juncture, navigating challenges in demand forecasting accuracy, inventory management, and shopper availability. The recommended course of action focuses on harnessing advanced data analytics, machine learning, and Generative Artificial Intelligence (GenAI) to elevate demand forecasting accuracy. Integrating LLM-powered models and market response analytics into the existing architecture would empower Instacart to predict and respond swiftly to dynamic market demands.

The recommended solutions align with operational analytics principles, providing a data-driven approach to enhance forecasting accuracy, optimizing the supply chain and reducing operational inefficiencies. These recommendations provide actionable insights for Instacart to address strategic challenges, enhance its market position, and capitalize on opportunities in the competitive grocery delivery industry.

Furthermore, strengthening partnerships with grocery retailers and expanding the retailer network through competitive advertising and unique collaborations can enhance real-time inventory data sharing. This collaborative system not only optimizes supply chain visibility but

also positions Instacart as a comprehensive platform for retailers, fostering long-term partnerships.

The proposed initiatives are not without challenges; however, careful pilot implementations, operational impact assessments, and cost-benefit analyses will mitigate risks and ensure the sustainability and positive outcomes of these interventions. Instacart's commitment to technological innovation, coupled with a customer-centric approach, is poised to reinforce its market dominance and secure sustained success in the dynamic grocery industry.

As Instacart pursues these strategies, it aligns with its mission to create a world where everyone has access to the food they love. Through proactive measures, collaborative partnerships, and cutting-edge technology, Instacart is well-positioned to build the future of grocery transactions and continue its remarkable journey as a market leader.

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