HOW WE TRANSFORM THE CUSTOMER EXPERIENCE WITH ML AT MOL PETROL STATIONS

CASE STUDY BY MÁRTON HÁRS

Budapest ML Forum

May 3, 2022

▶MOLGROUP

DIGITAL FACTORY

Experience driven by data science

45 124

MÁRTON HÁRS – GROUP DATA ANALYTICS LEAD FOR CONSUMER SERVICES

Enthusiastic for generating insights from the data and turning insights into measurable business results.

April 2021 – MOL Group
- Group Data Analytics Lead for Consumer Services

2020 - 2021 – Data Blossom
- Entrepreneurial experiment

2008 – 2020 – Procter & Gamble
- Global Analytics & Insights Director, Baby Care
- Europe Analytics & Insights Senior Manager, Baby Care
- CEEMEA Analytics & Insights Senior Manager, Drive Retail Advantage
- Central Europe Analytics & Insights Manager, Tesco Sales Teams

2002 – 2007 – Photo hall
- Marketing Communications Manager
- Market Analyst

2007 – International MBA, Corvinus University
2001 – Master of Sociology; Master of Arts in Communications

OBJECTIVES

- To share our journey of implementing Hot Dog Production Planner, our first fully operational prescriptive analytics tool

- To summarize key learnings from operationalizing the tool in the business

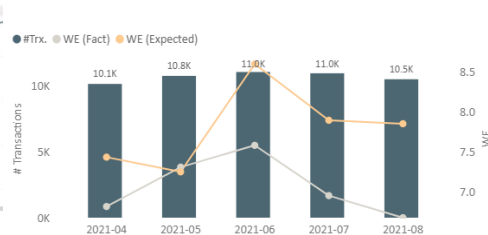# DIGITAL FACTORY: LEADING MOL CONSUMER SERVICES DIGITAL TRANSFORMATION

Digitalizing internal operations

*Portfolio of **BI Services** & **Advanced Analytics** Tools*
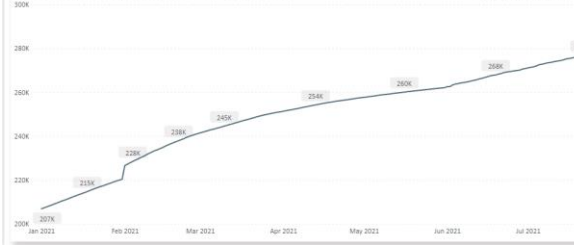
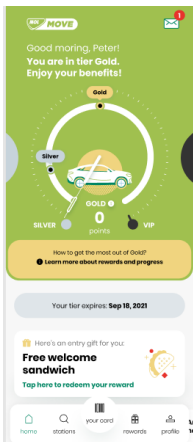

Data Analytics

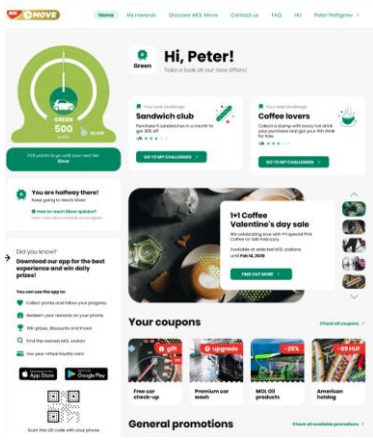## Digitalizing customer interactions

mobile *web* *email*

Personalization & Rewards (Loyalty Program)

Digital Factory

WE'VE BEEN BUILDING THE CONSUMER SERVICES DATA WAREHOUSE AND BASED ON THAT DELIVERING AN EXTENSIVE BI REPORTING ECOSYSTEM SINCE 2018.

WE INCREASINGLY INVEST INTO ADVANCED ANALYTICS TOOLS SINCE 2020, ENABLED BY THE INTRODUCTION OF AZURE DATABRICKS IN OUR SERVICE PORTFOLIO.
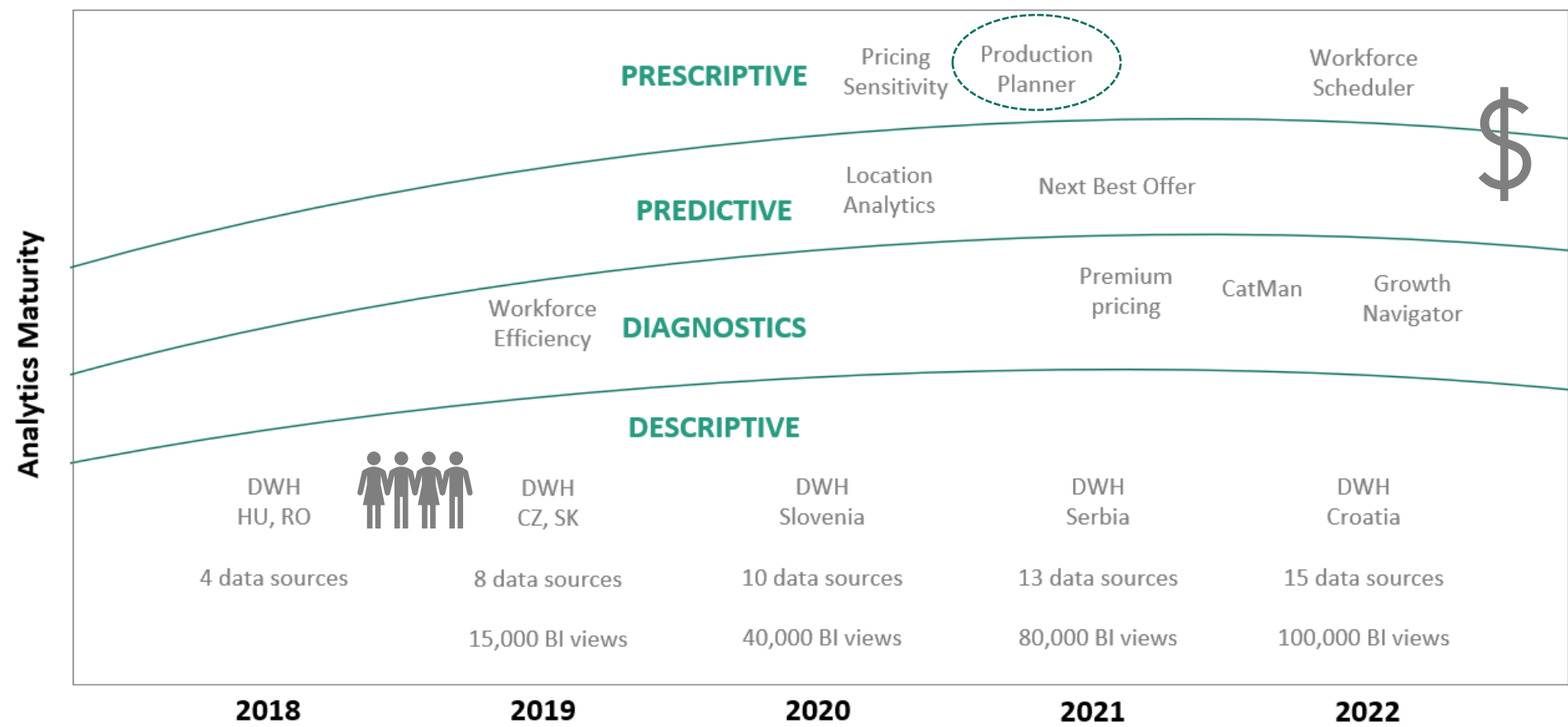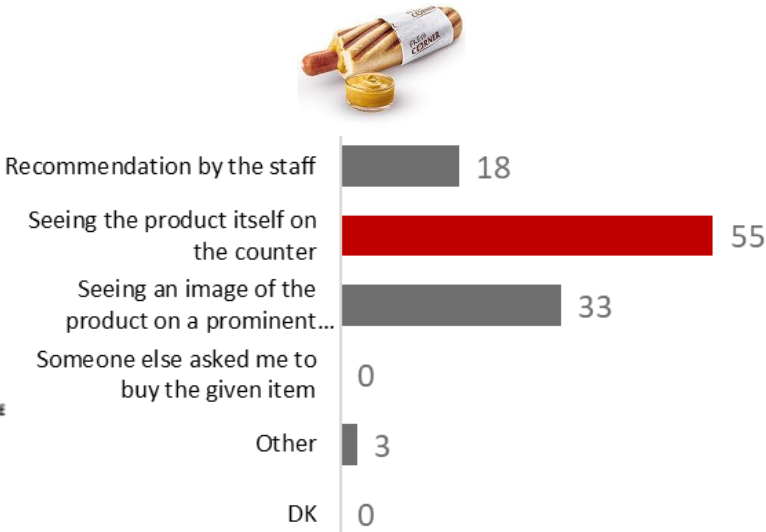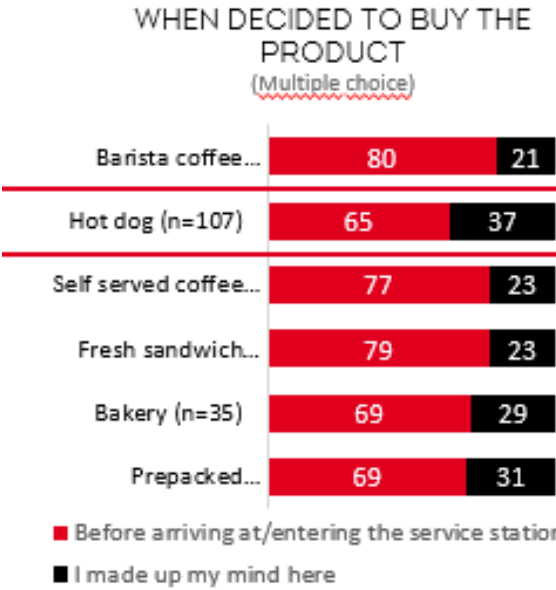
HOT DOG IS THE #1 GASTRO FOOD PRODUCT AT MOL SERVICE STATIONS.

CHALLENGE: THE RIGHT AMOUNT NEED TO BE AVAILABLE TO MEET DEMAND AND TRIGGER IMPULSE PURCHASES, WHILE MINIMIZING THE WASTE.

Gastro basket penetration	
Barista Coffee	49%
Hot Dog	**31%**
Self Service Coffee	13%
Pastry	5%
Prepacked Sandwiches	4%
Fresh Sandwiches	4%

Sausages need 20 minutes on the roller before ready to sell.

WHEN DECIDED TO BUY THE PRODUCT
(Multiple choice)

	Before arriving at/entering the service station	I made up my mind here
Barista coffee...	80	21
Hot dog (n=107)	65	37
Self served coffee...	77	23
Fresh sandwich...	79	23
Bakery (n=35)	69	29
Prepacked...	69	31

⚠ LOW SAMPLE SIZE

■ Before arriving at/entering the service station
■ I made up my mind here

Recommendation by the staff	18
Seeing the product itself on the counter	55
Seeing an image of the product on a prominent...	33
Someone else asked me to buy the given item	0
Other	3
DK	0

WE BUILT THE INITIAL VERSION OF THE TOOL IN 2020 WITH DIFFERENT AUTOREGRESSIVE MODELS IN HUNGARY AND SLOVAKIA. THEN INTRODUCED THE FACEBOOK PROPHET DUE TO BETTER MATCH WITH THE BUSINESS CASE AND STRONG ACCURACY.

- **Prophet is a** state-of-the-art **time series forecasting Machine Learning library** open-sourced **by Facebook** for automated, high-precision forecasting.

- **Accuracy outperformed or met initial forecasting methods** and other competing approaches.

- **Capable of using external inputs** including site level hyperparameters and built-in country-level holidays.

- Designed for strong multiple **"human-scale" seasonality** within the day, week and year.

- **Historical trend changes**, e.g. due to product launches, marketing support.

- **Trends with non-linear growth curves**, where a trend hits a natural limit or saturates.

Models RMSE comparison
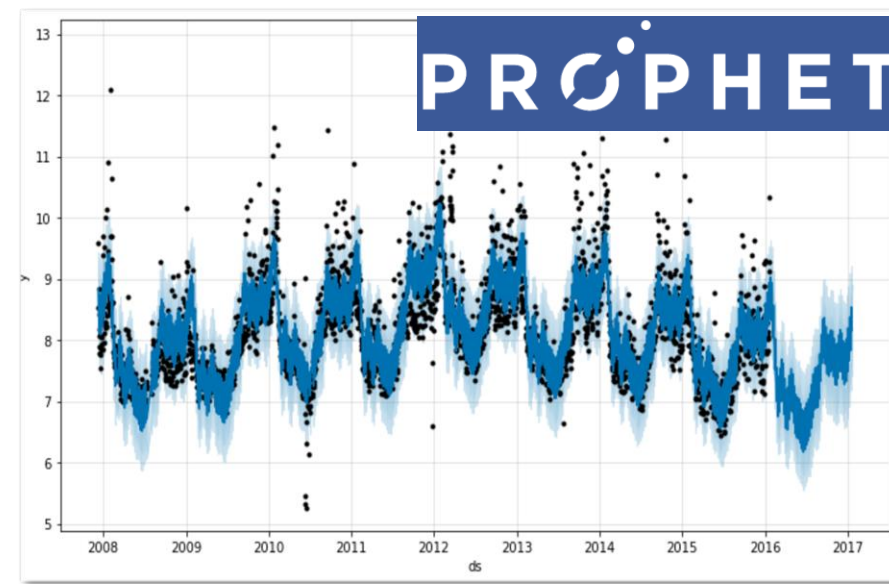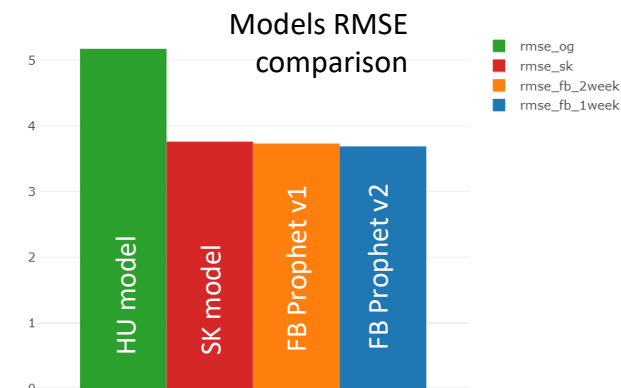
THE DELIVERABLE IS A SIMPLE ONE PAGER HOT DOG PRODUCTION PLAN POPULATED AND DISTRIBUTED AUTOMATICALLY TO EACH SITE ONCE PER WEEK
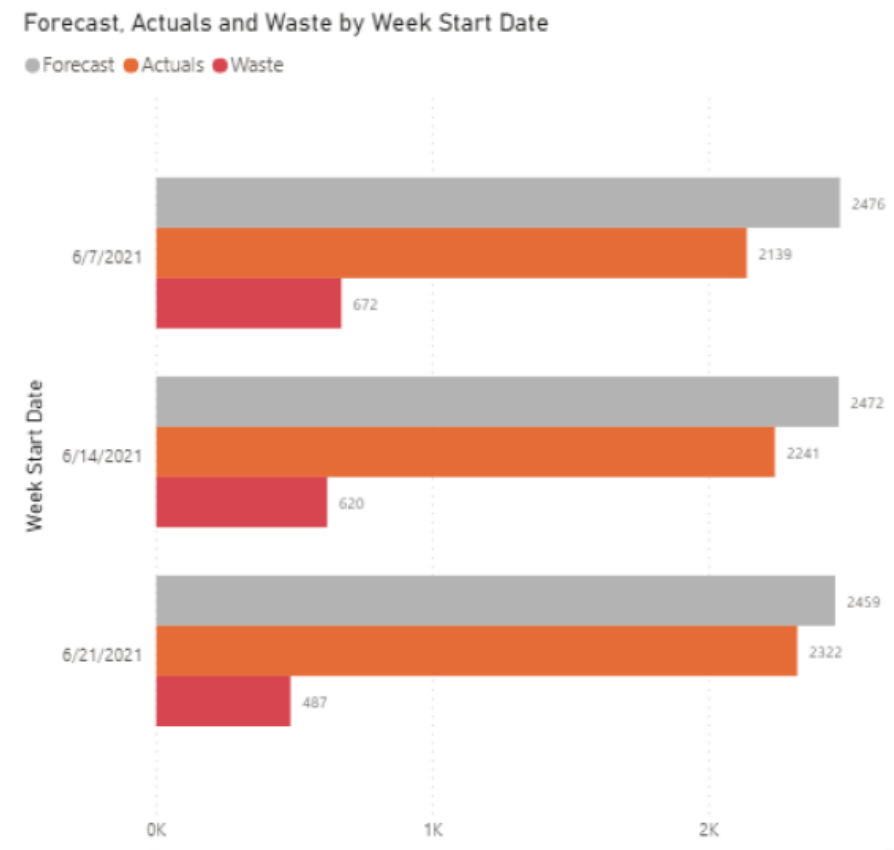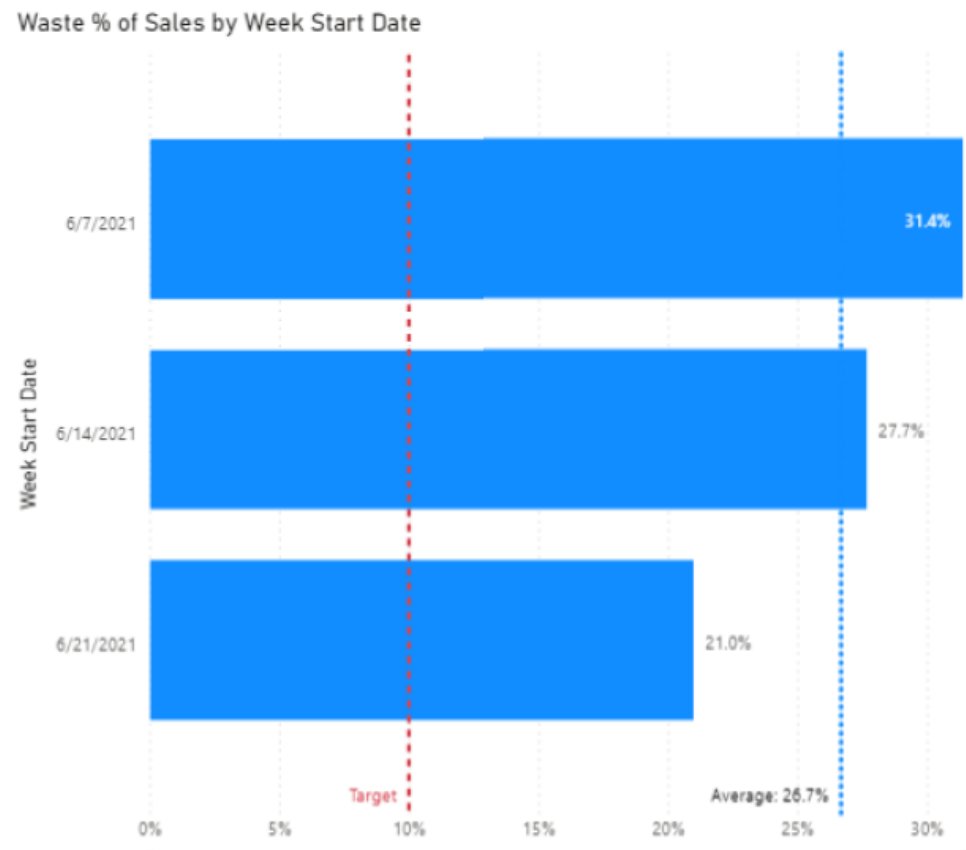
Distribution by type   Suggested amount by hour

Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday, April 18, 2022	3	3	3	3	3	3	5	8	10	10	10	9	9	8	8	6	6	4	4	3	3	3	3	3
K	1	1	1	1	1	1	2	2	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1
M	1	1	1	1	1	1	2	3	5	5	4	2	3	3	3	2	2	1	2	1	1	1	1	1
S	1	1	1	1	1	1	1	3	2	3	4	5	4	3	3	2	2	2	1	1	1	1	1	1
Tuesday, April 19, 2022	3	3	3	3	3	4	6	11	9	9	9	11	10	10	9	8	8	7	6	5	4	3	3	3
K	1	1	1	1	1	1	1	4	3	3	2	4	4	5	5	4	3	2	2	1	1	1	1	1
M	1	1	1	1	1	1	2	3	3	3	3	3	2	2	1	2	3	3	3	2	1	1	1	1
S	1	1	1	1	1	2	3	4	3	3	4	4	4	3	3	2	3	2	1	1	1	1	1	1
Wednesday, April 20, 2022	3	3	3	3	3	4	7	11	9	10	10	9	9	10	10	9	8	8	7	6	4	3	3	3
K	1	1	1	1	1	1	2	3	3	4	3	3	3	4	5	3	3	3	3	2	1	1	1	1
M	1	1	1	1	1	2	3	4	3	3	5	4	4	2	2	3	2	2	2	2	1	1	1	1
S	1	1	1	1	1	1	2	4	3	3	2	2	2	4	3	3	3	3	2	2	2	1	1	1

CURRENT FUNCTIONALITY

- Suggested number of hotdogs per day per hour for each Service Station

- Automatic E2E forecasting pipeline from model running to output distribution

- Model refresh each week leveraging fbprophet ML library

- Roller capacities, minimum amounts, opening hours, country specific holidays taken into account

- Tracking capability for Service Station compliance and business results

Pilot executed in 11 sites in Hungary

THE PILOT WE RAN ON 11 SITES IN HUNGARY PROVED POSITIVE IMPACT ON THE BUSINESS BEHIND GRADUALLY DECREASING WASTE AND GROWING SALES – AHEAD OF THE NETWORK AVERAGE.


Waste % of Sales by Week Start Date

Week Start Date	
6/7/2021	31.4%
6/14/2021	27.7%
6/21/2021	21.0%

Target
Average: 26.7%

Forecast, Actuals and Waste by Week Start Date

● Forecast ● Actuals ● Waste

Week Start Date	Forecast	Actuals	Waste
6/7/2021	2476	2139	672
6/14/2021	2472	2241	620
6/21/2021	2459	2322	487

Pilot executed in 11 sites in Hungary

DESPITE THE SOLID PERFORMANCE AT NETWORK LEVEL, SALES TEAMS RAISED CONCERNS OF OVER- OR UNDERPREDICTION AT SPECIFIC SITES.

WE FINE-TUNED THE BUSINESS LOGICS REFLECTING THE CONCERNS FROM THE FIELD.
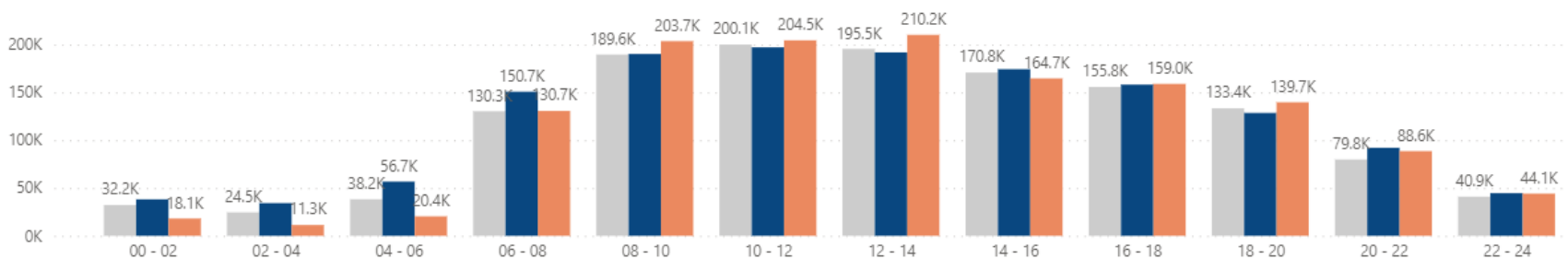
Total Network: overall solid performance.
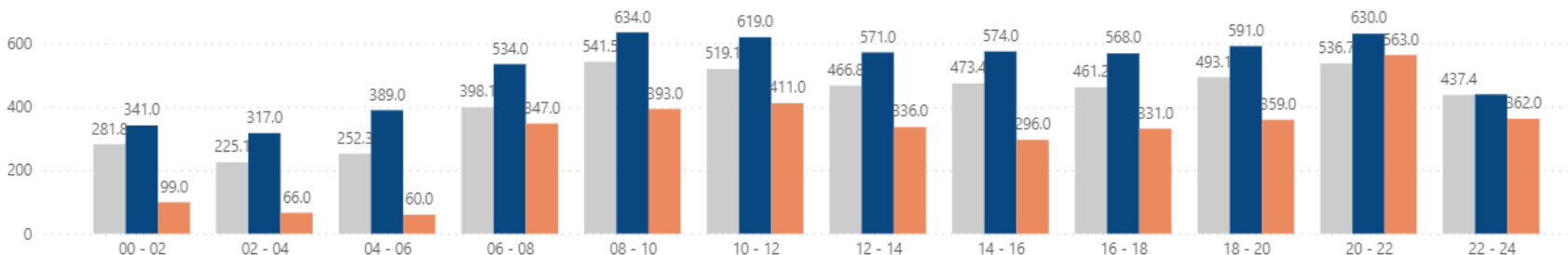
Select site (example - Berettyóújfalu): significantly lower volume than forecasted

WE DEVELOPED A TRACKING MECHANISM TO BETTER UNDERSTAND THE APPLICATION OF THE TOOL BY SITE AND CONSEQUENTLY MEASURE THE IMPACT ON THE BUSINESS.

EXPECTED DAILY HOTDOG PLACEMENT
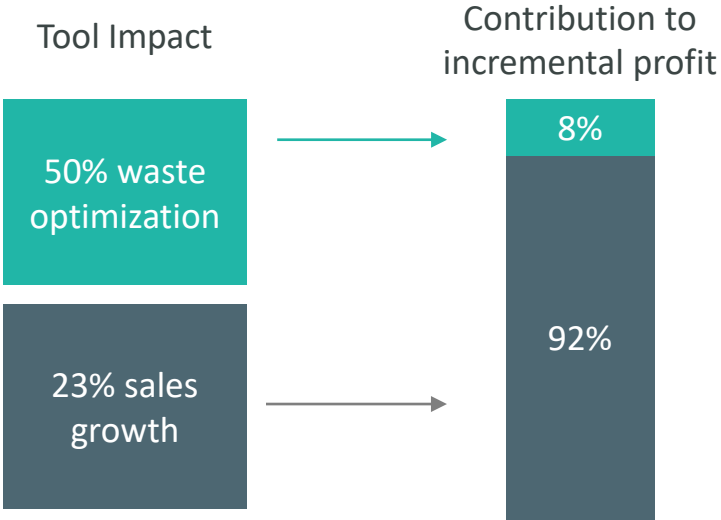Number of hotdogs that should be placed following the production planner

Based on suggested amounts and actual transactions

ACTUAL DAILY HOTDOG PLACEMENT
Number of hotdogs actually placed on the roller

Number of hot dog sold + waste

> 5%
expected > actual

placed below

Within 5% diff.

on-guidance

> 5%
expected < actual

placed above

Example: SeS „A" should place 100 hot dogs (=simulation) onto the roller on a given day following the production planner. If 94 pcs (or less) placed in reality (=fact data), the SeS on this day is grouped into this category.

Example: SeS „A" should place 100 hot dogs (=simulation) onto the roller on a given day following the production planner. If an amount between 95 and 105 is placed in reality (=fact data), the SeS on this day is grouped into this category.

Example: SeS „A" should place 100 hot dogs (=simulation) onto the roller on a given day following the production planner. If at least 106 pcs are placed in reality (=fact data), the SeS on this day is grouped into this category.

THE PRODUCTION PLANNER TURNS MORE CUSTOMERS INTO HOT DOG BUYERS WHILE SIGNIFICANTLY REDUCES FOOD WASTE.

| Group	Nr of occurrence (ses*day)	Avg waste per sales (%)	Hot dog trx per total trx (%)	Nr of hot dogs per total trx (pcs)	Gastro trx per total trx (%)
off-guidance	3,473	14%	5%	0.08	17%
on-guidance	478	7%	6%	0.10	20%
Total	**3,951**	**13%**	**5%**	**0.08**	**17%**

The results of the on-guidance sites vs. rest of the network:

- **50% less waste** as % of hot dog sales
- **23% more hot dogs** per transaction
- **19% higher hot-dog** basket penetration
- **17% higher gastro** basket penetration

Tool Impact

Contribution to incremental profit

50% waste optimization → 8%

23% sales growth → 92%

Up to 1.7m more Hotdogs

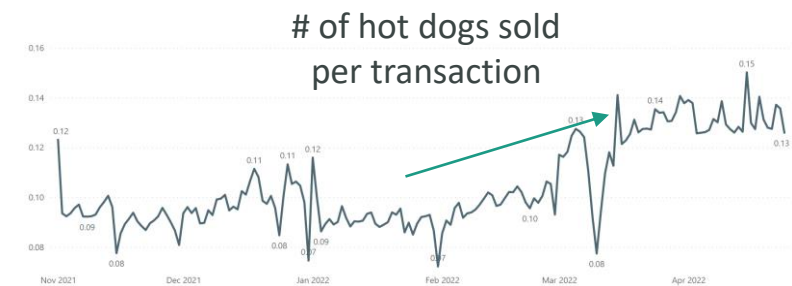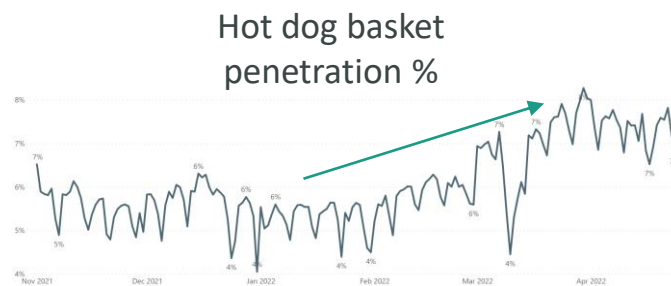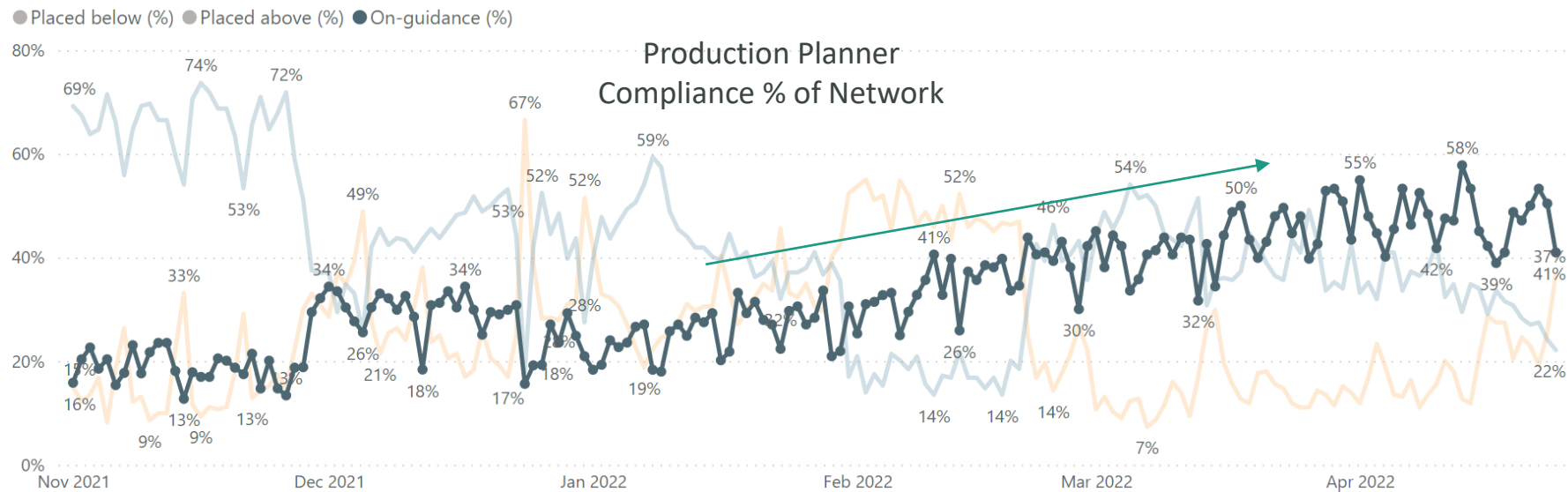in HU, SK, CZ, RO*

*at 50% compliance

HOWEVER, MOST OF THE NETWORK (SITE DAYS) DIDN'T FOLLOW THE PRODUCTION PLANNER.
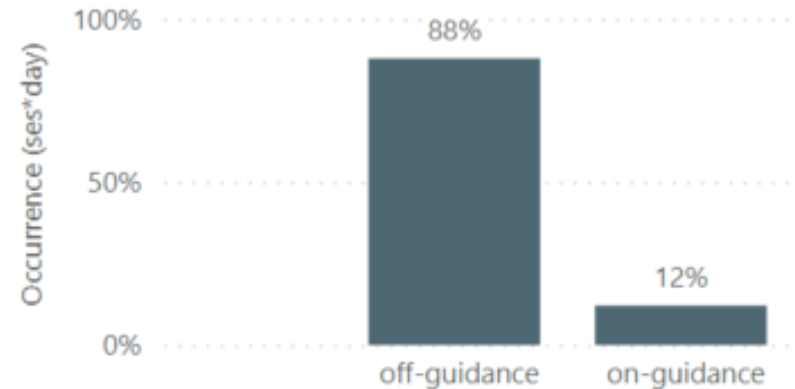
Actions to grow compliance:

- **Reworked standards & operation principles**:
  - Simplify administration for hot dog placement
  - Clarify application guidance: top up sausages on the roller after each transaction up to the suggested amount
  - Standardize waste administration
- **Added compliance target in the bonus schemes** of area managers and country head of sales
- **Placed production planner holders** above the hot dog roller in each site

COMPLIANCE ACCELERATED AND GREW TO +50% IN Q1 2022 AS RESULT OF THE INTERVENTIONS. THE SALES AND WASTE RESULTS IMPROVED IN-LINE WITH THE COMPLIANCE GROWTH.

Production Planner
Compliance % of Network

● Placed below (%)   ● Placed above (%)   ● On-guidance (%)

Waste % of sales

Hot dog basket penetration %

# of hot dogs sold per transaction

KEY LEARNINGS

- Excitement $\neq$ dedication by the business

- It's key to establish meaningful and measurable success criteria upfront (and possibly acceptance criteria)

- The tool development should go hand in hand with the development of the underlying business process

- Know your customers (very different expectations in field team vs. sales leadership)

- Top management endorsement and formal target setting is essential (you get what you measure)