NTT DATA

SAPIENZA
UNIVERSITÀ DI ROMA

# Predicting costumer complaints in an energy company

Laura Giuliano

Thesis Advisor
Anagnostopoulos Aristidis

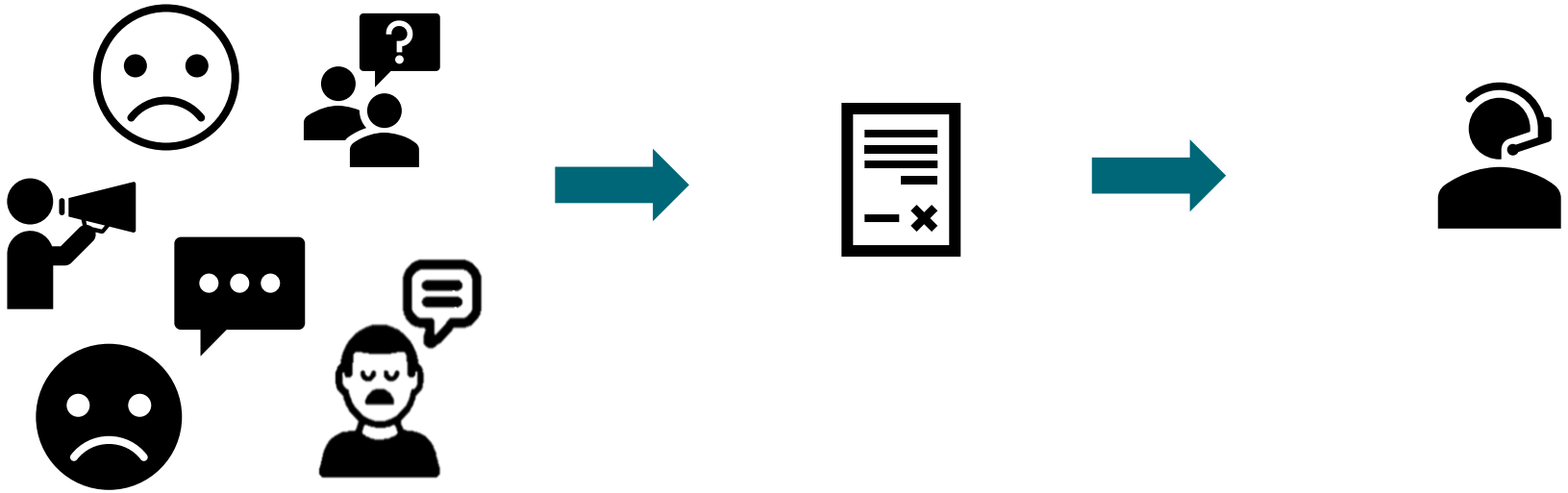
External Advisor
Olivieri Antonio

# Agenda

- Business challenge
- Goal
- Data
- Preprocessing
- Model
- Results
- Conclusions

# Business challenge

*Even if you have a good business, customers complaints are unavoidable*



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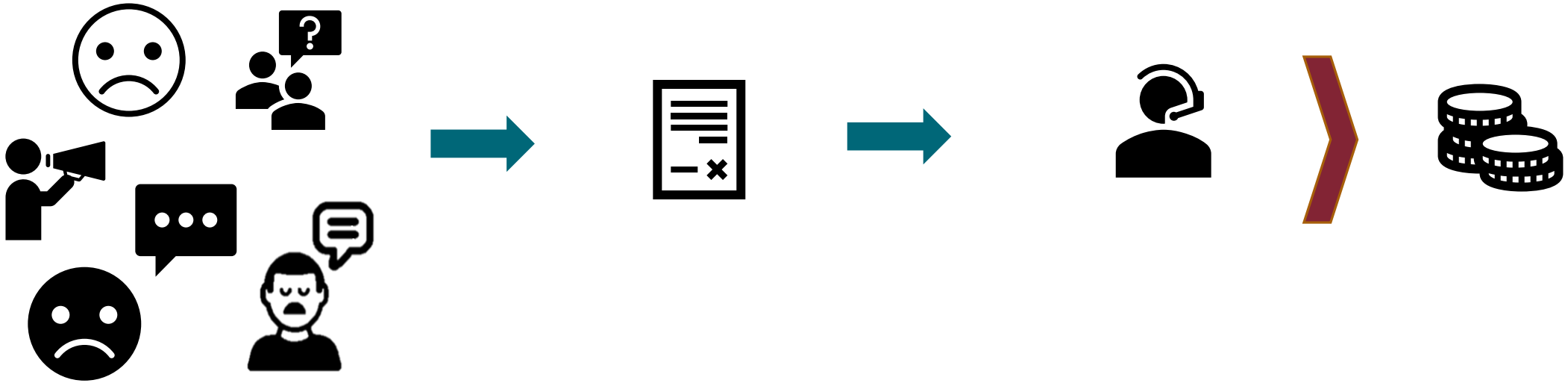

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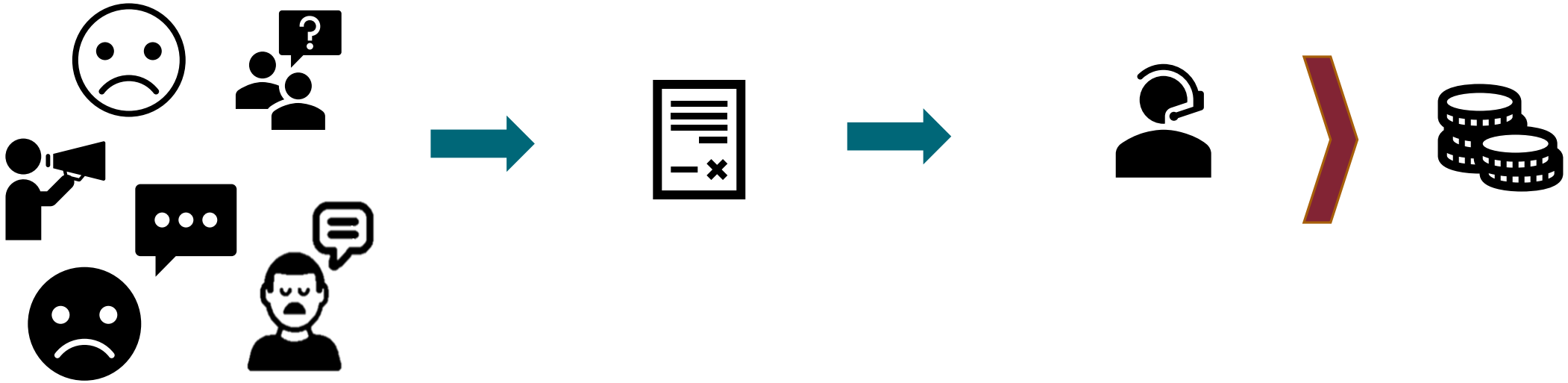
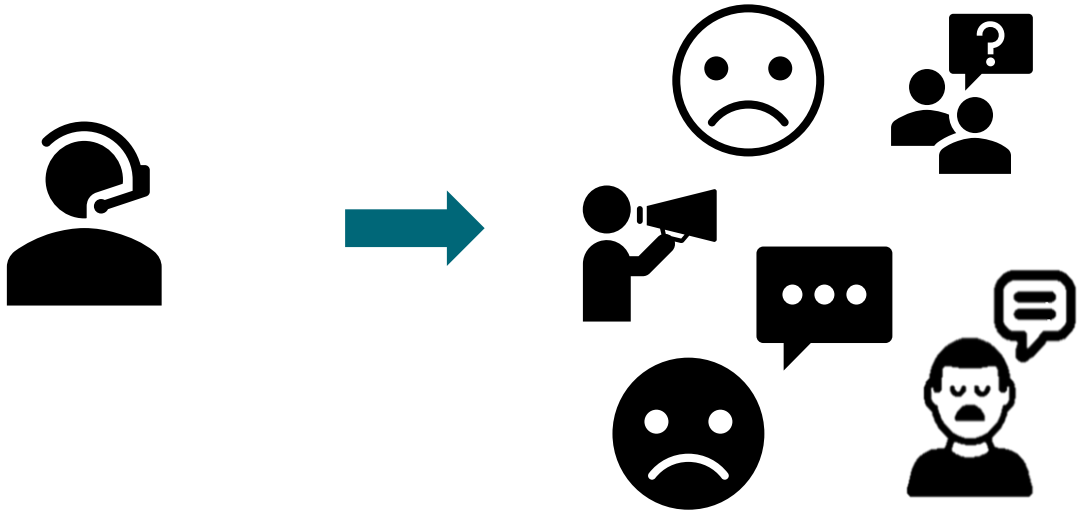


Understanding customers needs in order to prevent complaints

# Goal



# Goal

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Reducing by 12k customers complaints in a year

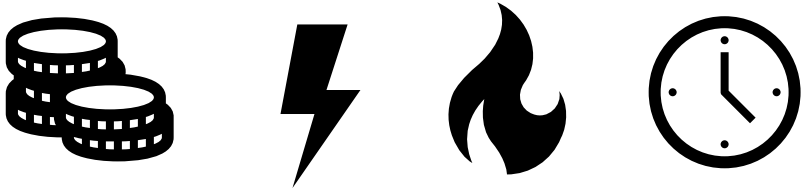
Satisfaction

# Data

- B2B

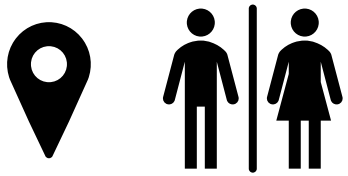
- B2C

- Billing & credit



- Interactions between customers and company

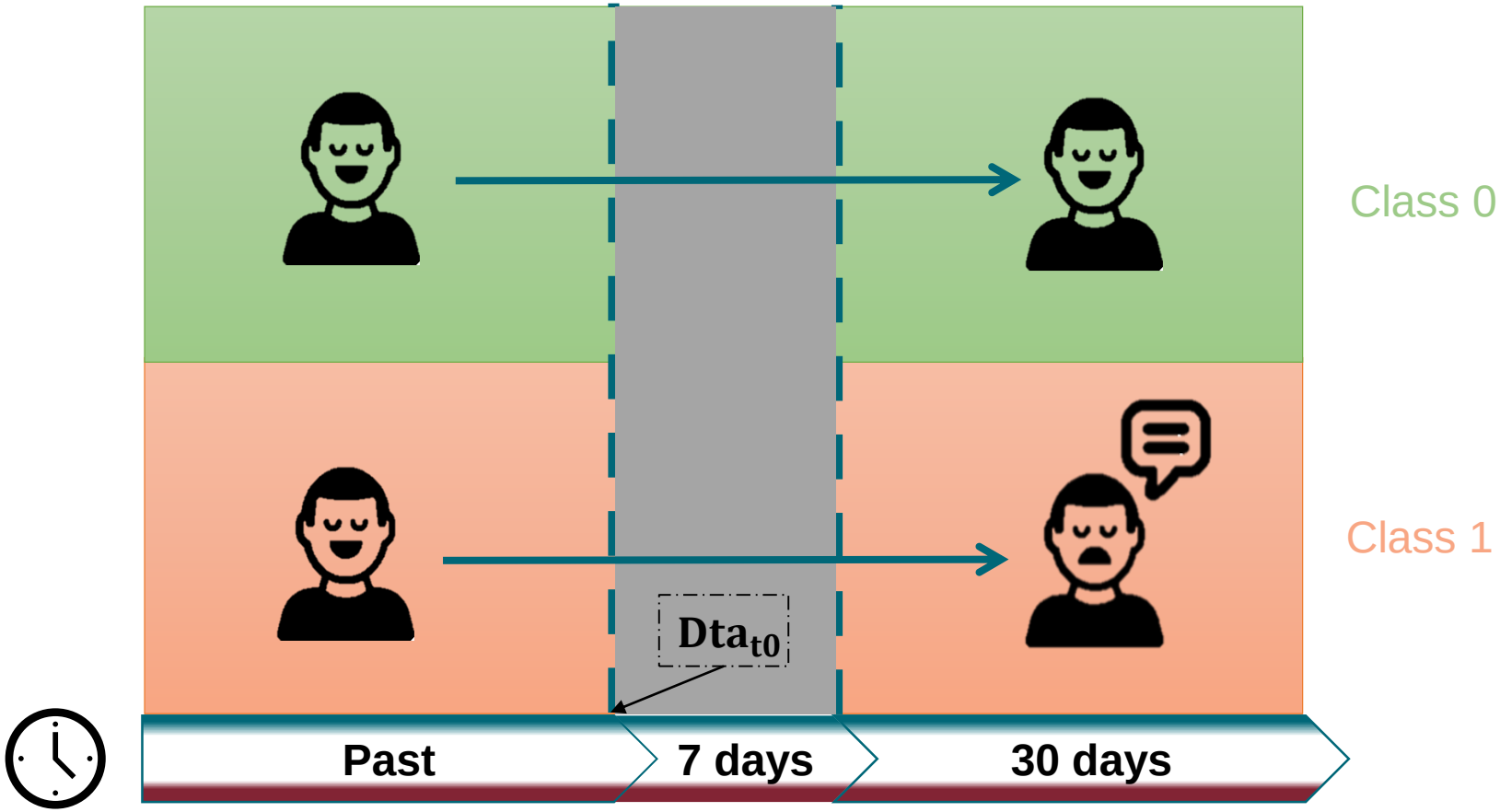
- Socio-Demographic information



January 2019 – June 2019

# Data: target

Time window constraint



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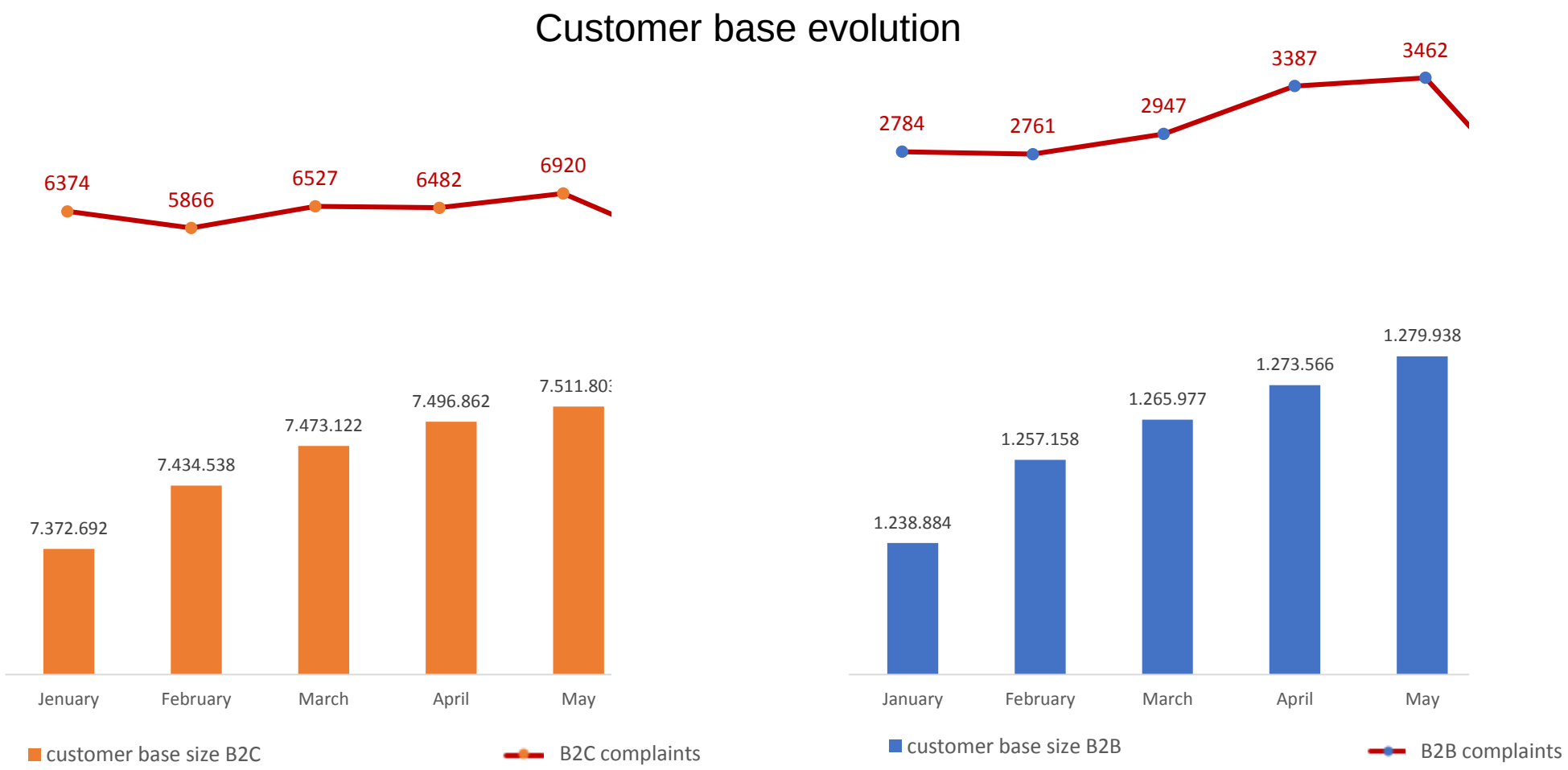
Customer base evolution
6374
5866
6527
6482
6920
2784
2761
2947
3387
3462
7.372.692
7.434.538
7.473.122
7.496.862
7.511.803
1.238.884
1.257.158
1.265.977
1.273.566
1.279.938
Jenuary
February
March
April
May
January
February
March
April
May
customer base size B2C
B2C complaints
customer base size B2B
B2B complaints

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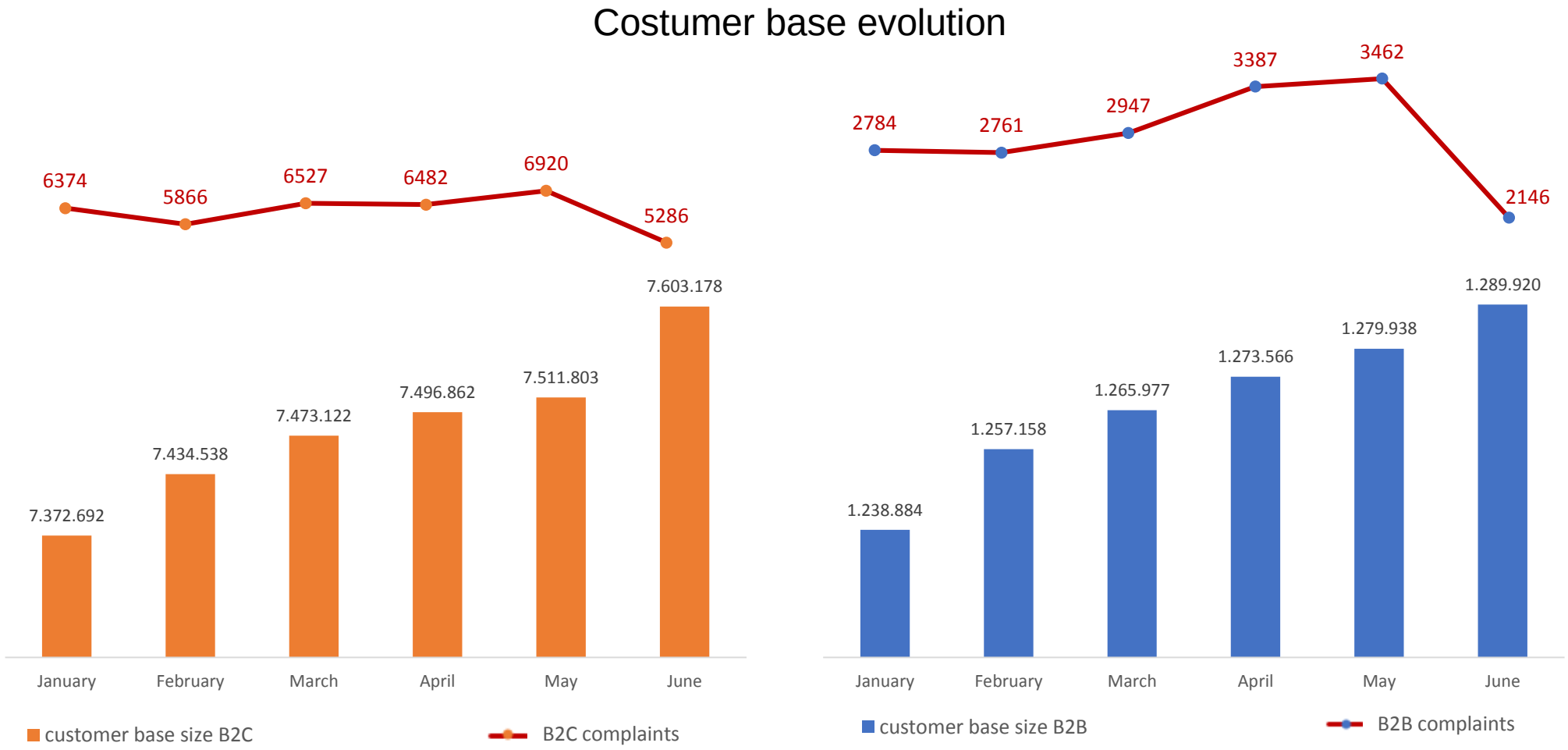
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6374
5866
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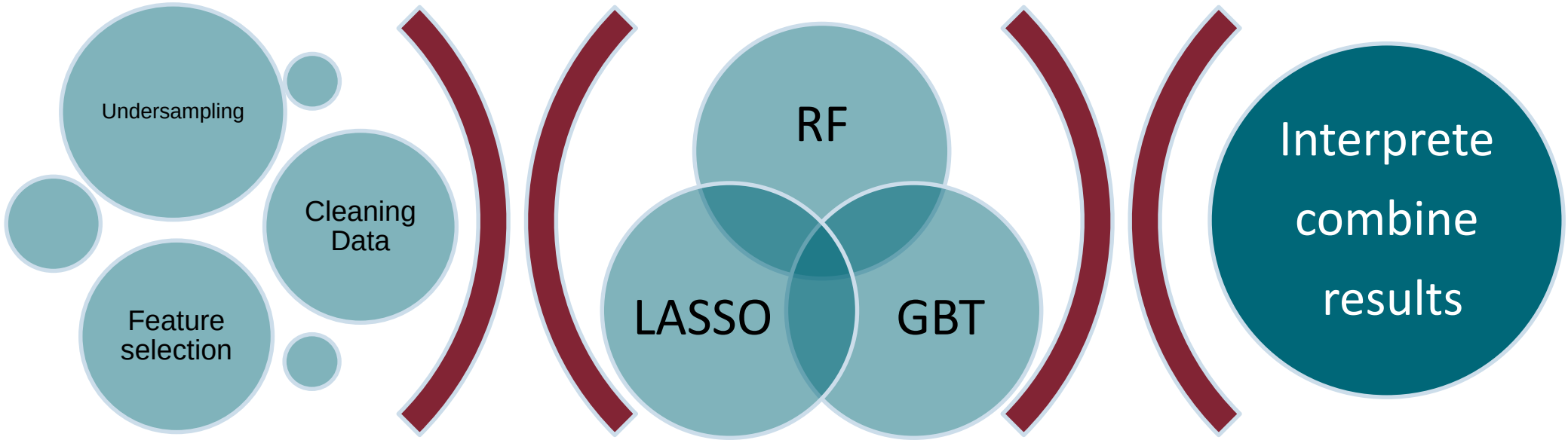
January
February
March
April
May
June
customer base size B2C
B2C complaints
2784
2761
2947
3387
3462
2146
1.289.920
1.279.938
1.273.566
1.265.977
1.257.158
1.238.884
January
February
March
April
May
June
customer base size B2B
B2B complaints

# Machine learning process

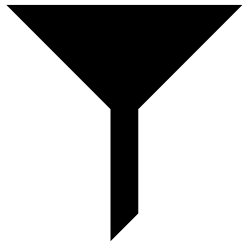



Data preprocessing Models Evaluation

# Preprocessing

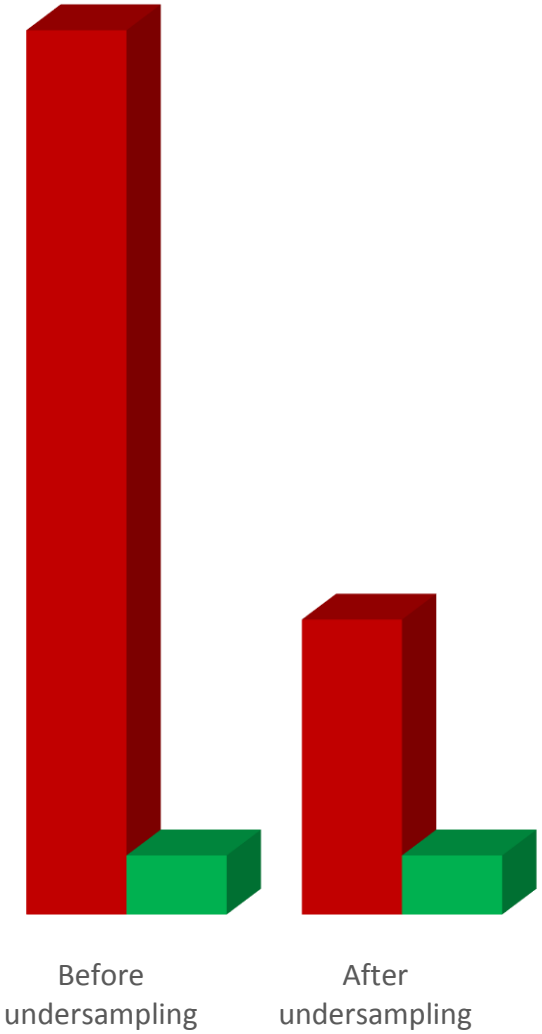
Cleaning data

Undersampling

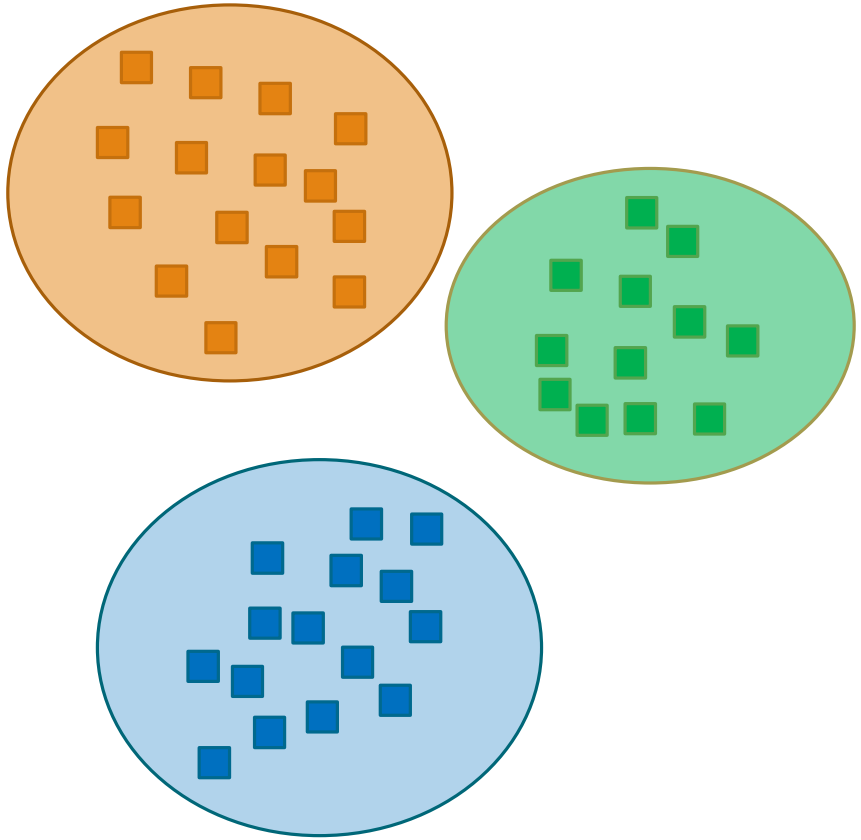


Feature selection

# Undersampling




K-means clustering



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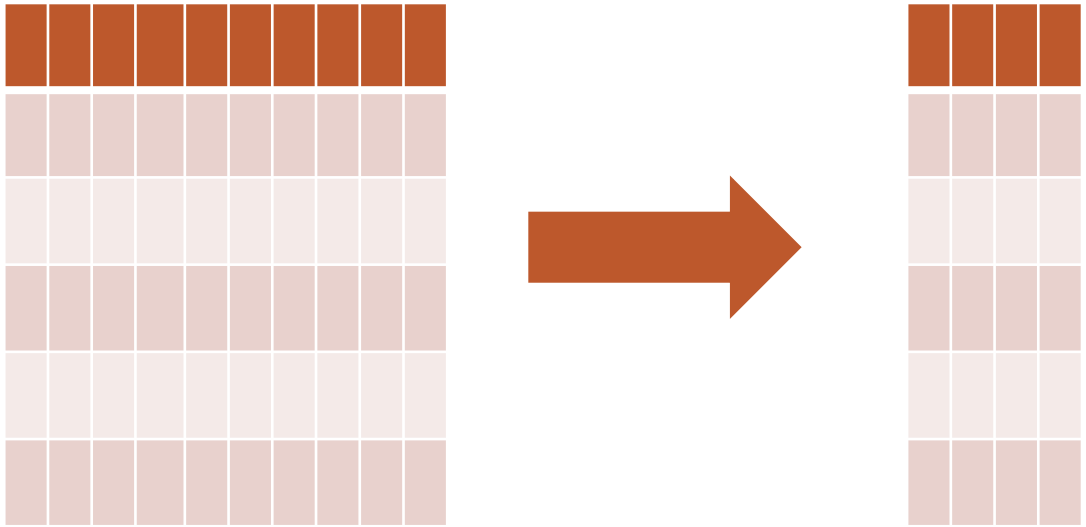
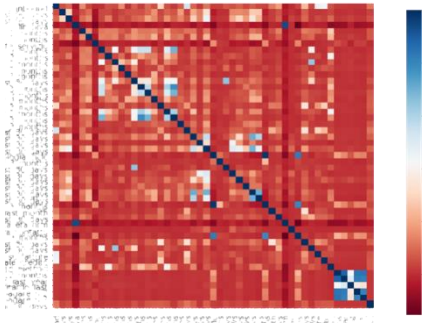
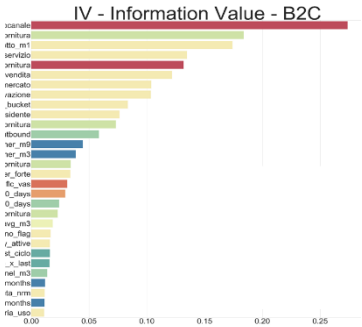


Reducing number of fields in the dataset

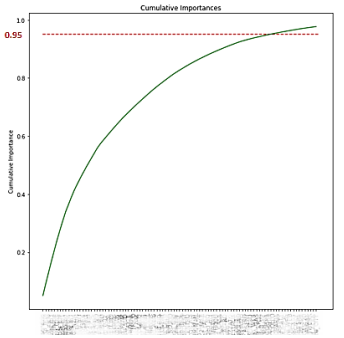
Correlation



WOE & IV




Cumulative importance



# Model selection

April

| Models | LASSO | RF | GBT |
|---|---|---|---|
| Lift | 21.8 | 32.53 | 24.2% |
| service5k | 7.8% | 15.9% | 13.26% |
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May

| Models | LASSO | RF | GBT |
|---|---|---|---|
| Lift | 30.16 | 38.6 | 24.4 |
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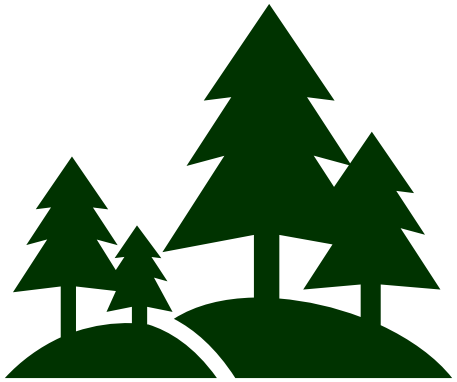

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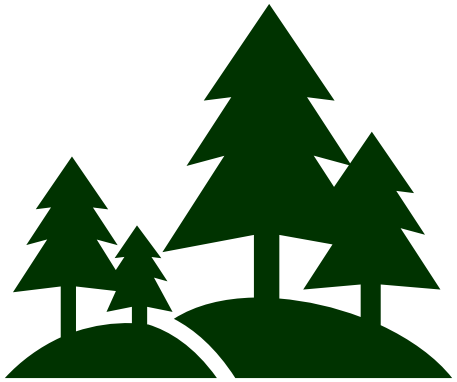
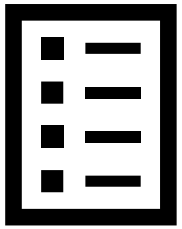


Propensity of complain



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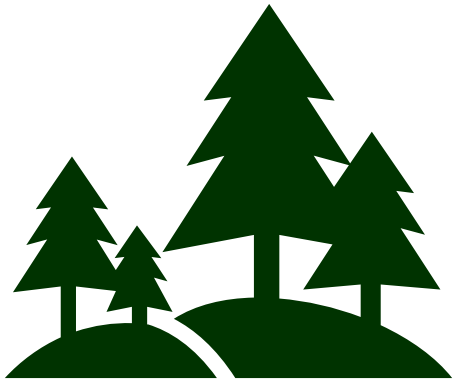

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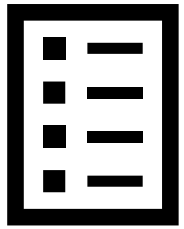
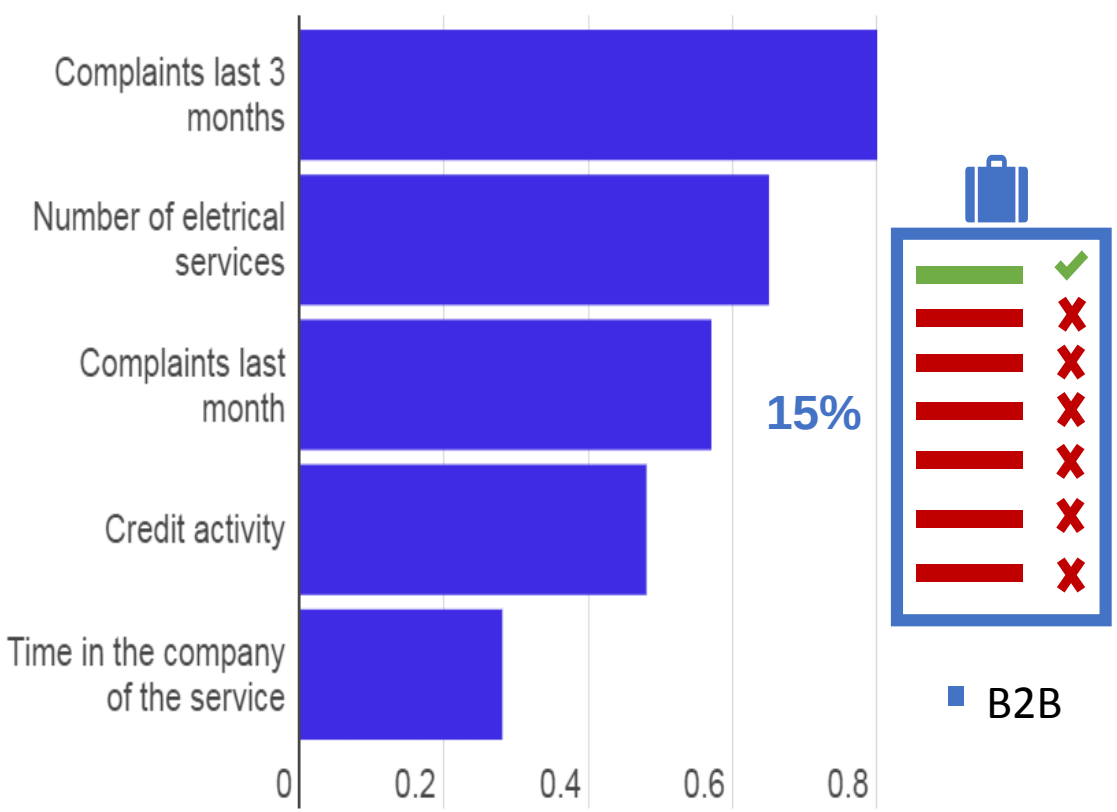


Understanding reasons

# Results

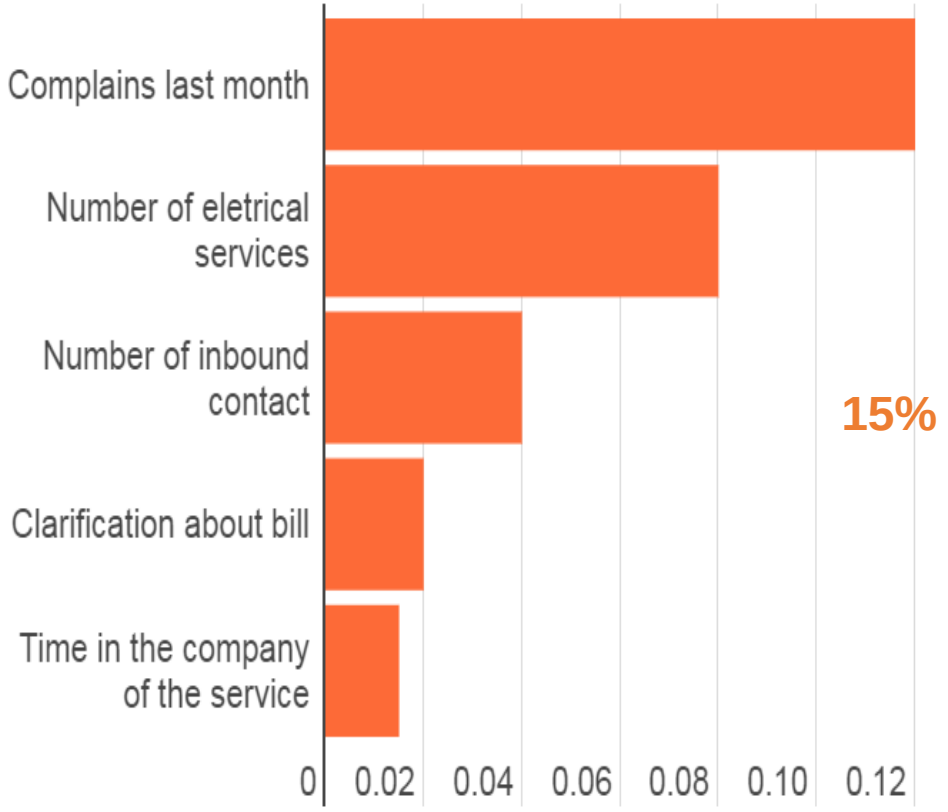
Example of May validation's result



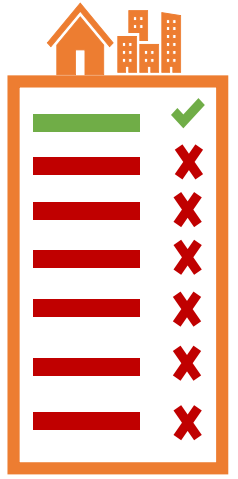

15%



B2B



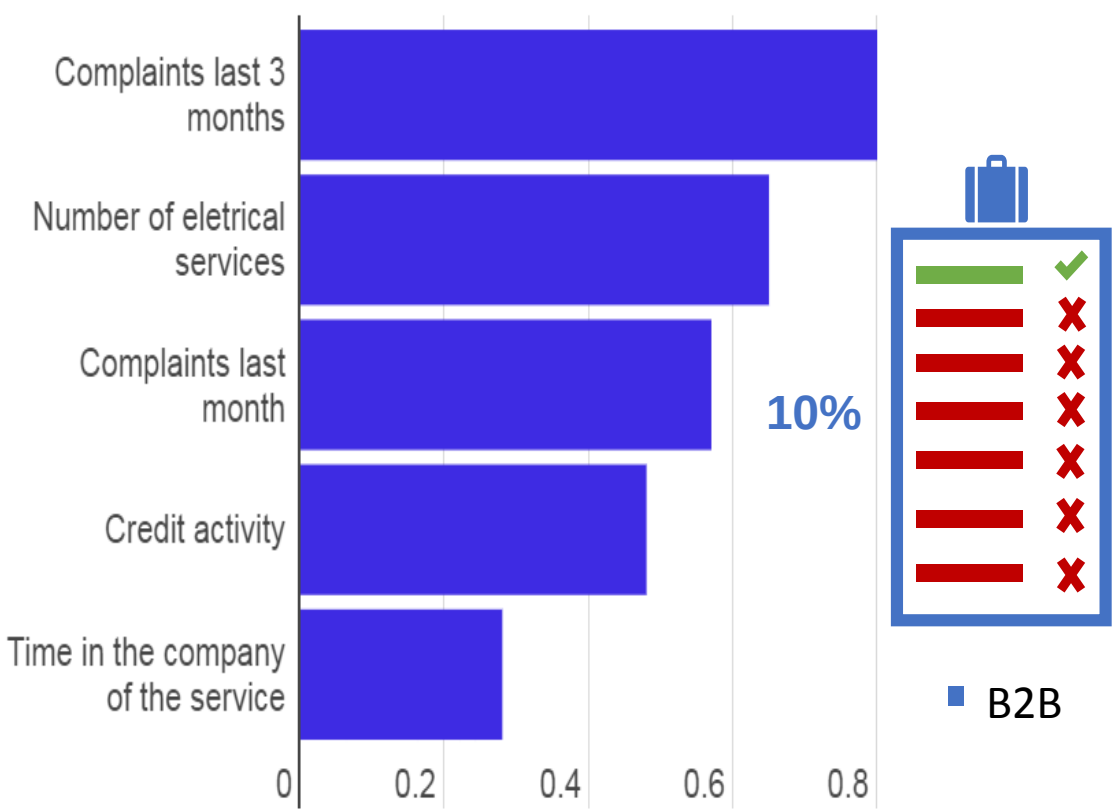

15%



B2C

# Results

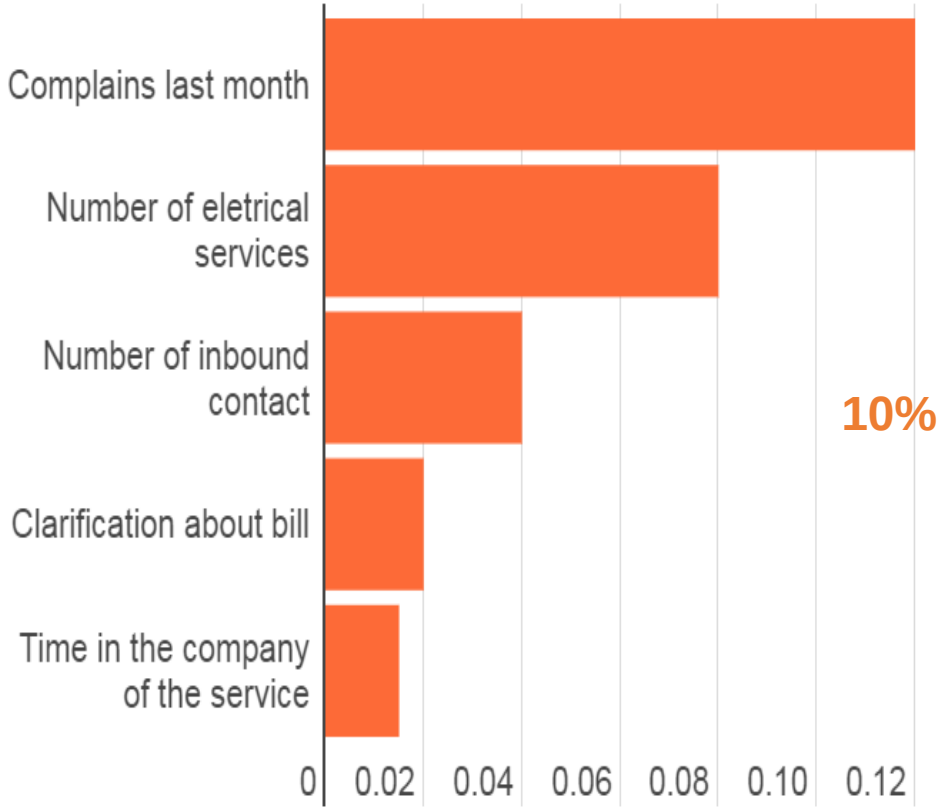
Example of June validation's result



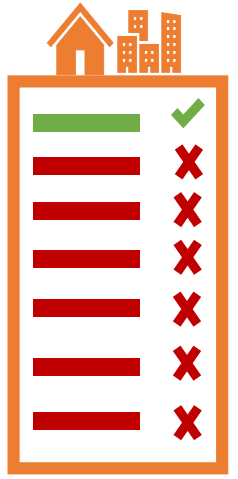

10%



B2B

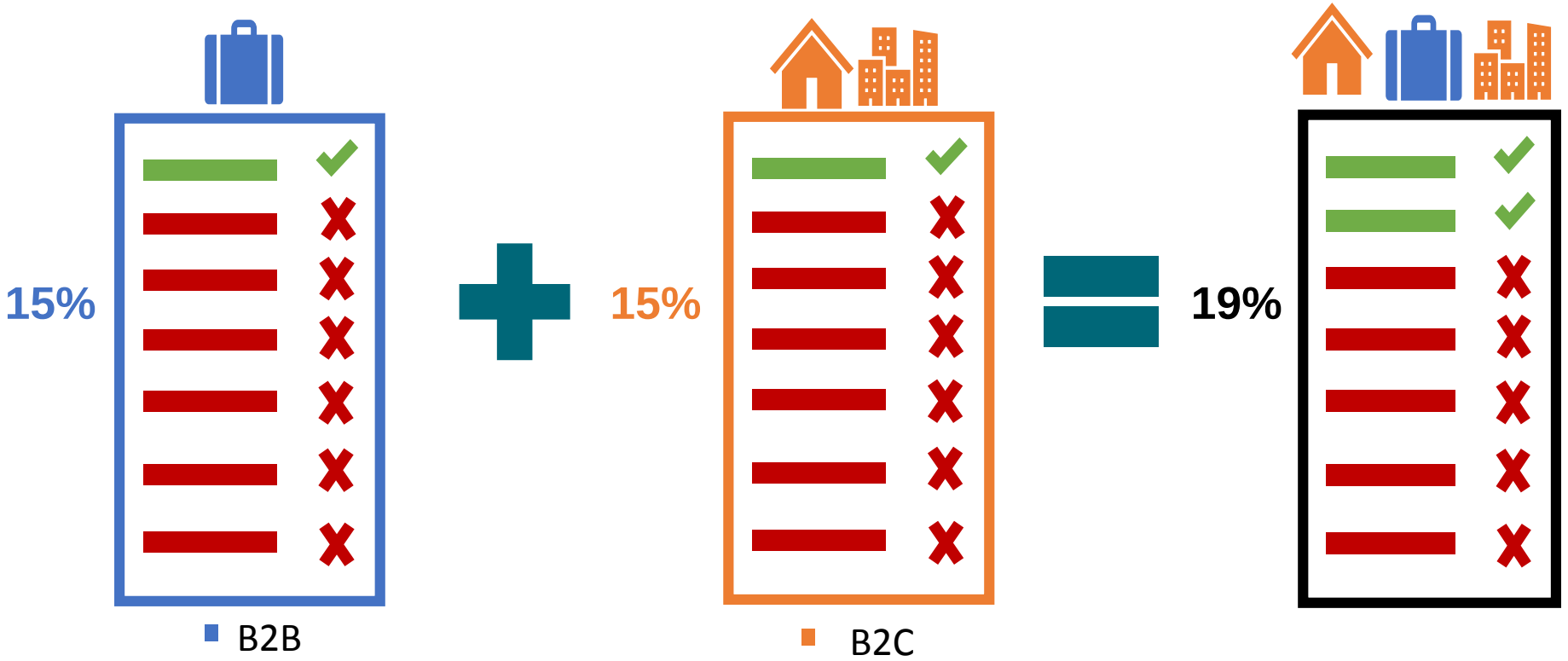


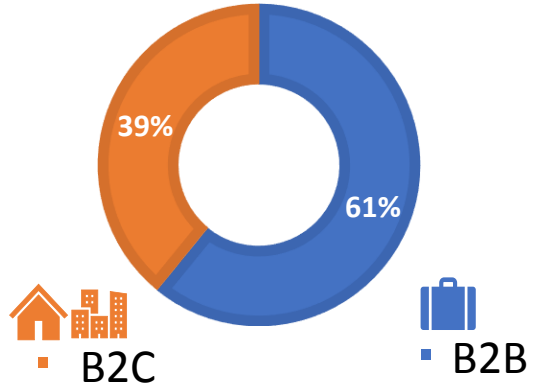

10%



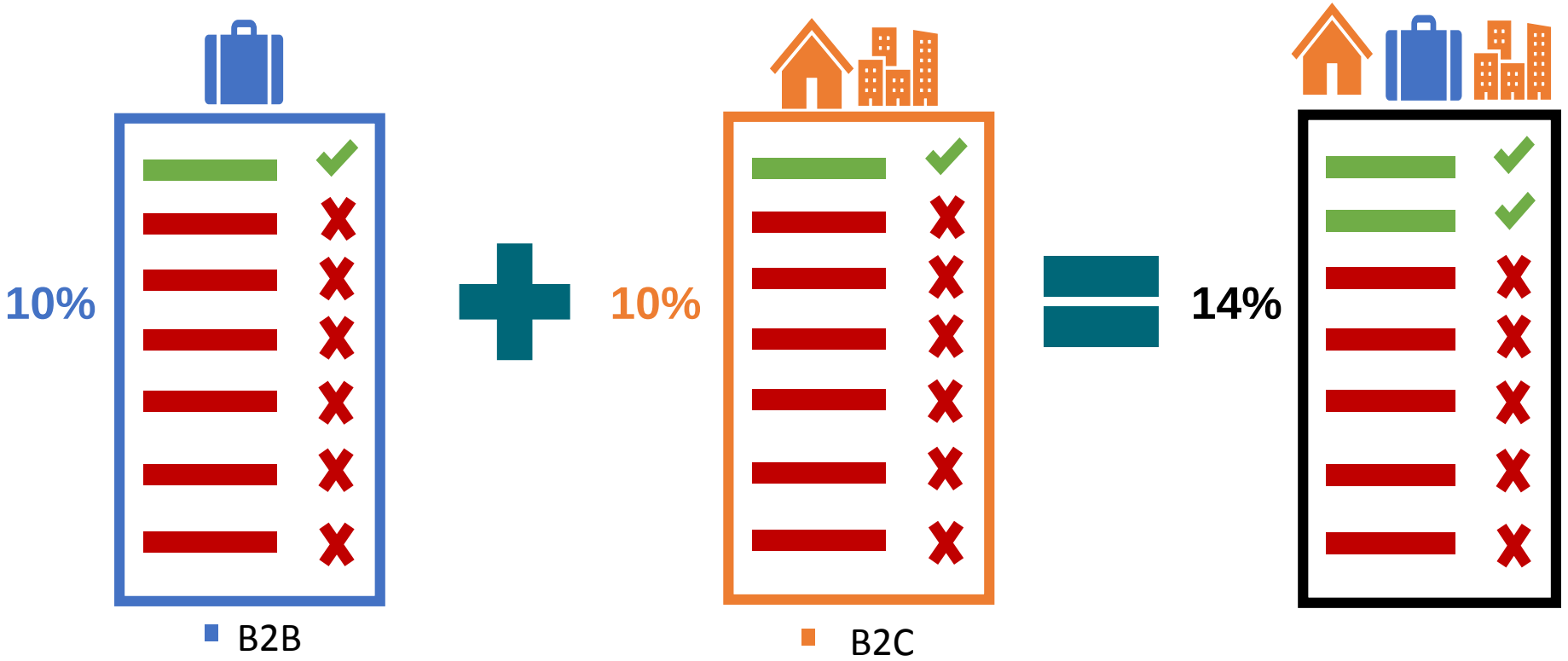
B2C

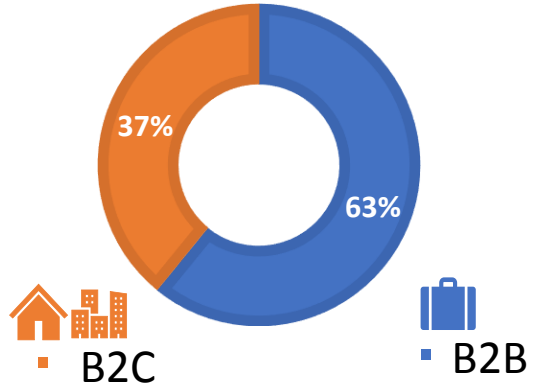
# Results: Combined May



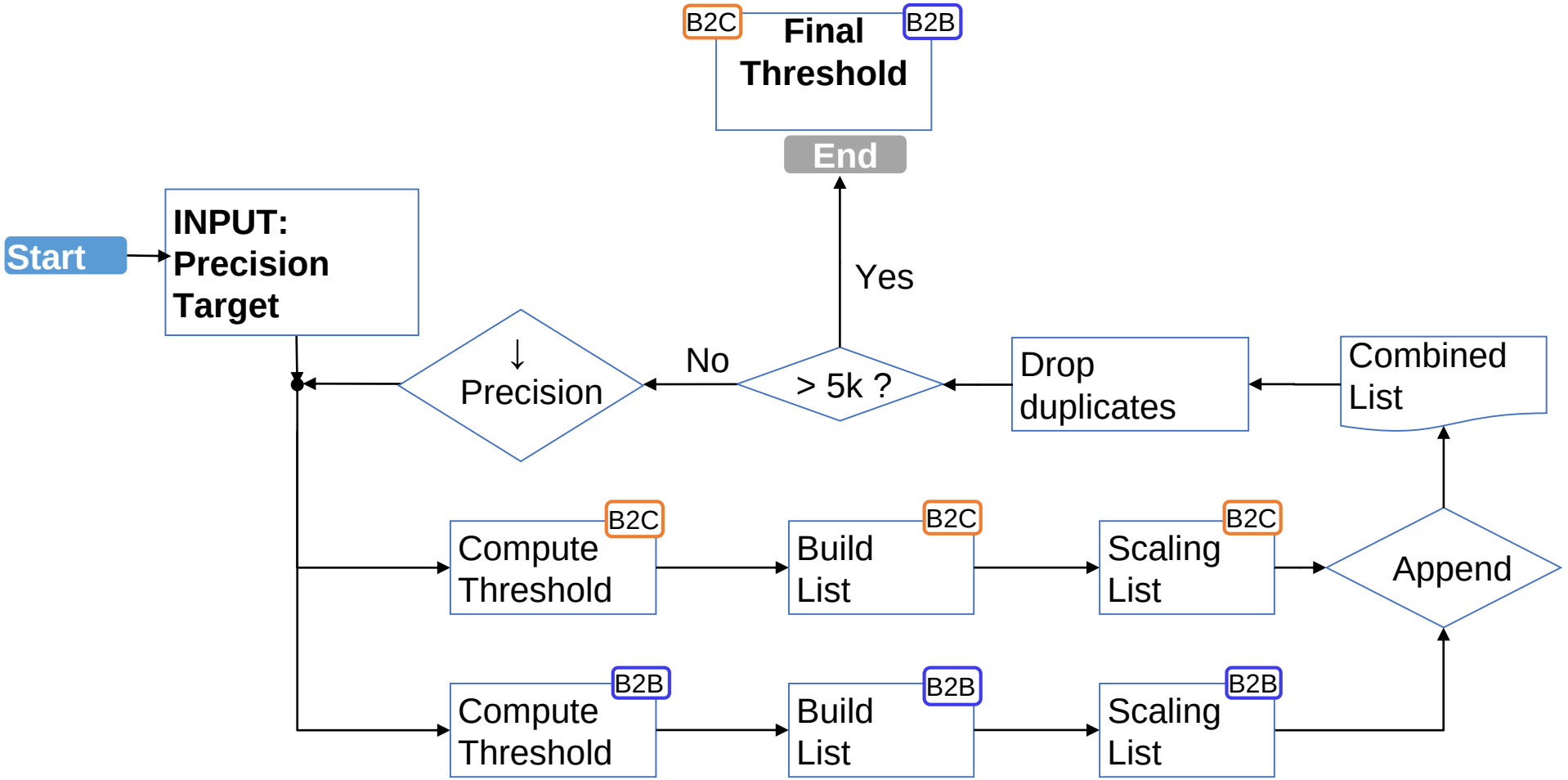
# Results: Combined June



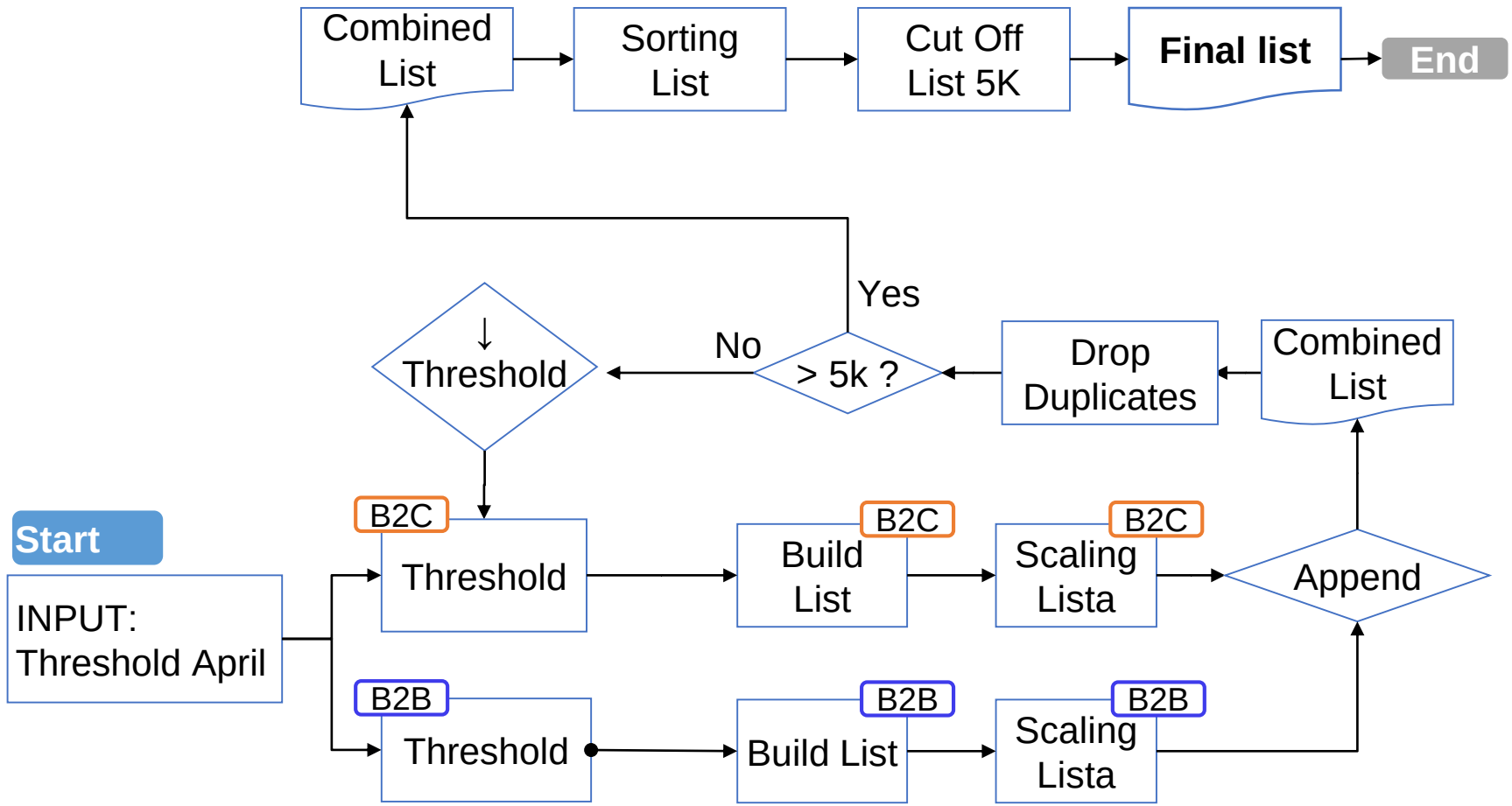
# Results: strategy to combine results

Process to find best Threshold for B2C & B2B applied to April



# Results: strategy to combine results

Definition of combined list applied to May and June



# Conclusions

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- Developing of a model to predict reasons of claims

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# Thank you
# for your attention

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Laura Giuliano