Driving retailer performance by optimizing promotions

Ira Kurthen, Data Analyst

Daniel Vogler, Data Scientist

Migros-Genossenschafts-Bund
Data & Analytics / Marketing Analytics

Swiss Data Science Conference
Zurich, 23.06.2023

20 minuten

«Das ist eine Frechheit» – Kunde leert Kühler mit Aktions-Pommes bei Migros

Source: 20min/News-Scout

Outline

1 Why Promotions?

2 Controlling - Promotion Success Drivers

3 Cannibalization Groups

4 Promotion Schedule Optimization

MIGROS

Why Promotions?

Retail channel selection

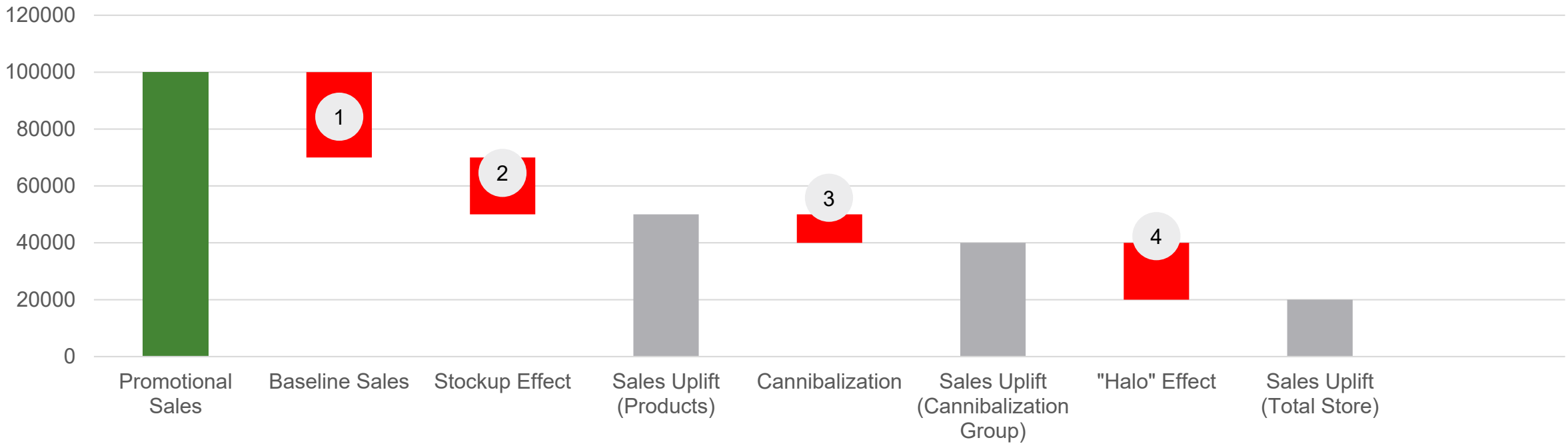
Product attractiveness

Customer loyalty

Cost  Benefits

MIGROS

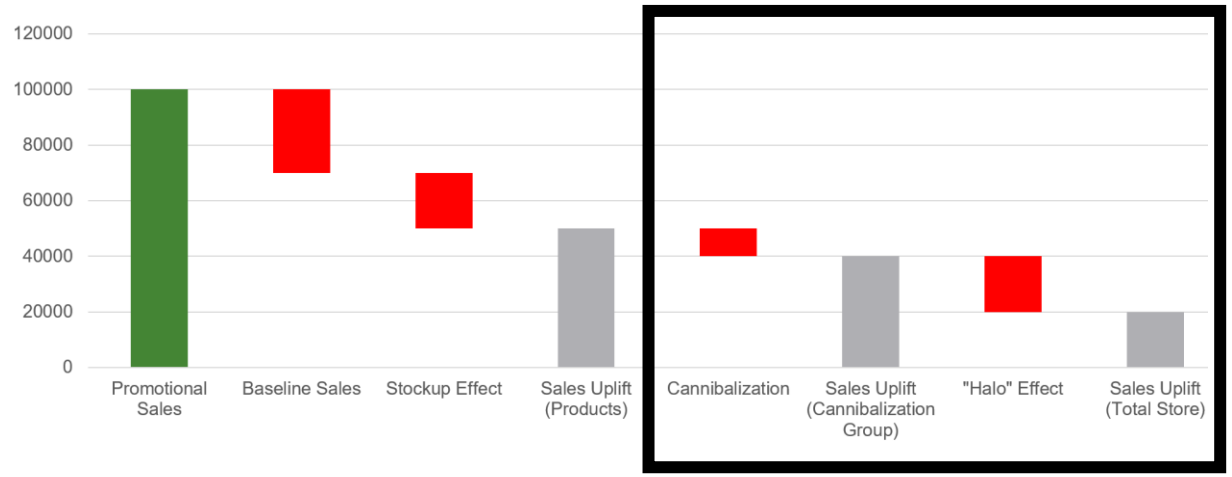
Controlling - Promotion Success Drivers



	1	2	3	4
Questions	How much would we have sold without the promotion?	How many of the promotional products have been bought for stock-up purposes?	Which similar products have not been bought because of the promotion?	Which other products have (not) been bought because of the promotion?
Challenges	Seasonality	Product Heterogeneity	Cannibalization Groups	Causality

MIGROS

Product cannibalization groups - Intro



Cannibalization groups (CG):

- Product groups **cannibalizing** each others **sales**
- used for **promotion** performance assessment, planning, pricing and assortment

Challenges:

- **Manual creation** and **organic growth**
  - **Differentiation** between groups
    - Incorrect sorting (**outlier**)

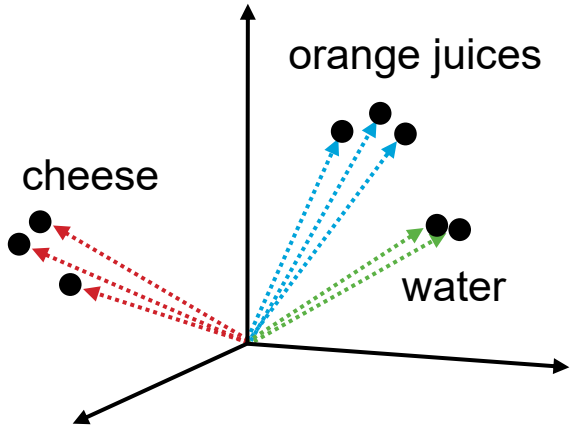
MIGROS

Product cannibalization groups – Methodology I

76462021-01-1811021033280...	104055100000,110230200000,...
3632021-09-14181107332802	104402500000,10446830000 0,105207300000,1052200000 00,151406600000,156058000 000
82021-09-14100756332802	101575000000,107064100000

transaction baskets

articles



NLP-NN

train model

-0.1178	-0.1064	0.1564	0.1916
0.0153	-0.2371	0.2031	0.2204
0.2481	0.2943	-0.1478	0.0224
0.3319	0.1035	0.1422	0.1292
0.2797	0.2907	0.2773	0.2025
0.1345	0.1307	-0.1237	0.1198
-0.0223	0.0616	-0.1189	0.2972
0.139	0.1298	0.418	0.203

article embeddings

Flexible model applicable to
regions, **seasonalities**, **customer segments**, and other **product categories**

Product cannibalization groups – Methodology II

−0.1178	−0.1064	0.1564	0.1916
0.0153	−0.2371	0.2031	0.2204
0.2481	0.2943	−0.1478	0.0224
0.3319	0.1035	0.1422	0.1292
0.2797	0.2907	0.2773	0.2025
0.1345	0.1307	−0.1237	0.1198
−0.0223	0.0616	−0.1189	0.2972
0.139	0.1298	0.418	0.203

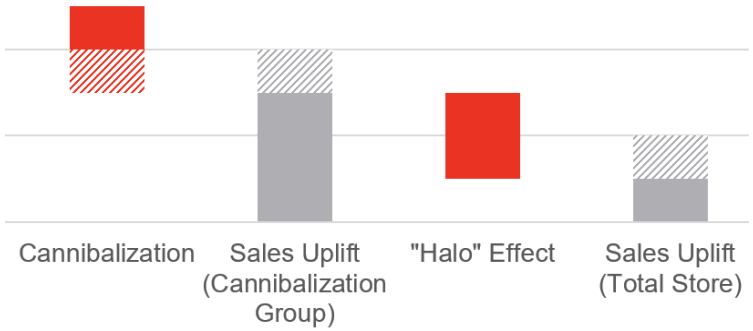
original

dim. reduction

detect outliers

CG-merging

CG-splitting



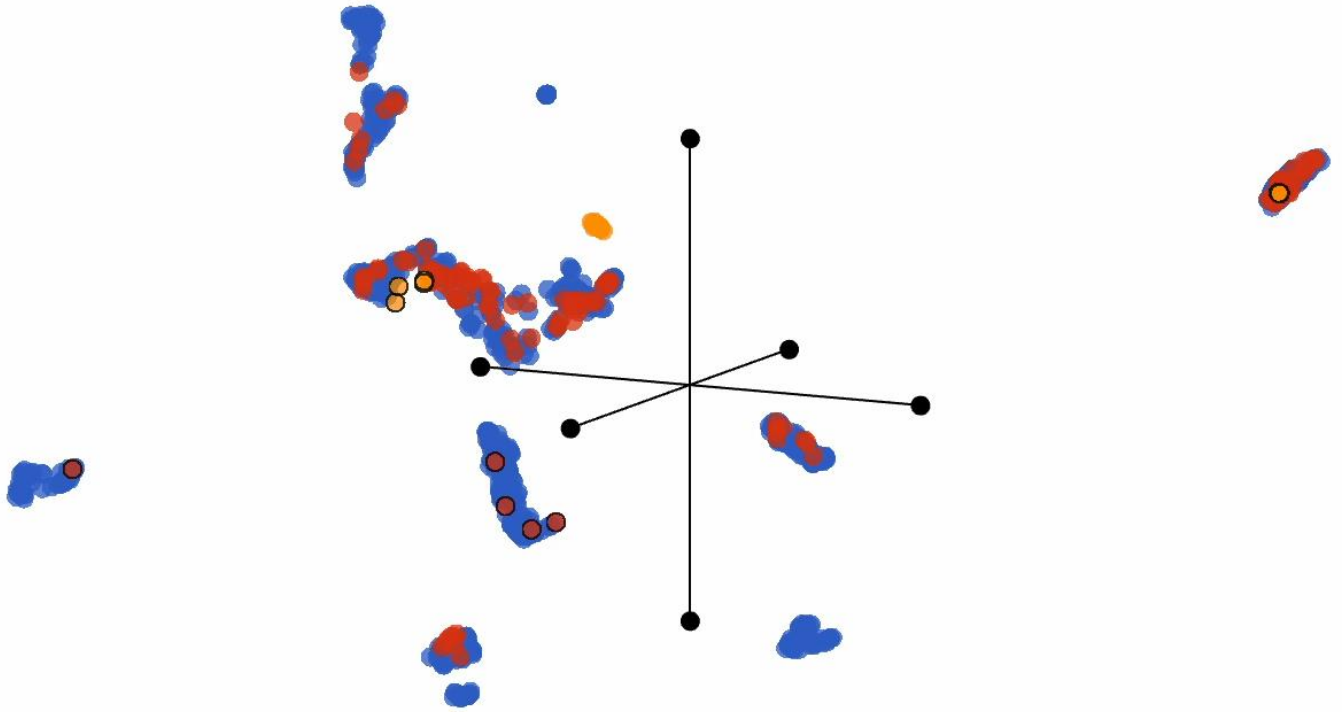
article embeddings

cannibalizing product groups form clusters

KPI improvement

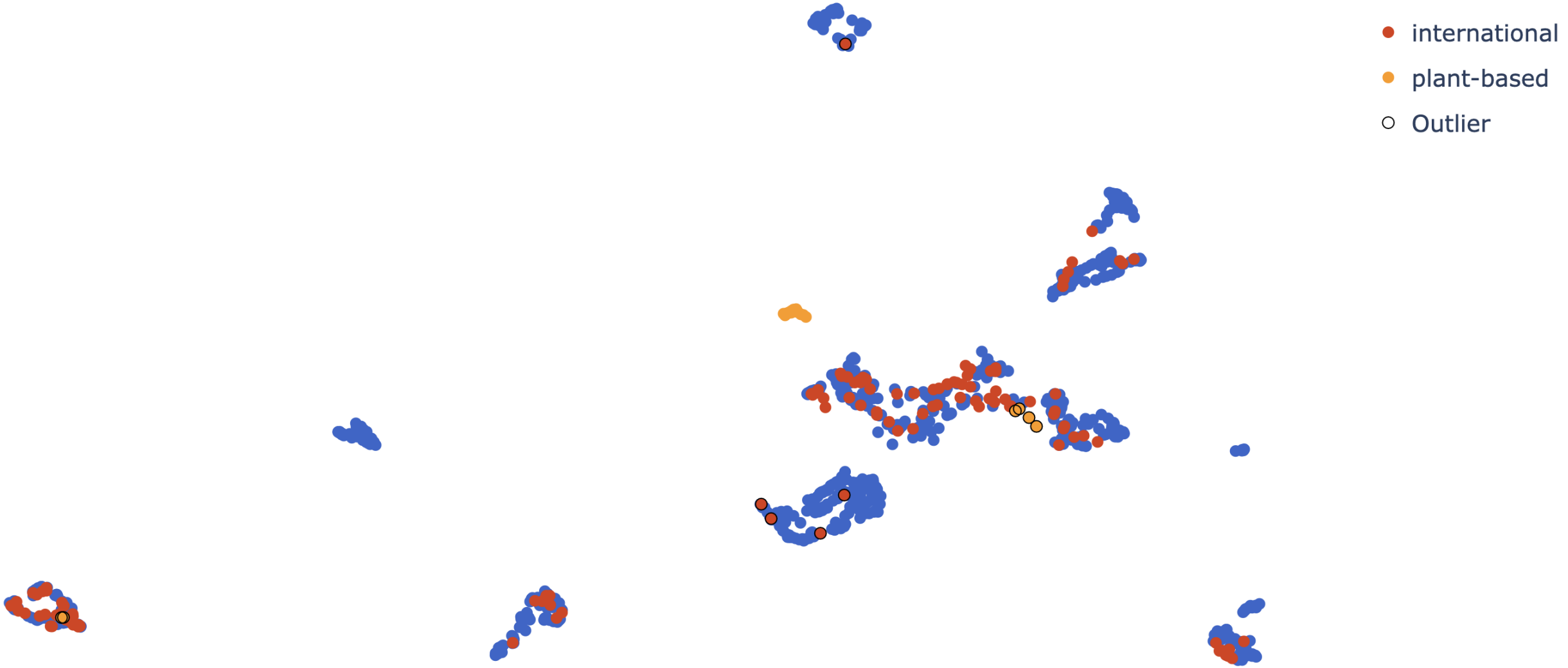
MIGROS

Product cannibalization groups – Example

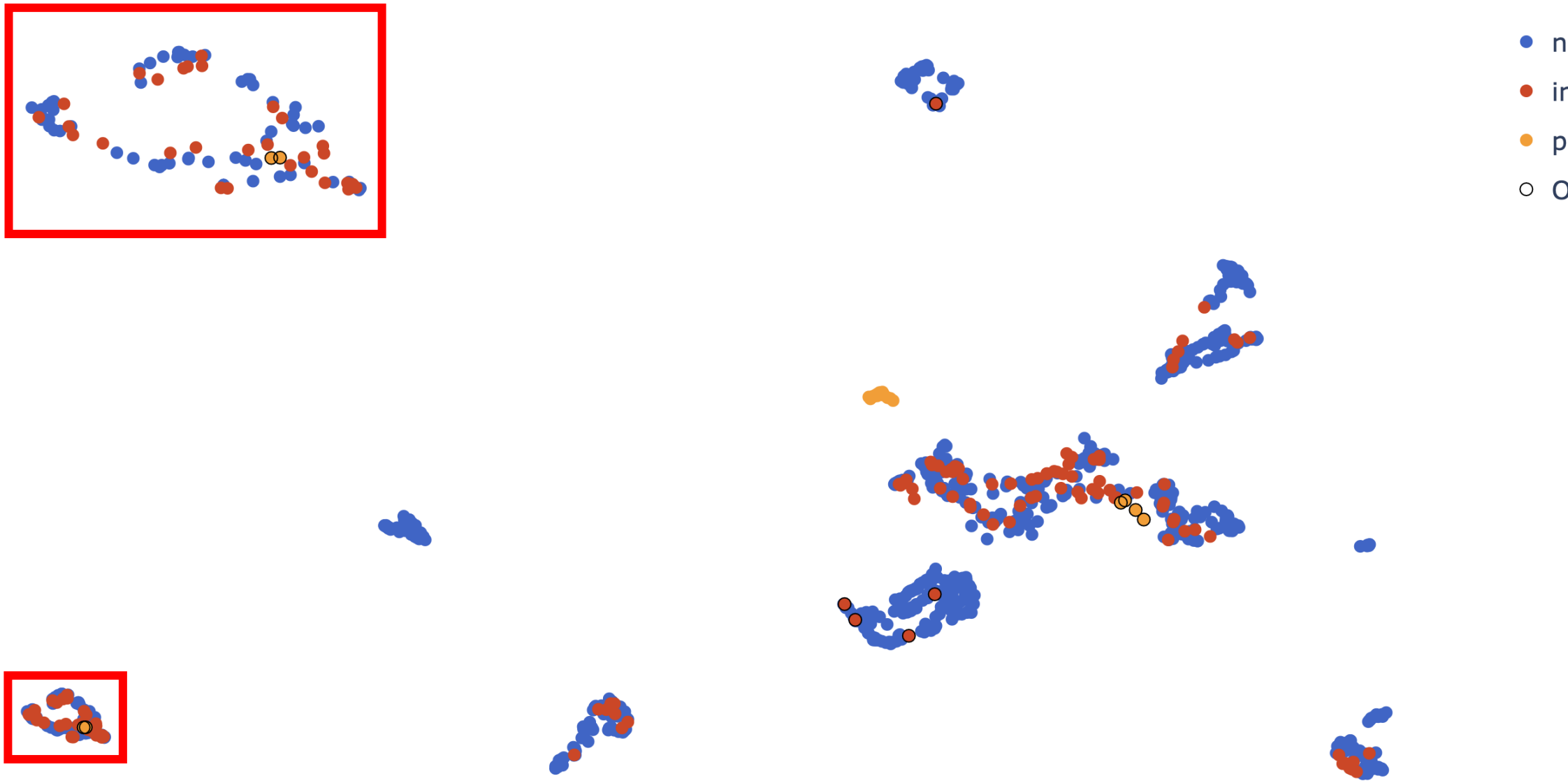


9

Product cannibalization groups – Example



Product cannibalization groups – Example



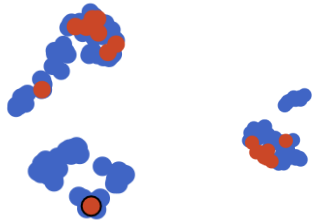
MIGROS

Product cannibalization groups – Summary

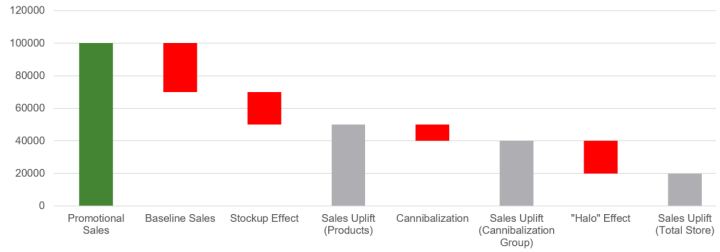
- Model captures **regionality**, **seasonality**, **customer profiles**, product groups with overarching **assortment hierarchy**

- Visual and quantitative analysis of **shopping behavior** to aid procurement
- **Cleaning** of cannibalization groups

- **Redefinition** of cannibalization groups



- **Improve KPIs** and promotion **performance + planning**



MIGROS

Promotion Schedule Optimization

Sets

P set of promotions

W set of weeks

Variables

x_{ij} $i \in P, j \in W$ decision variable for promotion i in week j

Should promotion *i* be planned in week *j*: Yes (1) or no (0)?

Business Constraints
(~ 180'000 constraints, ~ 68'000 variables)

Store Space

Seasonality

Related Marketing Campaigns

MIGROS V-LOVE

Campaign → Promotion

MIGROS V-LOVE

Promotion Schedule Optimization – Seasonality Constraints

Hard constraints

- Pros:
  - useful when there really are hard constraints
  - promotions can be fixed in time
  - easy to understand and manipulate

- Cons:
  - simplification of seasonality phenomena
  - requires either lots of manual annotation or (more or less) arbitrary threshold values

Soft constraints

- Pros:
  - detailed promotional performance estimation
  - risk mitigation (finding “the lesser of two evils”)
  - data-driven -> scalable

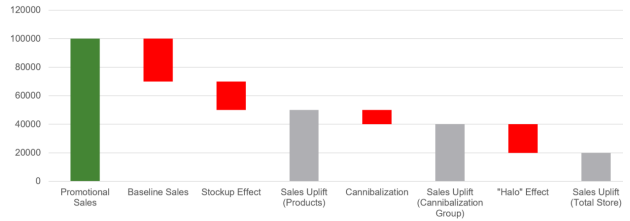
- Cons:
  - requires a seasonality model -> more initial effort
  - may yield a solution “inacceptable” for business

MIGROS

Summary

We provide data-driven solutions for promotion evaluation and planning

- KPIs to accurately assess promotion performance



- Capture cannibalization groups

- Enable data-driven and fully automized promotion planning

MIGROS

Thank you to...

...you for your attention!

...all our team members:

Simone Maier Begré
Kevin Bohn
Pascal Bücheler
Theo Helfenberger
Daria Izzo
Kathrin Oestringer
Pascal Sulser

... our business stakeholders

... the Data & Analytics Department & Marketing Analytics Team at MGB

MIGROS