



Case Study Background

Instacart is a North American grocery delivery and pickup service. Users can select items from local grocery stores through the Instacart app or website, and then either have them delivered to their doorstep by a personal shopper or prepared for pickup at the store.

Instacart is similar to India's Blinkit, Swiggy Instamart, or Dunzo app. In Europe, the comparable app is Getir and Gorrillas. In Latin America, Rappi serves a similar use case.

You're a **data analyst** at Instacart.

In your 1-1 call this morning, your manager tells you that leadership wants to analyze the Instacart market data over time, to understand how the business is changing or staying the same.

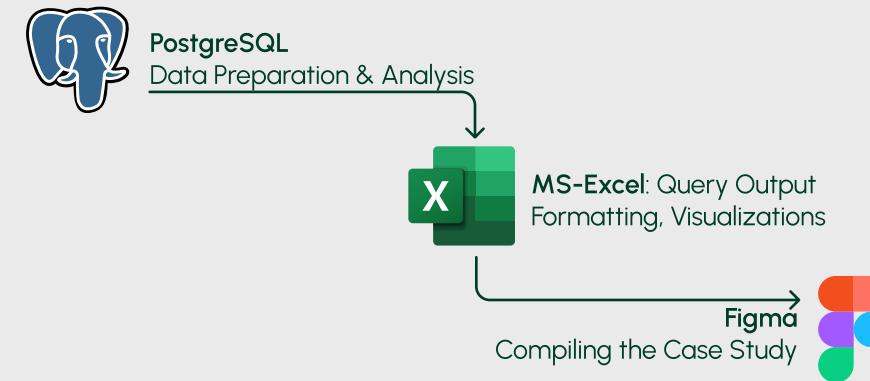
The Task: find a way to understand how Instacart's business changed over time...without using explicit dates!

Unfortunately, data engineering found some logging errors in the pipeline, and there are currently no date fields in the market data tables. So for now, you're stuck with the data you have.



Case Study Overview

The Task: find a way to understand how Instacart's business changed over time...without using explicit dates!



Case Study Inspiration: [DataLemur](#)

Data Source: [Kaggle - Instacart Competition](#)

Performed comparative analysis of key *order metrics*, *cart composition patterns*, *reorder trends*, and *top performing items*. Investigated *seasonal influences* on *fresh produce reorders*.

Database Schema

order_id	product_id	add_to_cart_order	reordered
2	33120	1	1
2	28985	2	1
2	9327	3	0
2	45918	4	1
2	30035	5	0

ic_order_products_curr: this table specifies which products were purchased in each Instacart order

ic_order_products_prior: this table contains previous order contents for all customers.

This data was collected in Q2, versus

ic_order_products_curr which is data from the current quarter (Q3).

product_id	product_name	aisle_id	department_id
1	Chocolate Sandwich	61	19
2	All-Seasons Salt	104	13
3	Robust Golden Un	94	7
4	Smart Ones Classic	38	1
5	Green Chile Anytin	5	13

ic_products: info about each item in the Instacart product catalog.

aisle_id	aisle
1	prepared soups salads
2	specialty cheeses
3	energy granola bars
4	instant foods
5	marinades meat preparation

ic_aisles: info about each aisle in a grocery store

department_id	department
1	frozen
2	other
3	bakery
4	produce
5	alcohol

ic_departments: info about each department

Department	Total Aisles	Total Products	Total Sold in Q3	Total Sold in Q2
produce	5	1684	3005	2913
dairy eggs	10	3449	1538	1647
snacks	11	6264	927	862
beverages	8	4365	770	801
frozen	11	4007	714	746
pantry	12	5371	641	598
canned goods	5	2092	356	362
dry goods pasta	5	1858	327	255
deli	5	1322	309	319
bakery	5	1516	308	354
household	10	3085	239	249
breakfast	4	1115	204	238
meat seafood	7	907	194	225
personal care	17	6563	144	125
babies	4	1081	101	131
missing	1	1258	77	15
international	4	1139	72	86
alcohol	5	1054	37	27
pets	2	972	19	28
other	1	548	10	13
bulk	2	38	8	6
Total	134	49688	10000	10000

Distribution of Products Sold

There are a total of **21** Departments with **134** Aisles.

Instacart has a total of **49688** Products listed in the products catalog.

In Q3, the products belonging to the *produce* department are sold most with total **3005** units sold. In Q2 also, the *produce* department products were sold most with total **2913** units sold.

55% of the products sold in Q3 are the products from the 3 departments of *produce*, *dairy eggs*, and *snacks*. While in Q2, these departments constitute **54%** of the total products sold.

The department of *personal care* has most number of products (**6563**) listed in the catalog and has been allotted most number of aisles (**27**). However, only **144** units were sold in Q3 and **125** sold in Q2.

Comparative Analysis

Metrics	Q2	Q3
Total Orders	977	939
Distinct Products Sold	4511	4660
Total Units Sold	10000	10000
Total Reordered Units	6066	5781
Avg no of items per order	10	11
Largest order	46	54
Smallest order	1	1

The orders in Q3 have dipped a little bit to **939** from **977** of Q2. In these orders, **4660** different products were sold which are more than Q2.

The reordered items also reduced in Q3 indicating that *people are trying new items listed in the catalog.*

The average number of items in a particular order are **11** in Q3 while in Q2 it was **10** items per order.

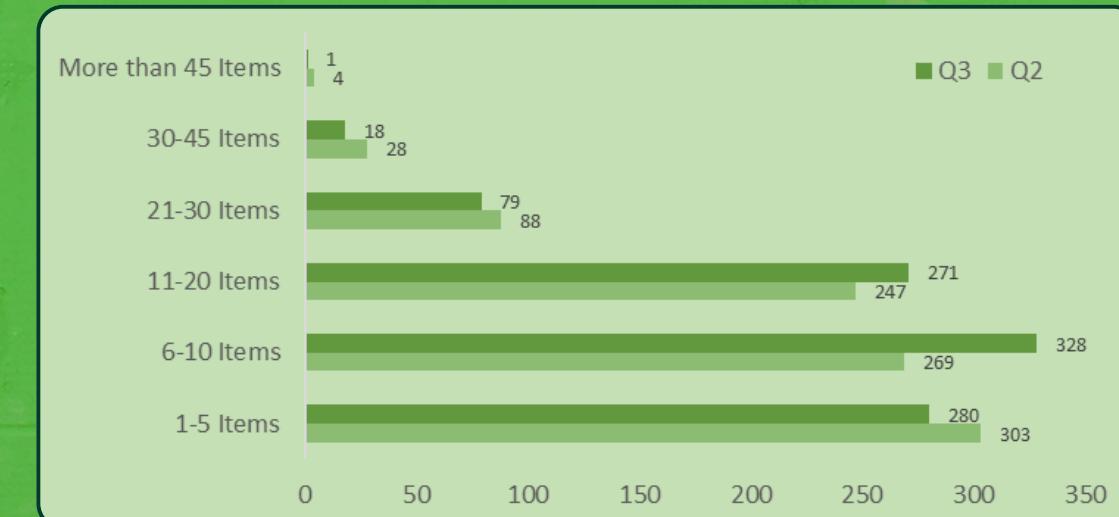
Cart Size Analysis

We can see that most of the orders have a cart size of up to **20** items regardless of the concerned quarter.

In Q3, most orders (**328**) have the the cart size of **6-10 items**. While in Q2, cart size of **1-5 items** have most number of orders (**303**).

It can be said from the finding that *most people tend to buy up to 20 items in an order from a particular grocery store.*

Bin	Q2	Q3
1-5 Items	303	280
6-10 Items	269	328
11-20 Items	247	271
21-30 Items	88	79
30-45 Items	28	18
More than 45 Items	4	1



Top 10 Products (by Units Sold)

Banana was the top most sold product in both Q2 and Q3. However, the sales were decreased in the later quarter.

After bananas, it was the *organic bananas* which were sold most in Q2, while in Q3 it was 3rd most sold.

All the top 10 products sold in both the quarter are from the *produce* department.

The sales of *large lemon* have increased in the Q3, ranked at 5th while in Q2 it was at 8th rank.

Organic cucumber and *limes* are two new entrants in the top 10 products category. The sales of organic cucumber has increased 70% in Q3 as compared to Q2.

The sales of *strawberries* have decreased by 21% in Q3. Subsequently the products' rank also got down to 10th from 7th.

Q2		Q3	
Product	Total Units Sold	Product	Total Units Sold
Banana	156	Banana	124
Bag of Organic Bananas	119	Organic Strawberries	98
Organic Strawberries	73	Bag of Organic Bananas	94
Organic Baby Spinach	70	Organic Baby Spinach	70
Organic Hass Avocado	68	Large Lemon	66
Organic Avocado	53	Organic Hass Avocado	54
Strawberries	52	Organic Avocado	45
Large Lemon	46	Organic Cucumber	44
Organic Yellow Onion	41	Limes	43
Organic Raspberries	39	Strawberries	41

Product	Department	Total Orders (Q3)	Rank (Q3)	Total Orders (Q2)	Rank (Q2)
Banana	produce	124	1	156	1
Organic Strawberries	produce	98	2	73	3
Bag of Organic Bananas	produce	94	3	119	2
Organic Baby Spinach	produce	70	4	70	4
Large Lemon	produce	66	5	46	8
Organic Hass Avocado	produce	54	6	68	5
Organic Avocado	produce	45	7	53	6
Organic Cucumber	produce	44	8	26	18
Limes	produce	43	9	33	12
Strawberries	produce	41	10	52	7

In what order, the top 10 products are being added to the Cart?

Product	Aisle	Total Units Sold	Avg Cart Order
Banana	fresh fruits	124	4
Organic Strawberries	fresh fruits	98	8
Bag of Organic Bananas	fresh fruits	94	5
Organic Baby Spinach	packaged vegetables fruits	70	7
Large Lemon	fresh fruits	66	9
Organic Hass Avocado	fresh fruits	54	7
Organic Avocado	fresh fruits	45	6
Organic Cucumber	fresh vegetables	44	11
Limes	fresh fruits	43	11
Strawberries	fresh fruits	41	7

On average, *bananas* are added to online shopping carts during the **fourth** turn of a customer's browsing session.

Organic bananas follow closely behind, typically being added in the **fifth** turn.

Interestingly, the rest of the top 10 most popular products are also chosen on or after the **fourth** turn.

Since, the top-selling products tend to enter the cart later, typically around the fourth item or beyond.

This begs the question: what fills the cart initially?

Top sellers join carts late (4th+ position). So, what fills carts early?

There are total **277** products which were added first to the cart and only **296** units of these products were sold, implying that these products aren't always must-haves.

Yogurt, baking stuff, juice drinks, tea, ice, etc. seem to be the things people grab first. Not everyday buys, but they hit the spot when you need them.

Not pantry staples, but purpose-driven picks. So, whenever mood strikes, shoppers tend to shop for these specific products and add them to the cart immediately. The daily needed pantry products make to the cart little late.

Aisle	Total Products	Aisle	Total Products	Aisle	Total Products	Aisle	Total Products
yogurt	10	cold flu allergy	3	eggs	2	tofu meat alternatives	1
baking ingredients	10	condiments	3	other	2	other creams cheeses	1
juice nectars	9	diapers wipes	3	grains rice dried goods	2	digestion	1
tea	8	dog food care	3	pasta sauce	2	packaged meat	1
ice cream ice	8	dry pasta	3	cookies cakes	2	deodorants	1
packaged vegetables fruit	7	first aid	3	plates bowls cups flatware	2	trail mix snack mix	1
soft drinks	6	fresh vegetables	3	beers coolers	2	poultry counter	1
refrigerated	6	frozen appetizers sides	3	canned meals beans	1	trash bags liners	1
chips pretzels	6	frozen pizza	3	refrigerated pudding dess	1	preserved dips spreads	1
soy lactosefree	6	hot dogs bacon sausage	3	salad dressing toppings	1	protein meal replacement	1
fresh fruits	6	instant foods	3	skin care	1		
crackers	5	milk	3	soap	1		
packaged cheese	5	oils vinegars	3	fresh dips tapenades	1		
candy chocolate	5	oral hygiene	3	feminine care	1		
energy granola bars	5	paper goods	3	breakfast bars pastries	1		
frozen meals	5	prepared soups salads	3	specialty cheeses	1		
coffee	5	spices seasonings	3	frozen breakfast	1		
cream	4	spreads	3	facial care	1		
water seltzer sparkling water	4	tortillas flat bread	3	bakery desserts	1		
laundry	4	vitamins supplements	3	fruit vegetable snacks	1		
pickled goods olives	4	butter	2	granola	1		
popcorn jerky	4	soup broth bouillon	2	spirits	1		
prepared meals	3	cleaning products	2	energy sports drinks	1		
baby food formula	3	breakfast bakery	2	frozen produce	1		
bread	3	asian foods	2	kitchen supplies	1		
buns rolls	3	nuts seeds dried fruit	2	doughs gelatins bake mix	1		
canned jarred vegetables	3	missing	2	lunch meat	1		
canned meat seafood	3	packaged produce	2	marinades meat preparat	1		
cereal	3	white wines	2	more household	1		

What about the rest of the Add to Cart Orders?

We saw that shoppers prioritize must-haves early, filling carts with must-have rarely needed products first and the daily-need products later.

Daily needs are added later, as add to cart order approach the average size of 10 items.

The most number of items are added generally at 7th order.

Beyond the Basics, Choices Narrow. Beyond 10 items, total items sold drop, likely due to budget constraints or fulfilled needs.

The same trend follows for the total reordered items as well.

The bigger the cart, the less frequently it appears, and the same goes for the items purchased.



Avg Cart Order	Total Units Sold	Total Reorders
1	296	173
2	331	217
3	489	304
4	662	438
5	690	427
6	737	441
7	1006	652
8	888	568
9	807	495
10	884	501
11	740	400
12	458	233
13	387	192
14	243	124
15	217	99
16	205	98
17	124	60
18	172	74
19	103	50
20	81	35
21	81	34
22	63	26
23	47	22
24	47	22
25	29	6
26	23	10

Reordering Behavior Change

Q3 saw **13** products with reorder growth exceeding 50% compared to Q2, **60%** of the products being *fresh produce*.

Notably, there are 8 products whose reorders have decreased by at least 50%.

Seasonal shifts in demand, particularly for fresh produce, impact both product availability and reorder patterns.

Product	Aisle	Total Reorders (Q2)	Total Reorders (Q3)	% Change
Small Hass Avocado	fresh fruits	5	21	320%
Organic Broccoli	fresh vegetables	8	16	100%
Red Vine Tomato	fresh vegetables	8	15	88%
Organic Spring Mix	packaged vegetables	5	9	80%
Organic Grade A Free Range Large Eggs		7	12	71%
Large Lemon	fresh fruits	26	44	69%
Organic Lacinato (Dinosaur) Kale	fresh vegetables	8	13	63%
Organic Ginger Root	fresh vegetables	8	13	63%
Lightly Salted Baked Snap Pea Chips	pretzels	5	8	60%
Organic Red Bell Pepper	fresh vegetables	11	17	55%
Yellow Onions	fresh vegetables	10	15	50%
Organic Black Beans	canned meals beans	8	12	50%
Pure Irish Butter	butter	6	9	50%
Original Hummus	fresh dips tapenades	22	11	-50%
Organic Blackberries	fresh fruits	18	9	-50%
Green Bell Pepper	fresh vegetables	14	6	-57%
Organic Whole Strawberries	frozen produce	14	6	-57%
Organic Whole String Cheese	packaged cheese	14	6	-57%
Blueberries	frozen produce	17	7	-59%
Roma Tomato	fresh vegetables	13	5	-62%
Half & Half	cream	16	5	-69%



Business Recommendations

Increased produce sales are beneficial for the company, so leadership should capitalize on customers' higher propensity to reorder produce during the summer months.

While shopping, after adding first three items to the cart, the shopper should get recommended with the options of previously bought fresh produce items and also the top performing items.

If not already implemented, marketing should consider promoting bundle deals on produce to incentivize new buyers, who may then become repeat customers for those products.

Additionally, team members working with suppliers and grocers should ensure the consistent availability of popular produce items, including Bananas, Strawberries, Avocado, and Broccoli, in order to maintain high reorder rates.



Thank you for your Time!

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