# Demand Forecasting

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**November 2022**

# Problem Statement

# What is Mercadona Tech

- Mercadona Tech is the first grocery company in Spain that satisfies "The Boss" online, assuring decent work to all Employees and generating a profitable business within a sustainable Society.
- **Facts:**
  - ~8K orders / day
  - 5 hives (big centers)
  - 12 shops

# Why demand forecasting?

- An accurate forecast means **efficient use of the resources** while **satisfying** all our **customer needs**.
- **What if our forecast is above reality?**
    - We may have more workers than required.
- **What if our forecast is below reality?**
    - We may not meet our customers need.

# How is the process?

- Our demand is measured in “columns”.

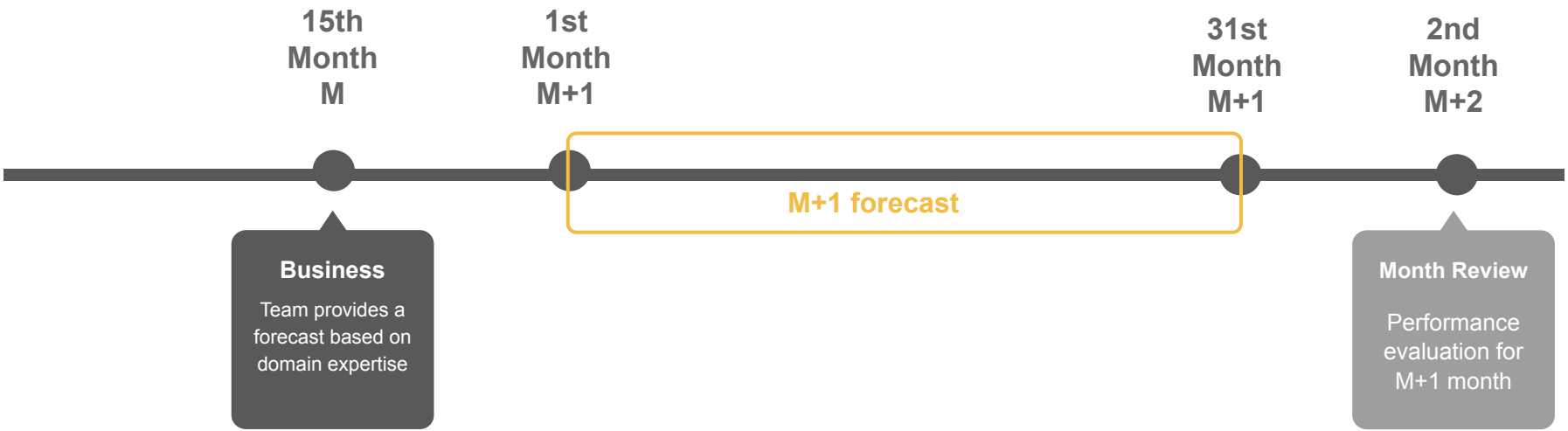
**columna**

Del lat. *columna.*

1. f. Soporte vertical de gran altura respecto a su sección transversal.

Where “*gran altura*” means the maximum height of the delivery truck (~8 crates)

# How was the process?



# Is there anything we can do to help our business team?

# Our journey began…

# Where is my data?

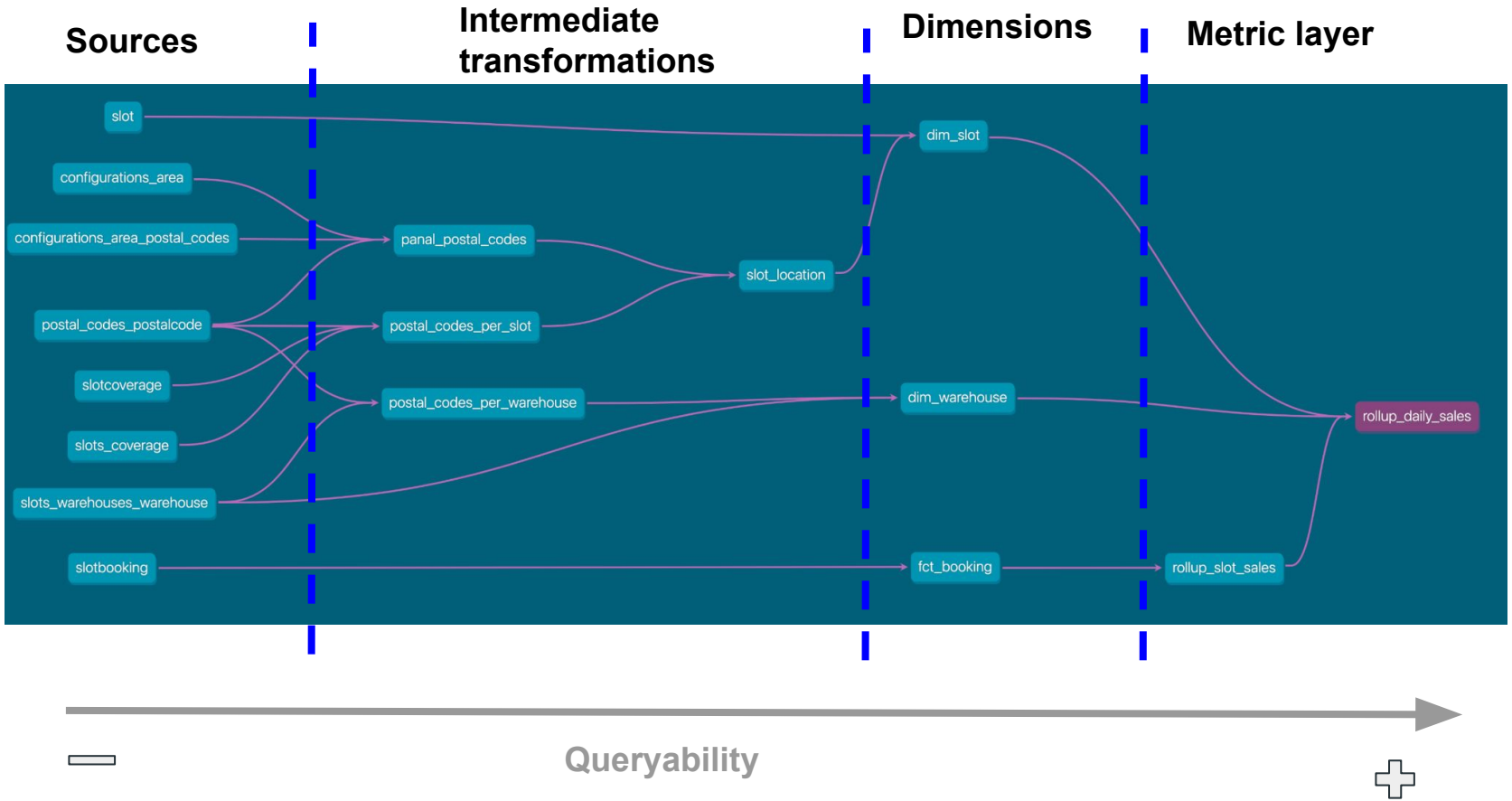
# Starting point

- Retrieving the info from the data warehouse was difficult.
- Knowledge silos in the scheduled queries / views.

# Current point

- Dimensional modeling to make info more queryable.
- DBT (Peer review + version control) to remove silos.

# What can we do with DBT?



# Is our data biased?

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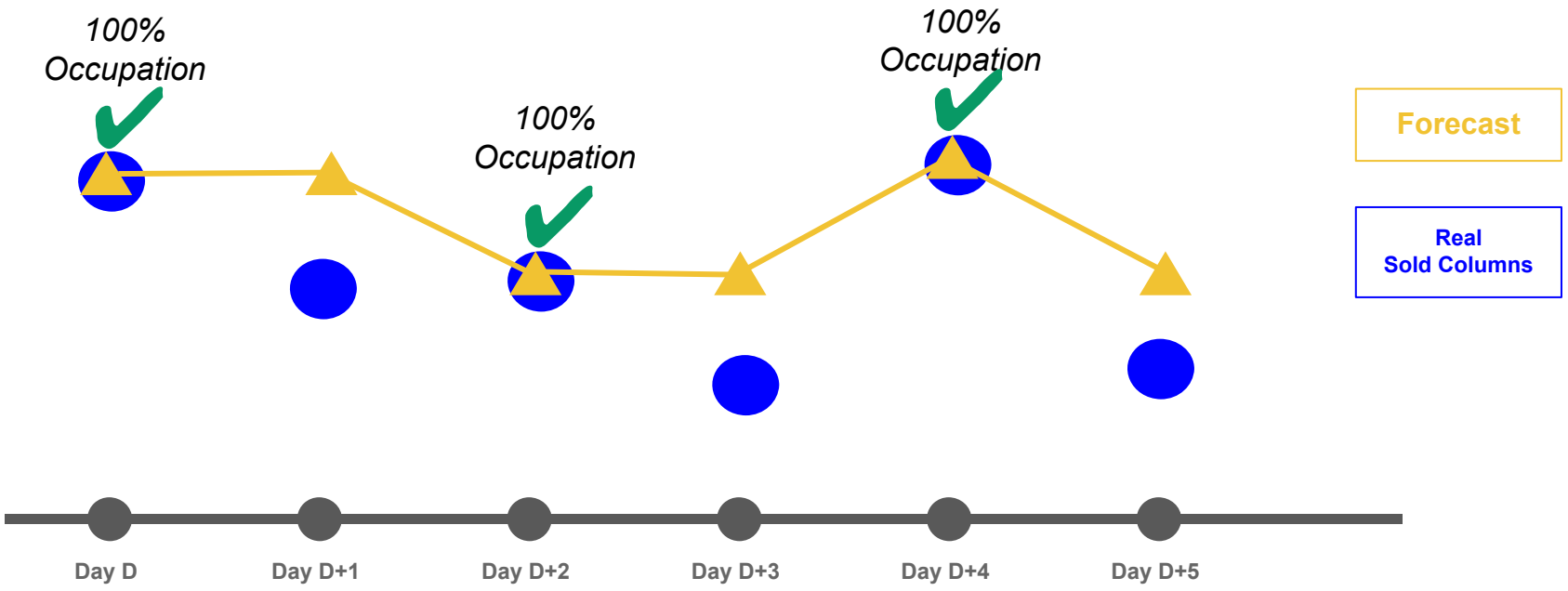
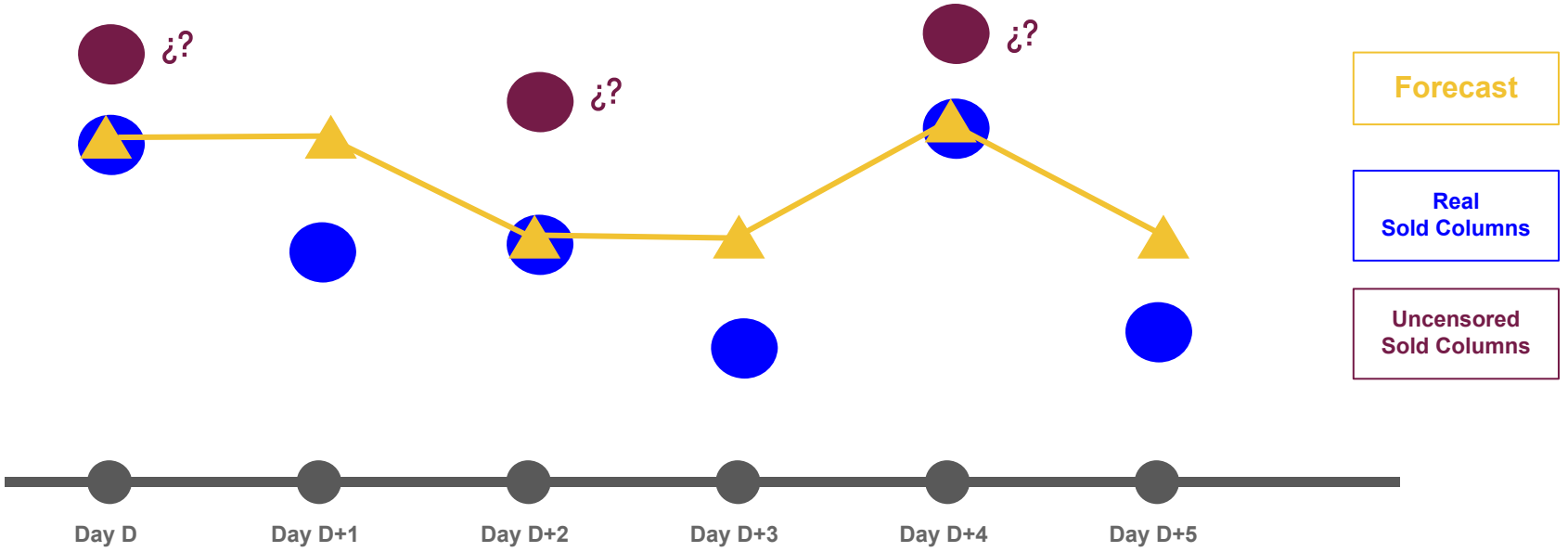


# Our past data may be censored



# Why do we care about censure?

- The main problem is that we can have a bias to do “pessimistic” predictions.

- Bibliography points into two different directions:

**Demand Management**

*“Ajustes”* flash

Dynamic pricing

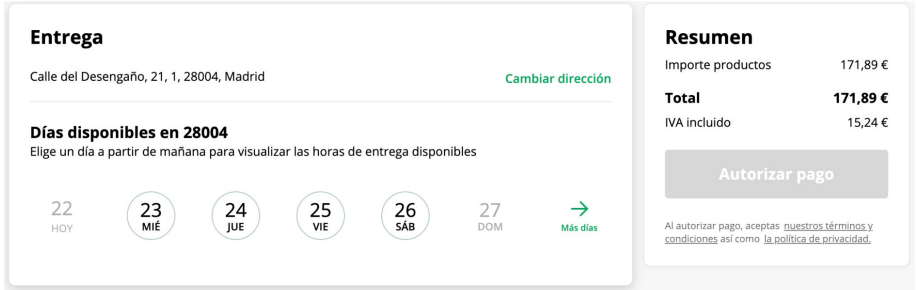
Marketing campaigns

**Unconstrained demand**

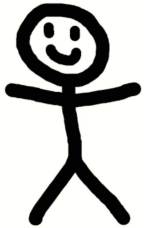
*Inflate the “seen” demand*

*Followed approach* ✔

# How is the buying process?




Customer



Day D | Day D+1 | Day D+2 | ... | Day D+10 | Day D+11

**Booking day**

Customer confirms the order for a future day

**Delivery day**

Customer receives the order

# How is it solved?

- **We broke the problem into two sequential parts.**

**1st STEP**

**Unmet confirmed columns**

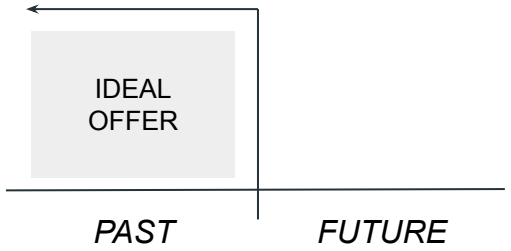
*How many confirmed orders are we losing each day due to a lack of availability?*

**2nd STEP**

**Unmet sold columns**

*How do we transform unmet confirmed columns into unmet sold columns?*

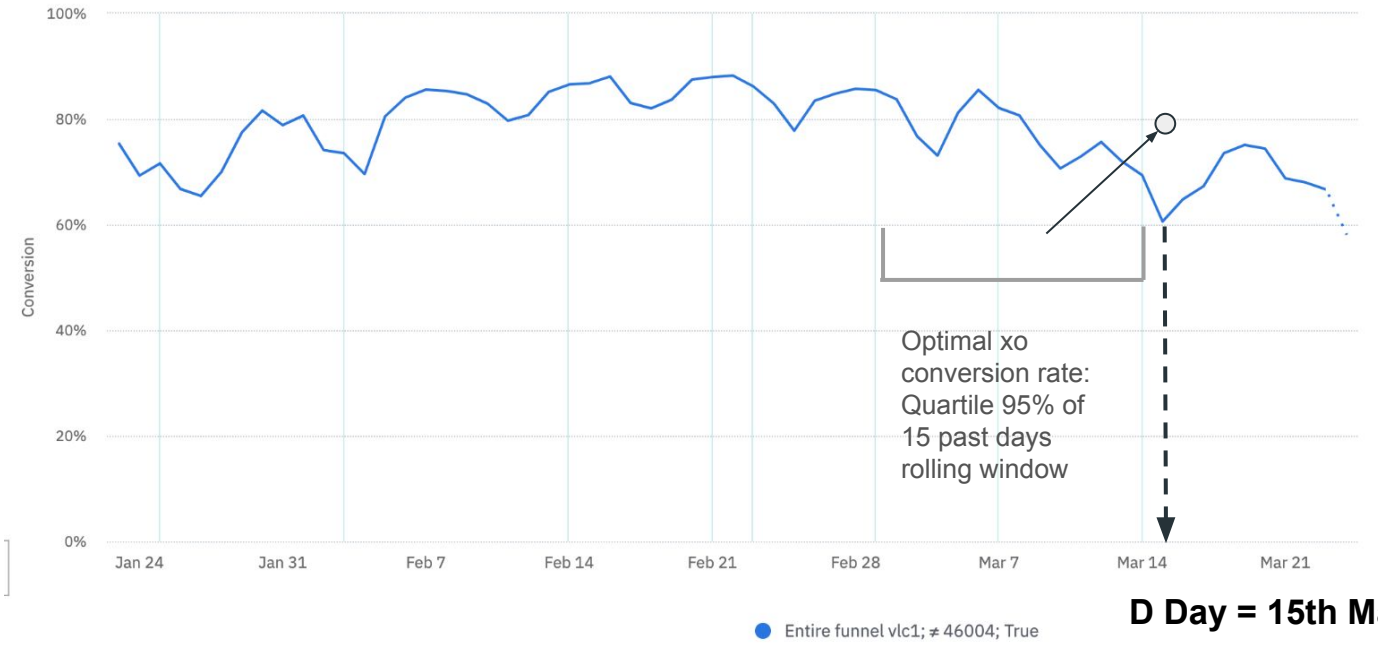
**Ideal Offer**
**=**
**Sold Columns**
**+**
**Unmet sold columns**



# 1 Unmet confirmed columns

LINK TO AMPLITUDE DASHBOARD...

# 1 Unmet confirmed columns




Average Conversion

78.0%

Last 60 Days

Average conversion rate across the last 60 days from **start_checkout_click (≥ 50.0) (> 3) to [Custom] finish_slot_selection** completed within 20 minutes.

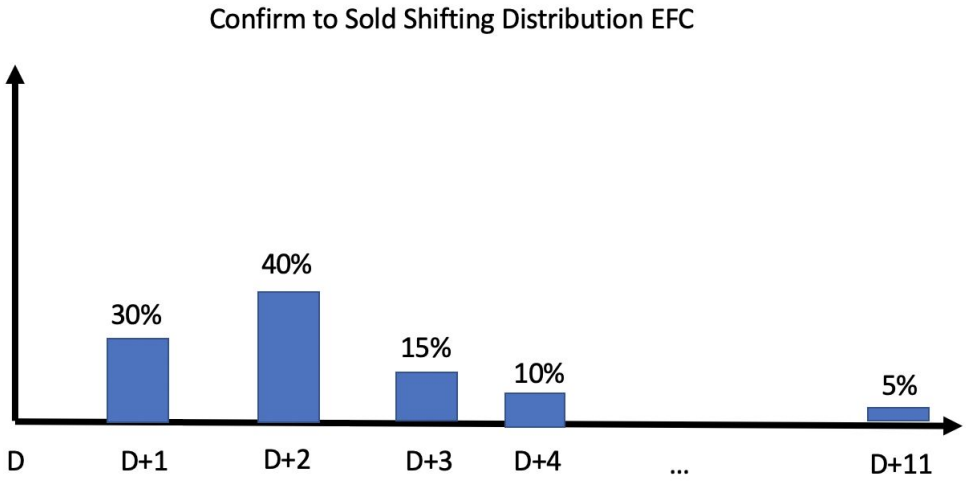
**D Day = 15th March**

**Unmet confirmed columns** = (optimal_xo_rate - xo_rate) * confirmed columns

# 2 Unmet sold columns

**Ideal Offer Shifting :** Once we have unmet confirmed columns per day, we have to infer when this customers would have been delivered.

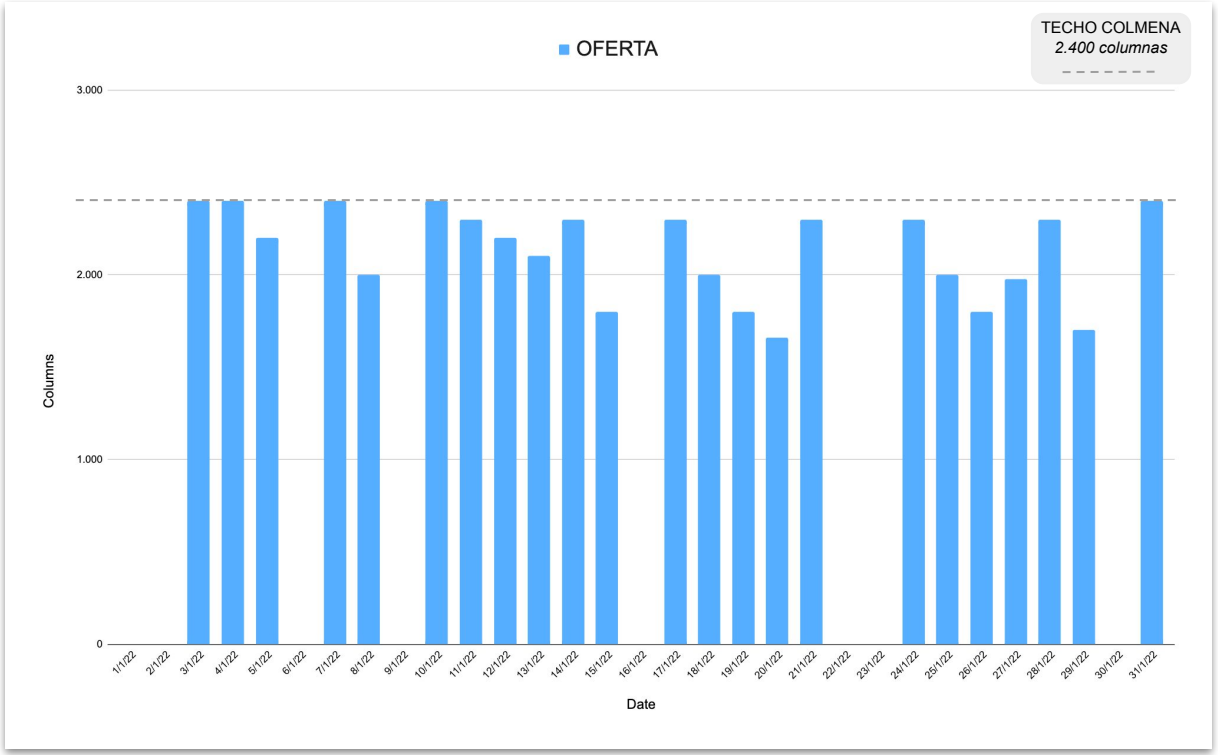
**We apply the delivery date distribution of the confirmed orders of the very same booking day.**



# Real example

**E.G. JANUARY 2022**
VLC1

📌 **Note:** 99% occupation & 2.5 Días de Cola



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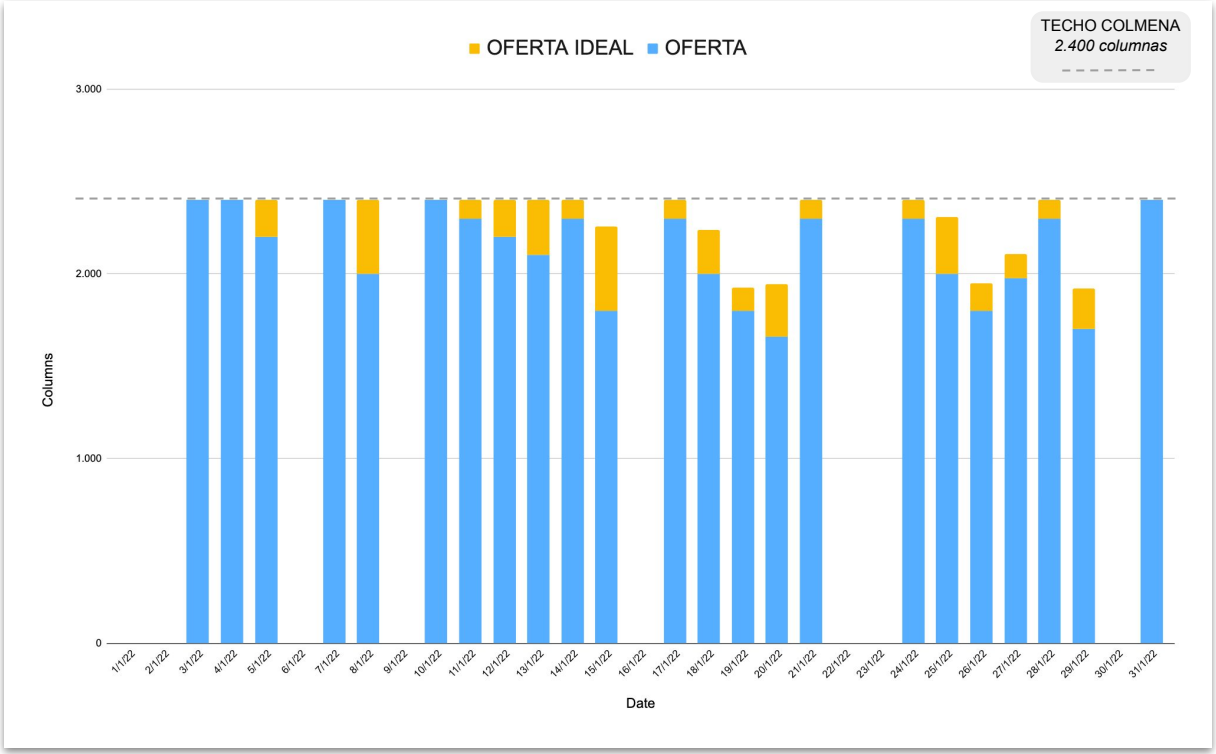

# It also can serve as indicator for expansion.

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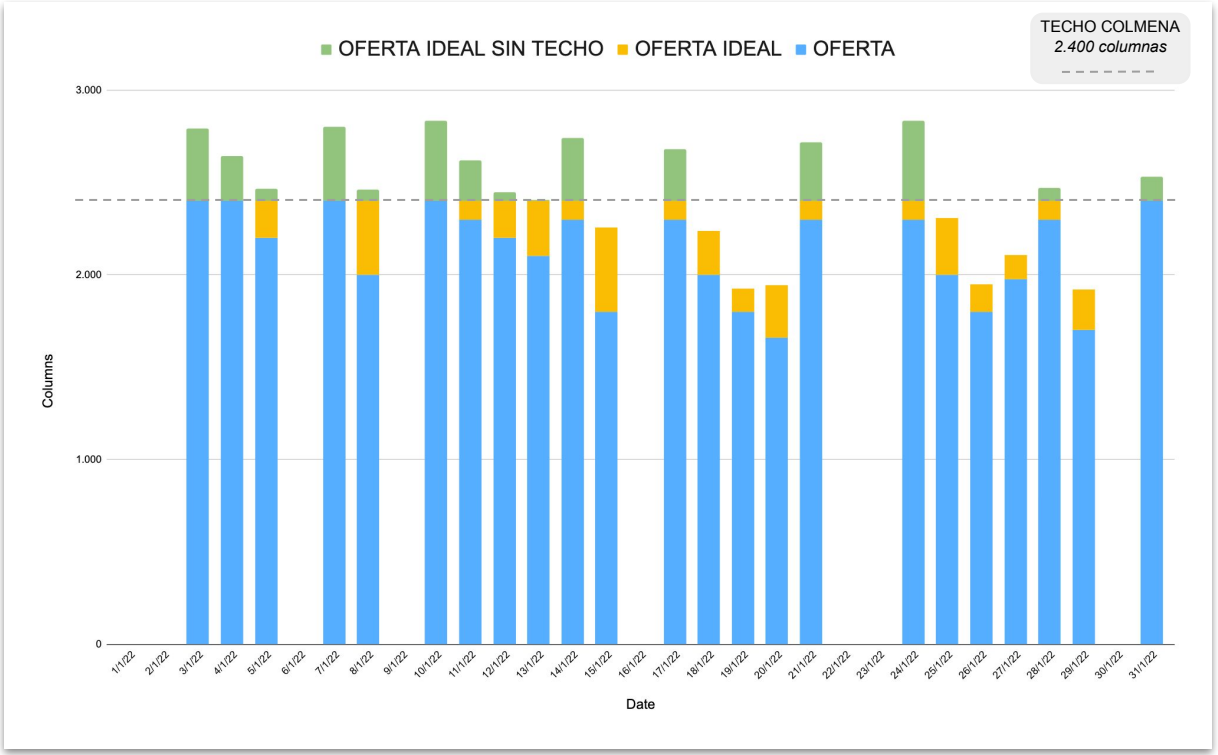
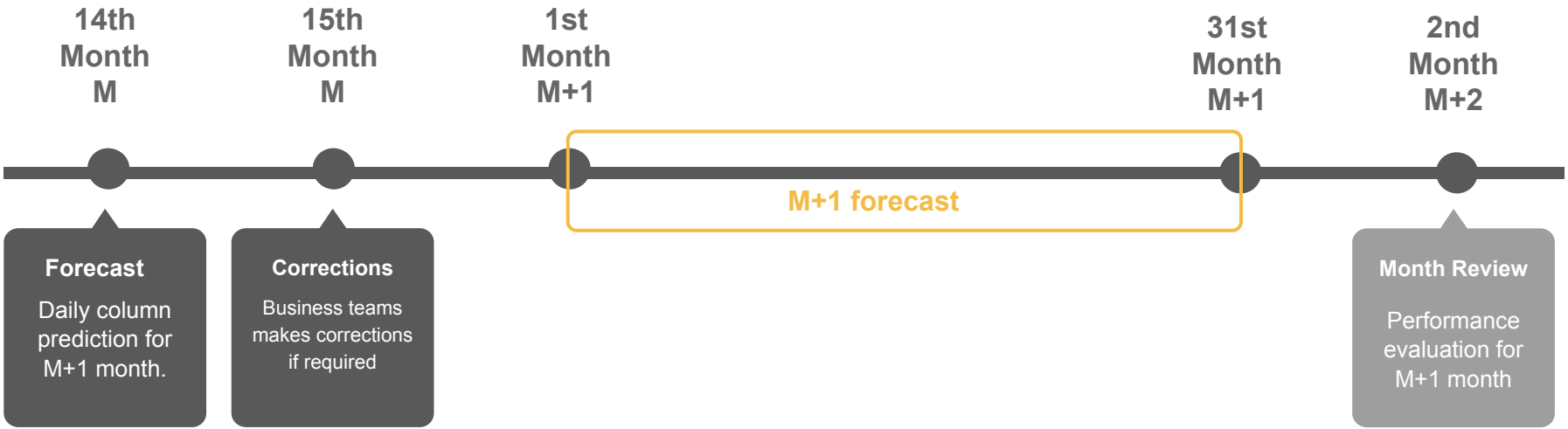


# How do we want the process to be?

# How is the process?



# Wish list for our ML model

- Interpretability
  - We want our business team to be confident when using our model.
- Easy to iterate
  - We want small feedback loops
- Be sure that our model generalizes well
  - We want to be “certain” that our model generalizes well.

# How is the execution of the model?

Show notebook

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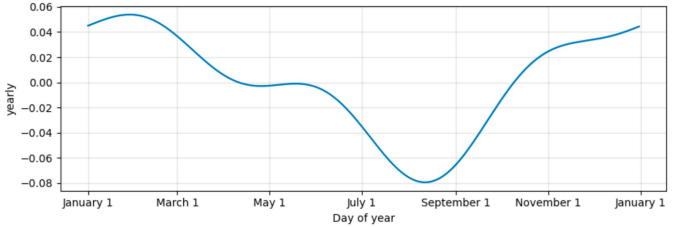


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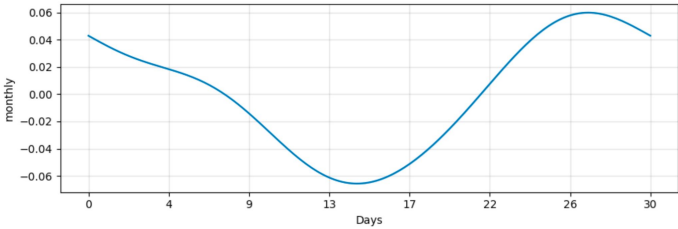


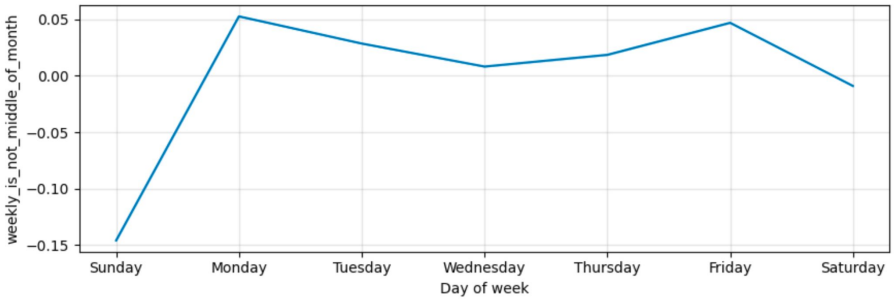


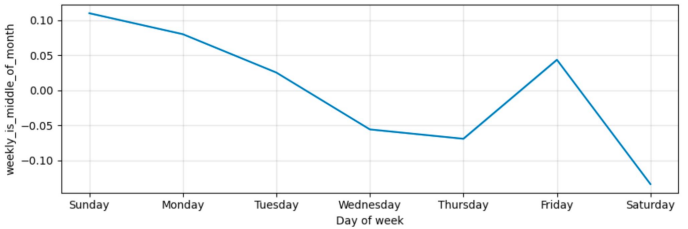

# How is the monitoring?

Link to metabase dashboard

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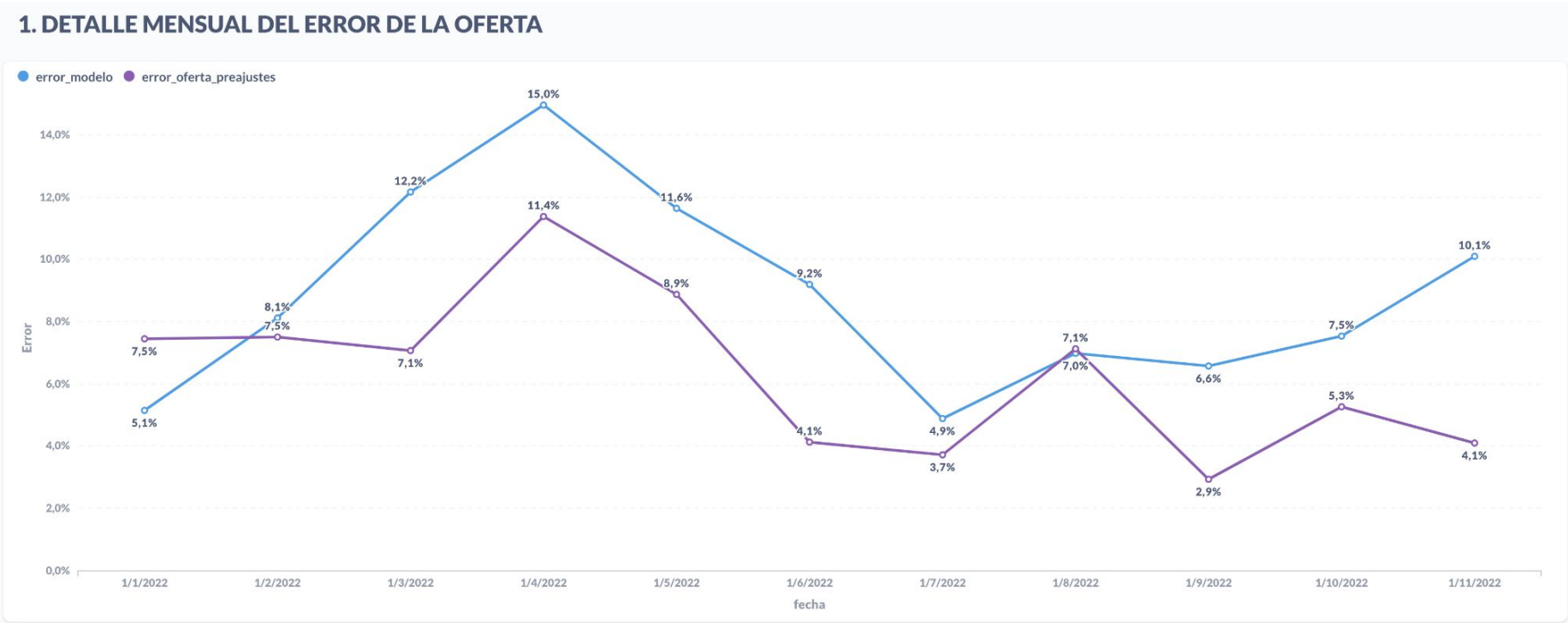

# Conclusions / Added value

## QUERYABILITY

Datamart Layer

simplifies data consumption across Mercadona Tech



## UNBIASING CENSURE

Deriving a censure proxy helps us to have a ground truth to measure against



## ML MODEL AS A BASELINE

Not fully automatized process, but it helps to business team

*Thank you!*

# Q & A

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