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INTELLUS GROUP

arvesta
Experts in the field

Leveraging data for supply chain analysis and forecasting

Who

arvesta
Experts in the field

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Agenda

1. Arvesta: business & project context
2. Data Landscape
3. Focus 1: Transport & Logistics
4. Focus 2: Process Optimization for Pellet Quality
5. Conclusion

Arvesta: business & project context

arvesta

Experts in the field

€250 MILLION

invested in innovation, IT, production sites, and sustainability initiatives (2021-2025)

€1.9 BILLION

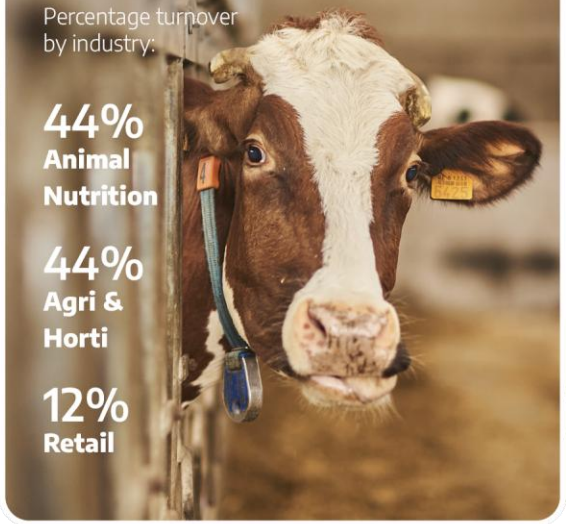
consolidated **turnover**

Percentage turnover by industry:

44% **Animal Nutrition**

44% **Agri & Horti**

12% **Retail**



Animal Nutrition

1.8 MILLION TONNES

global sales per year

14 production sites

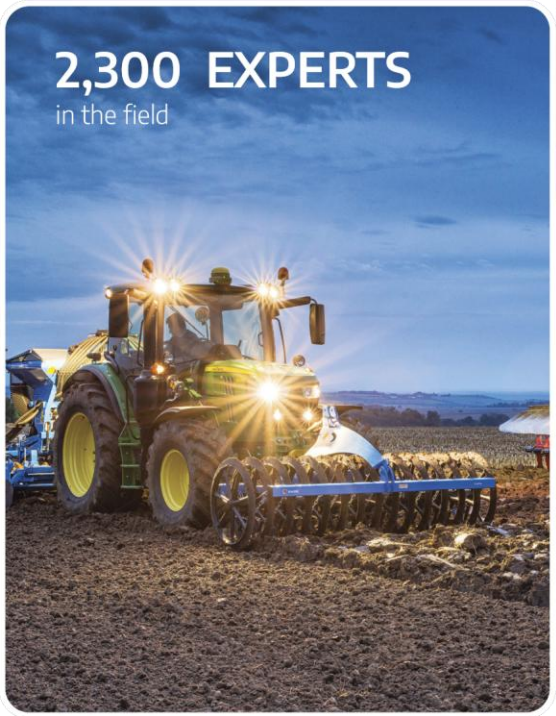
SPECIALIST

in both **professional** and **hobby feeds**

122 YEARS

as **the partner** for agriculture and horticulture

More than **40 strong brands** across 3 industries



International operations with offices in Belgium, the Netherlands, Germany, and France

Agri & Horti

Belgium's market leader in seeds, grains, and plant nutrition and protection for all crops

Global market leader in mobile gully systems with Hortiplan and greenhouses with Van der Hoeven

Importer and distributor of John Deere

Retail

Aveve

200 Aveve stores

Eurotuin

3 Eurotuin stores

50 stores under own management

210,000 m2 **of shopping fun**

BESTE WINKELKETEN VAN BELGIË 2023 - 2024 DIERENSPECIALZAKEN

16 consec-utive years

BESTE WINKELKETEN VAN BELGIË 2023 - 2024

4 consec-utive years

Animal Feed production: business context

Cost leadership

- Low margin business
- Fragmented and highly competitive landscape
- Raw materials up to 80% of total cost (followed by logistic cost and production cost)

Capital intensive

- Manufacturing process in 15 factories (proximity importance)
- Relative old production facilities

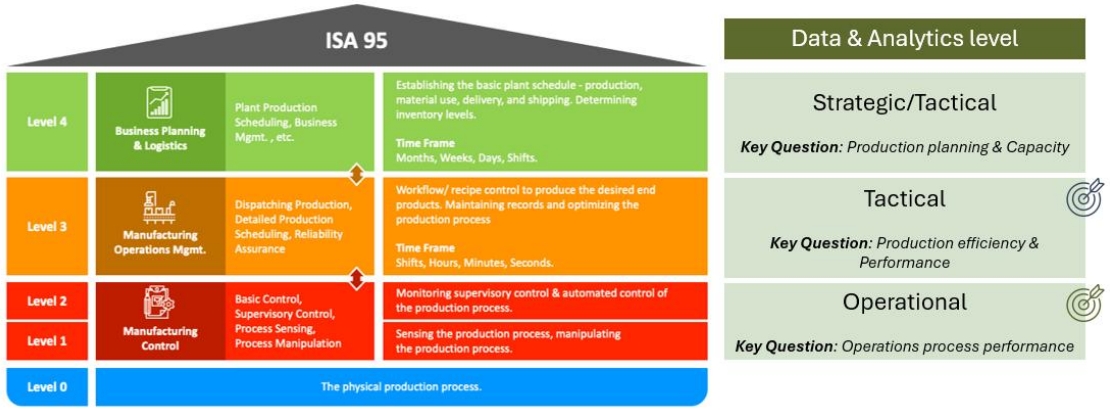
Agility

- Last minute ordering
- Transport planning determines production planning
- Variable composition of feed (raw material cost optimization)

Partnership & Service

- Advice on maximising yield/return
- Quality of the feed
- Service levels
- Unburden farmer in his administration

Project Objectives



Deliver using the Arvesta Data Platform 2 Use Cases in Proof of Concept (PoC)

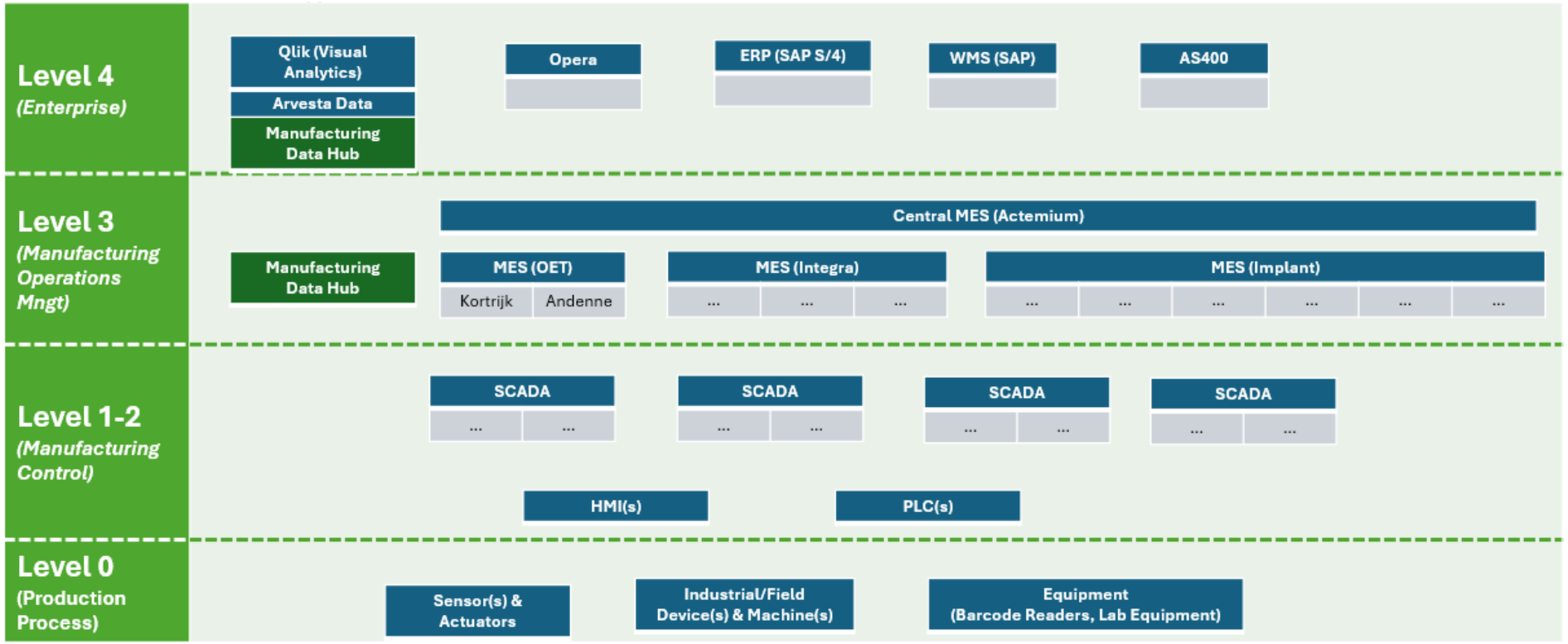
- Focused on Operational Insights – Process Optimization for Pellet Quality
- Focused on Tactical Insights – Transport/Logistics

As such :

- Showcasing the capabilities of the Arvesta Data Platform, its role in the Manufacturing Data Landscape and the potential value of such insights towards AN.
- Identifying the (missing) underlying critical components which could lead to input for future projects within roadmaps/portfolio.

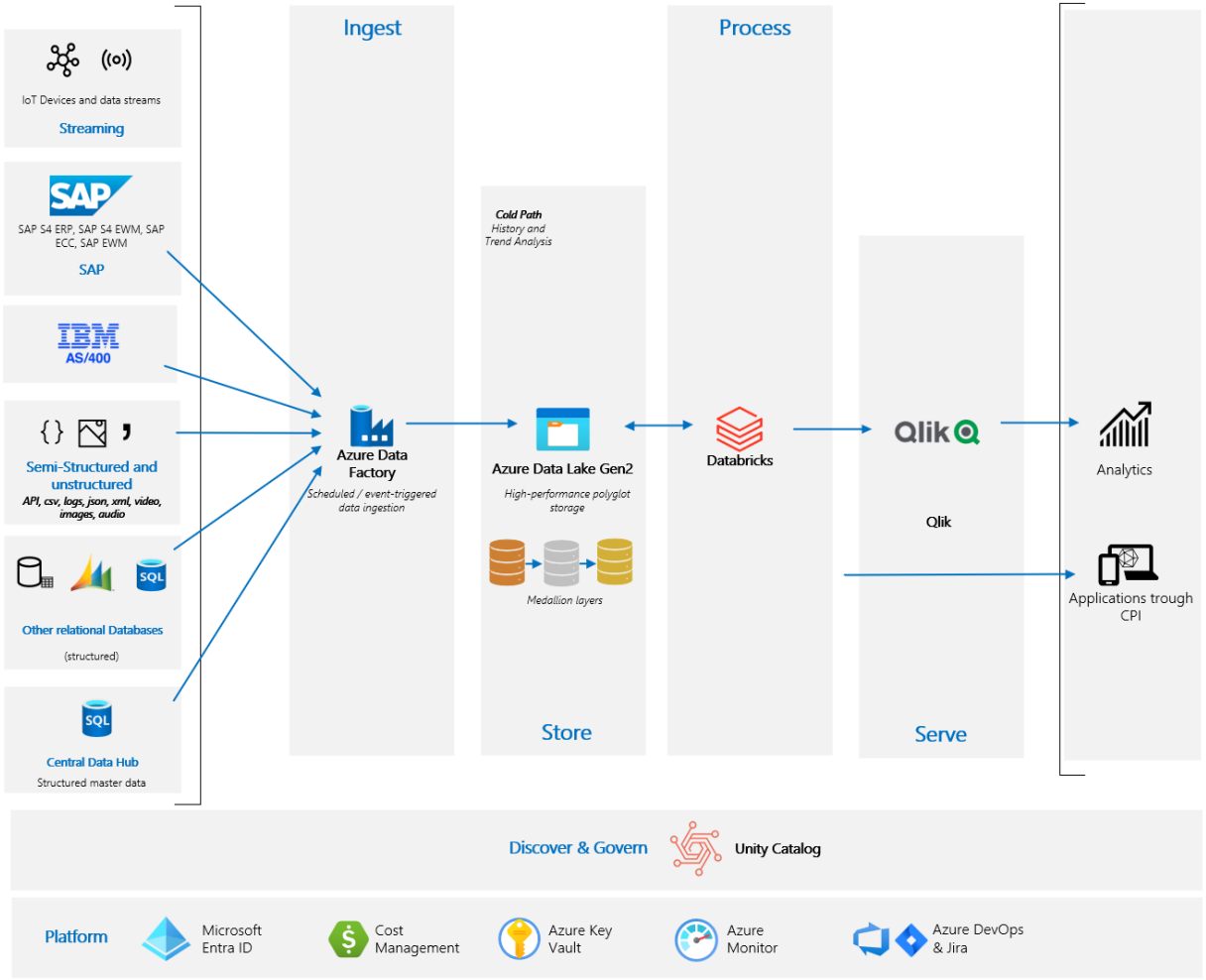
Data Landscape

Manufacturing IT Landscape



- Focus on Simplifying Data Flows & making them Sustainable (Future, Cost & Supportable Proof) within Manufacturing Domain
- Integrate with the Arvesta Data Platform

Arvesta Data Platform



General

- Group wide (support all business domains & activities)
- True modern data platform (multi-technology)
- Should support:
  - Traditional Business Intelligence
  - Data Science & AI
  - Data provisioning for external applications (like order portals & webshops)

For this Project

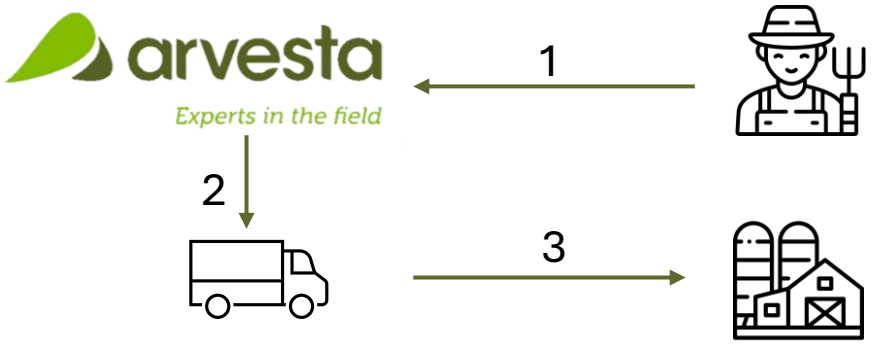
- Use Data Platform for data cleaning & processing (efficient & re-useable after POC)
- Use one shot CSV files instead of connecting to source systems:
  - Reduced data scope needed for feasability focus
  - limit landscape impact & investment during POC

Focus 1: Transport & Logistics

Business Challenge

What?

We want to improve our **transport & production efficiency**.



Why?

- Feed production is mainly a MTO process, optimizing the usage of our production facilities can lower the production cost of the feed. Flexibility comes with a cost
- Our farmers don't always receive the goods at the desired moment: impact on yield

How?

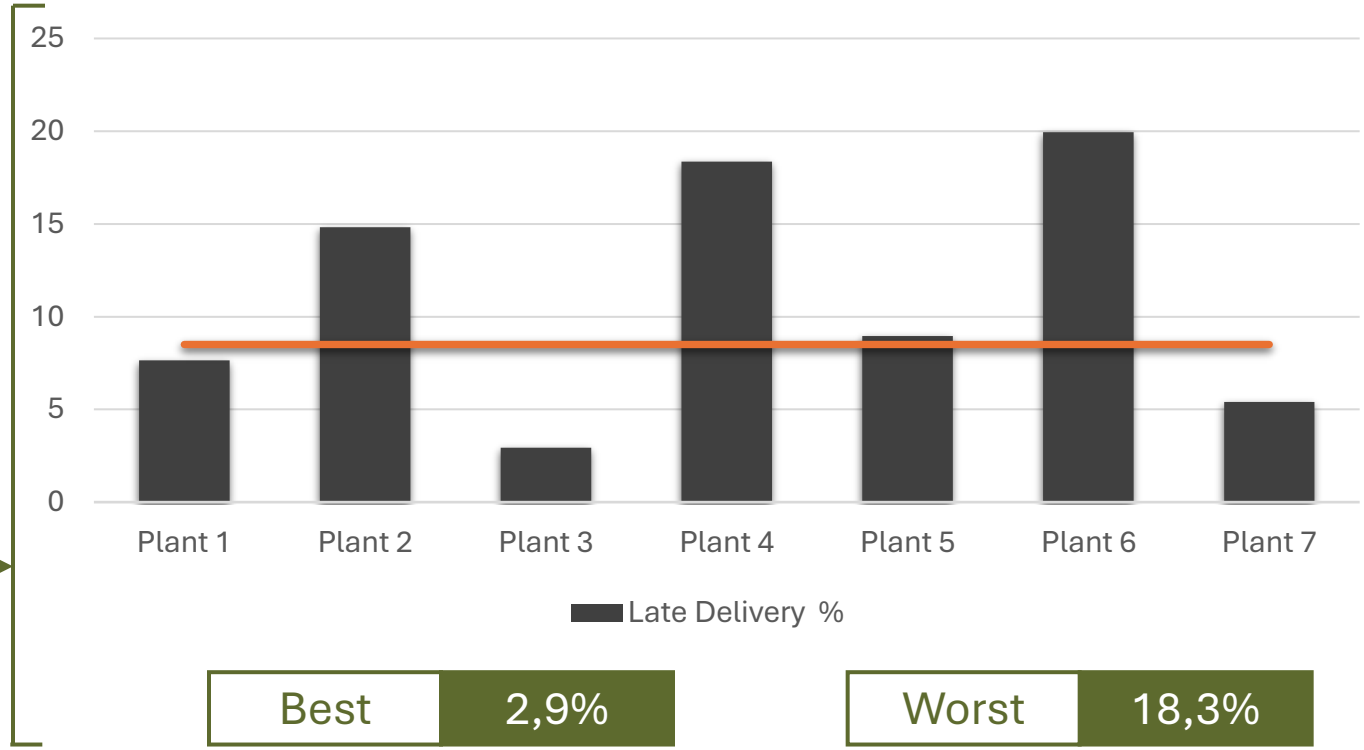
We want to have better knowledge in how order & delivery times are correlated and how we can use these insights to improve both the ordering & delivery process

On Time Delivery (OTD)

How many of the orders where delivered at the date requested by the customer?

235.000 Orders	
Late Delivery	On Time Delivery
8,5%	91,5%

.. But big differences per production plant



Best	2,9%

Worst	18,3%

On Time Ordering (OTO)

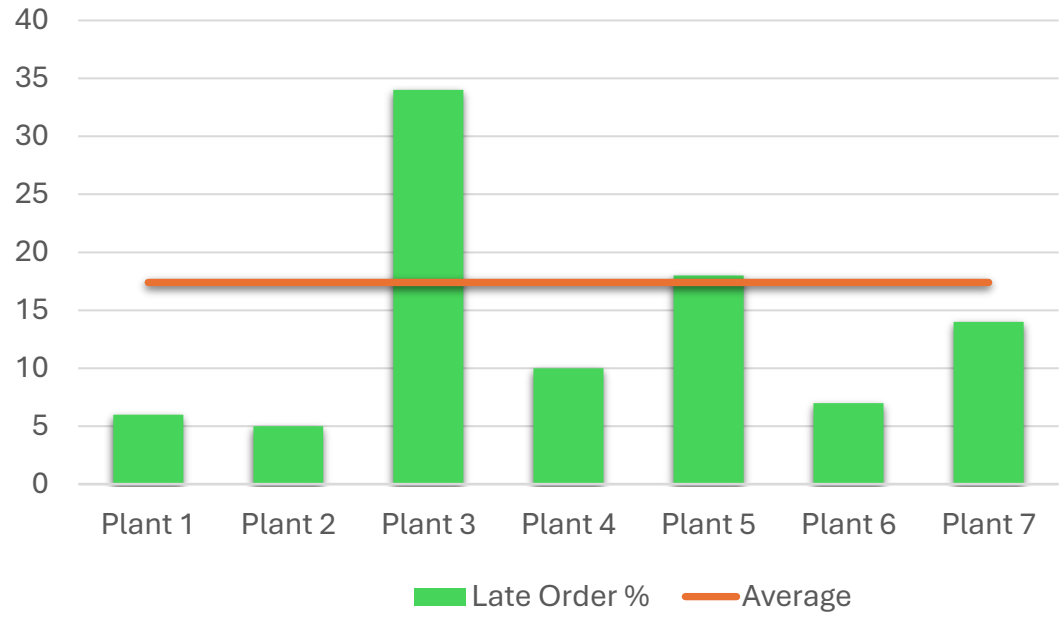
Late deliveries can have numerous root causes. One common complaint was that customers were ordering too late (and expecting unrealistic delivery times)

→ Ordering agreement for earliest delivery:

- Monday - Thursday: Ordering before 2pm for delivery on next working day (Tuesday – Friday)
- Friday: Ordering before 2pm for delivery on Monday
- Saturday - Sunday: Ordering for delivery on Tuesday

235.000 Orders	
Late Order	On Time Order
17,5%	82,5%

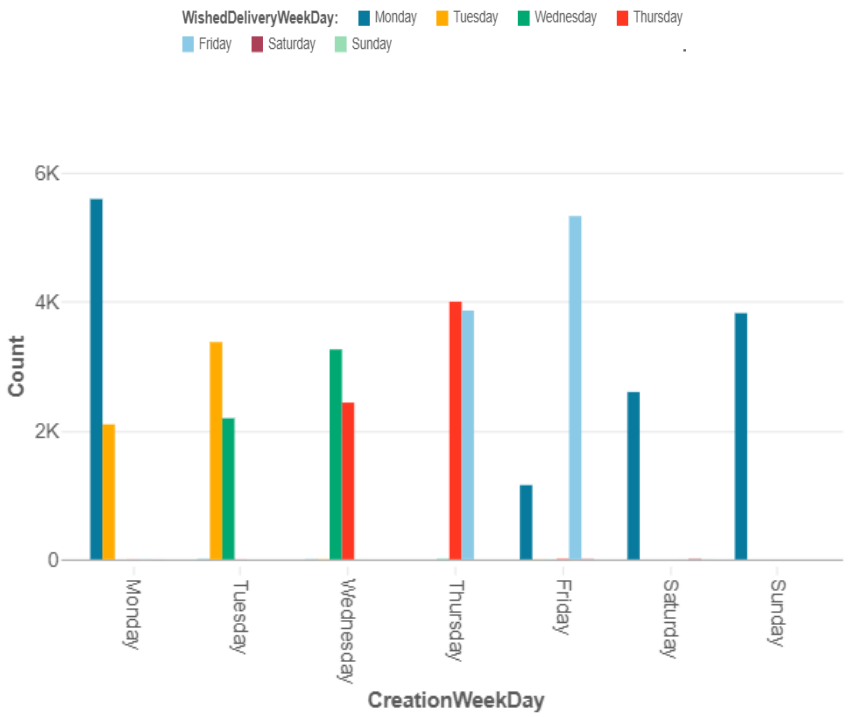
.. But big differences per production plant



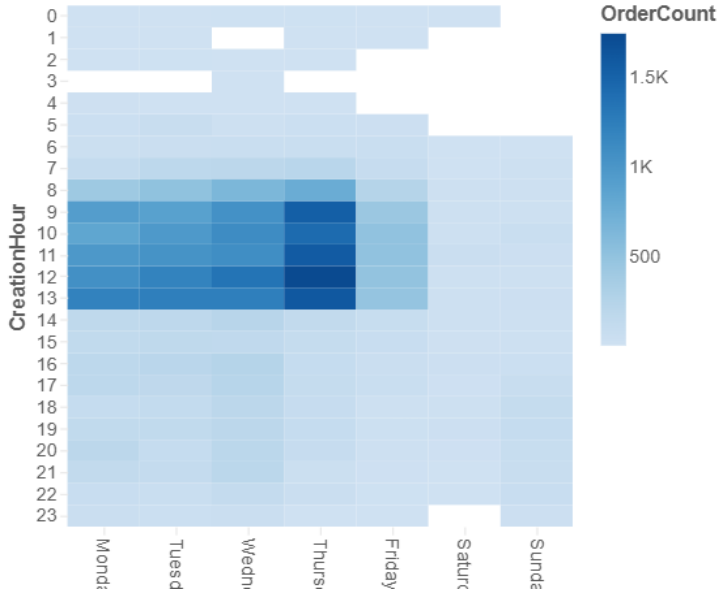
Best	5,0%

Worst	34,1%

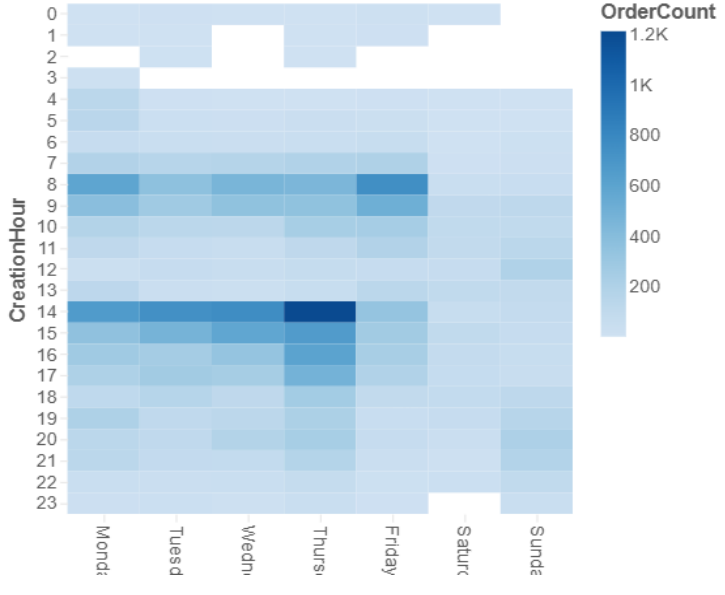
On Time Ordering (OTO)



On time orders



Late orders



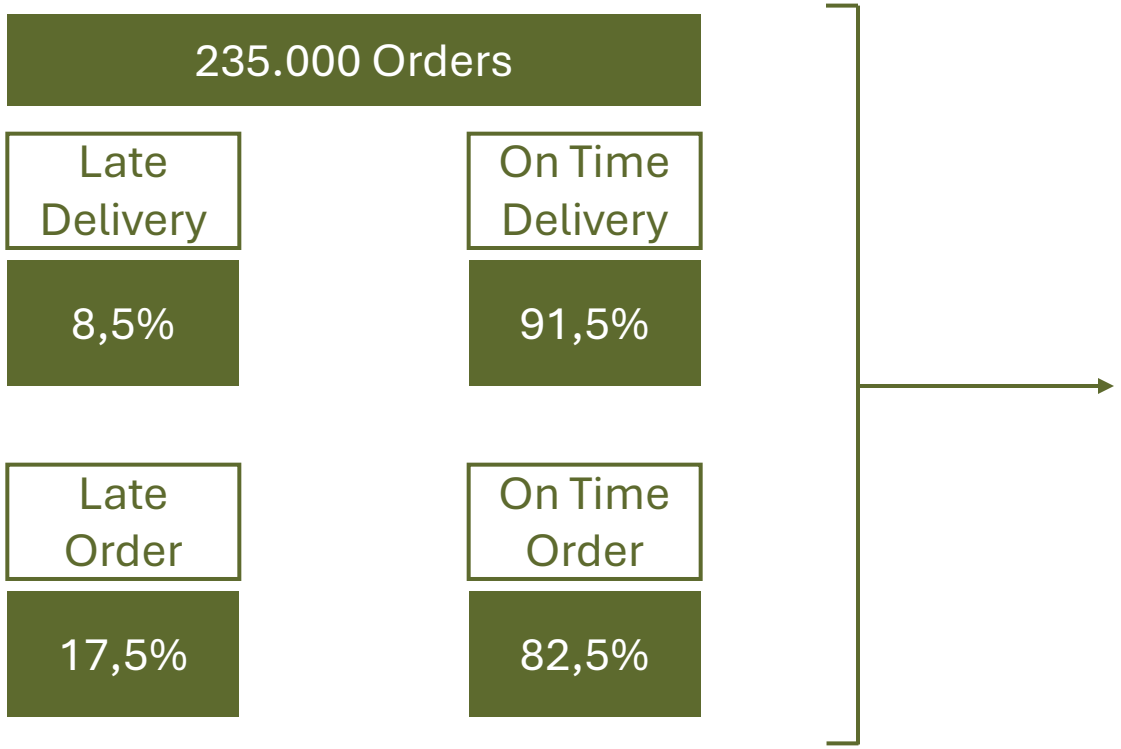
→ Lots of ordering for “Same Day Delivery” at 8 AM

→ Lots of ordering for “Next Day Delivery” just after the cut-off at 2PM

→ Lots of “Before the weekend” ordering Thursday afternoon & Friday itself (peak in late but also overall orders)

On Time Delivery (OTD) & On Time Ordering (OTO)

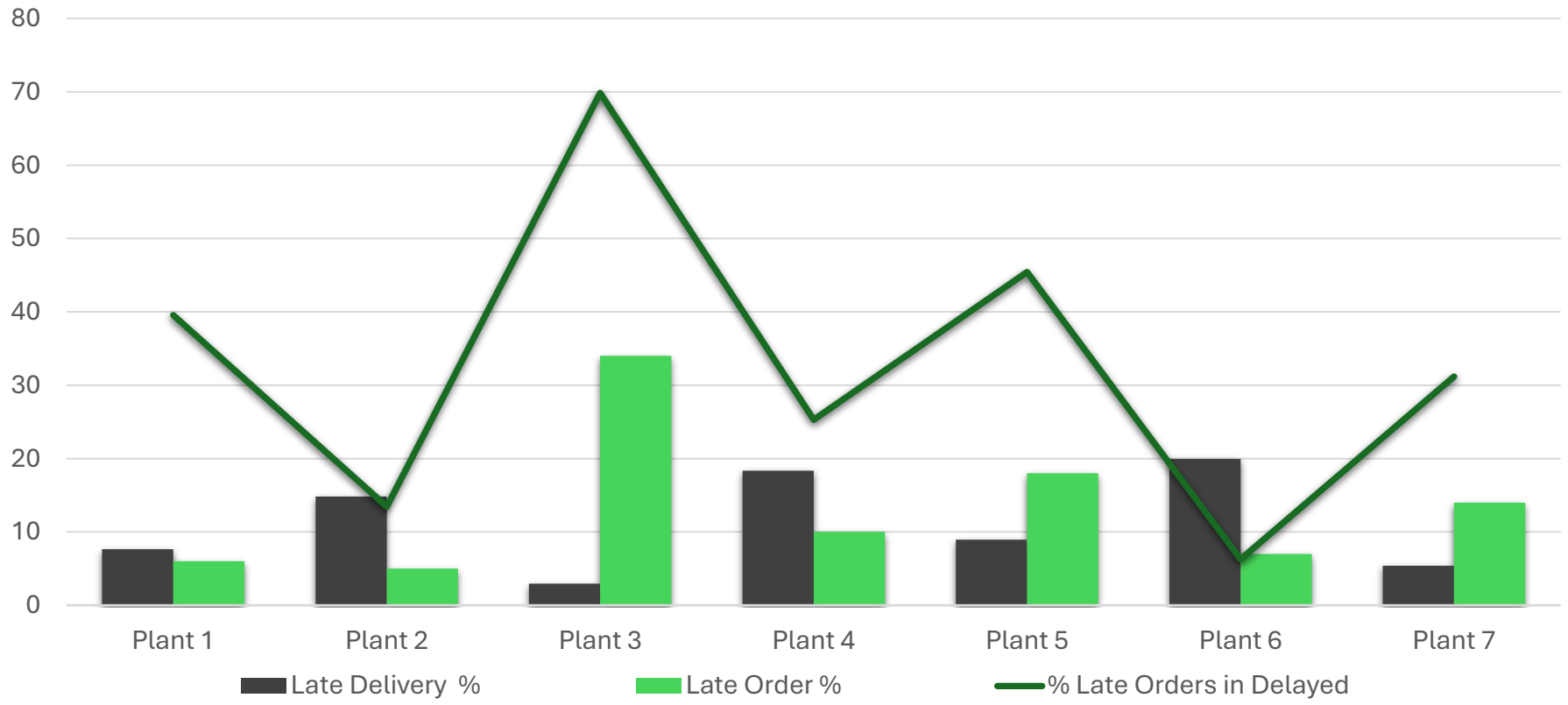
What if we now combine both insights



“The % of late o exceeds the % of late deliveries, so this is clearly ason”

On Time Delivery (OTD) & On Time Ordering (OTO)

What if we now combine both insights properly?



Intermediate conclusions

Service Level

On time and in Full delivery are not in line with the target SLA.

Cut off time of ordering is a hard deadline

Peak demands

There are significant peaks in the needs for production capacity (esp Thursday/ Friday)

This causes significant inefficiencies for Arvesta

Shared Responsibility

Although the customer's behaviour & ordering discipline is a factor in this, several plants have other issues in delivering on time

Order Related factors

→ Coach the customer through Sales Reps (order on time or even early)

→ Become less dependent on the ordering discipline of the customer

Other factors

→ More root cause investigation is needed to identify other factors negatively influencing the delivery timing

Detailed Order forecasting

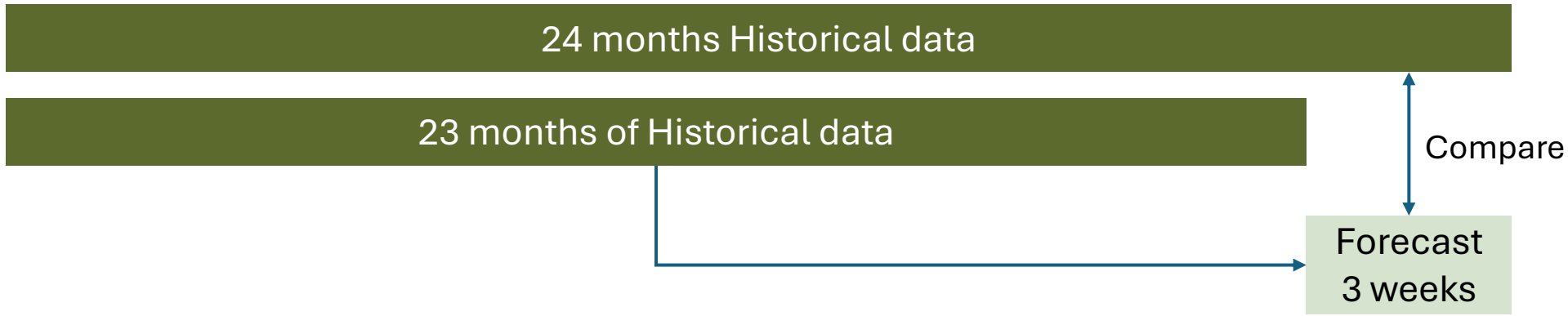
Order Related factors

→ Become less dependent on the ordering discipline of the customer

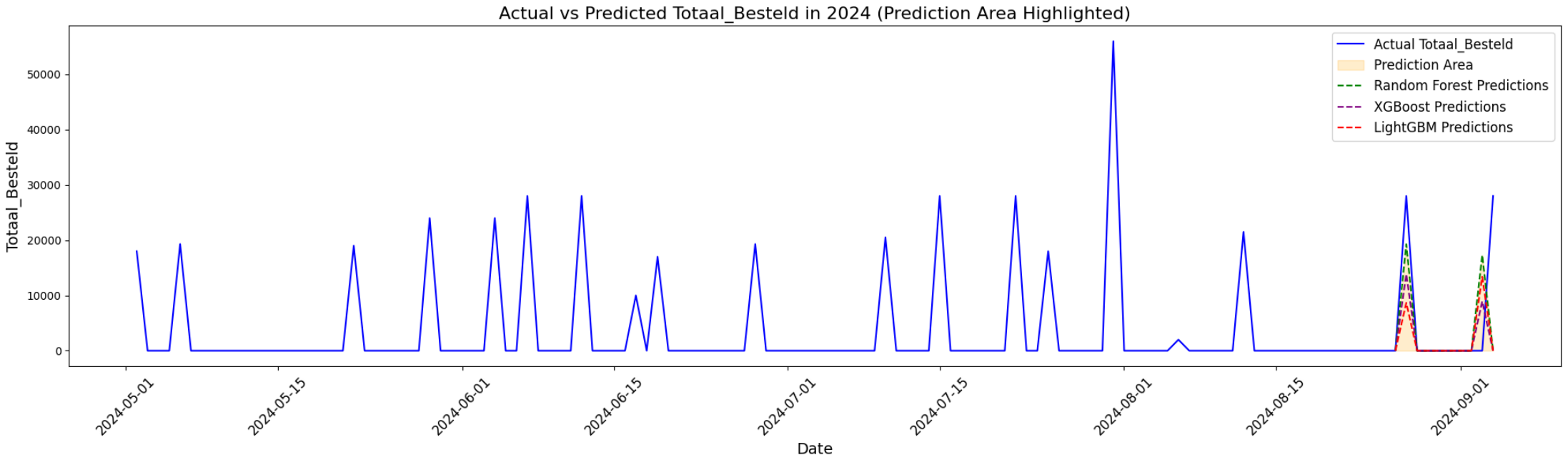
→ Can we predict the orders of the customer, ie "**Order forcasting**".

Two variables to be determined:

- WHEN will the farmer order
- HOW much will he order



Detailed Order forecasting



Results

“When” > accurate results on large parts of the test data

“**How Much**” > mixed results

More data & extensive fine-tuning of the forecast model would be required to incorporate forecasting in the business processes

Focus 2: Process Optimization for Pellet Quality

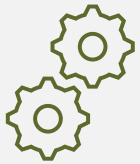
Business Challenge

What?

We want **to optimize the quality** of our animal feed pellets: consistent quality and reduce “safety margins”

Why?

- **Production Flexibility**: standardization across plants will allow production at different sites (without impacting the customer)
- **Decrease waste**
- **Best possible output at the lowest cost** for the customer by using less raw materials & applying less energy



How?

We want to have better insights into which (combination of) **process conditions & factors** lead to a good/optimal quality and which to a poorer one.

This will **help the operator** to intervene more quickly before and during the process so that the feed grain quality is as optimal as possible.

Data Approach

Iteration 1

Data Export & Preparation

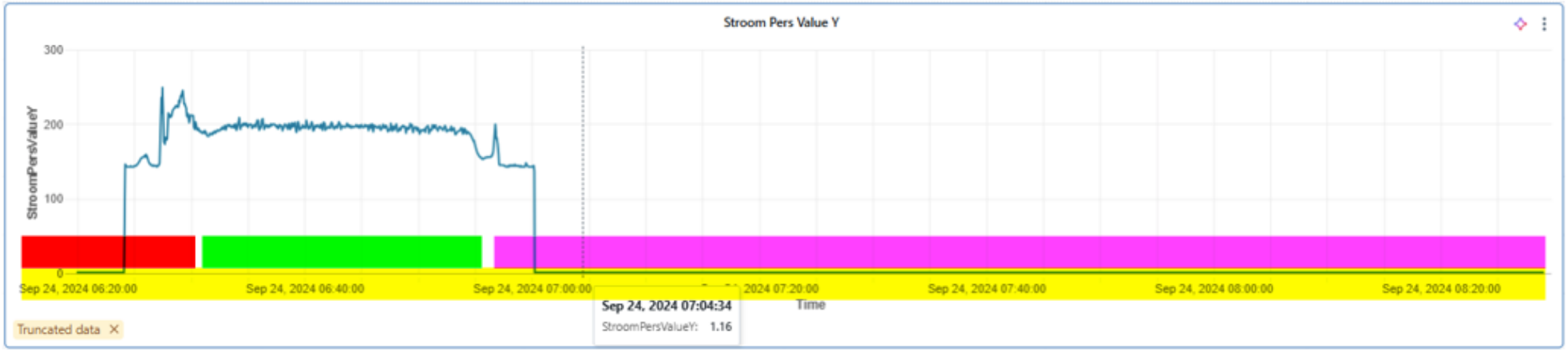
- Limited data sets as manual export (→ low cost)

- Prepare data quality for analysis
  - Harmonization
  - Cleaning
  - Completeness
  - ....

Data Approach

Iteration 1	Iteration 2
Data Export & Preparation	**Data Modelling & Base Exploration**

- Understand the process parameters (business language)
- Visualize > define steady state ranges > extract via Databricks Algorithms
  - StroomPersValueY_order_duration: 129
  - StroomPersValueY_steady_duration: 24
  - StroomPersValueY_start_to_steady_duration: 10
  - StroomPersValueY_steady_to_end_duration: 95

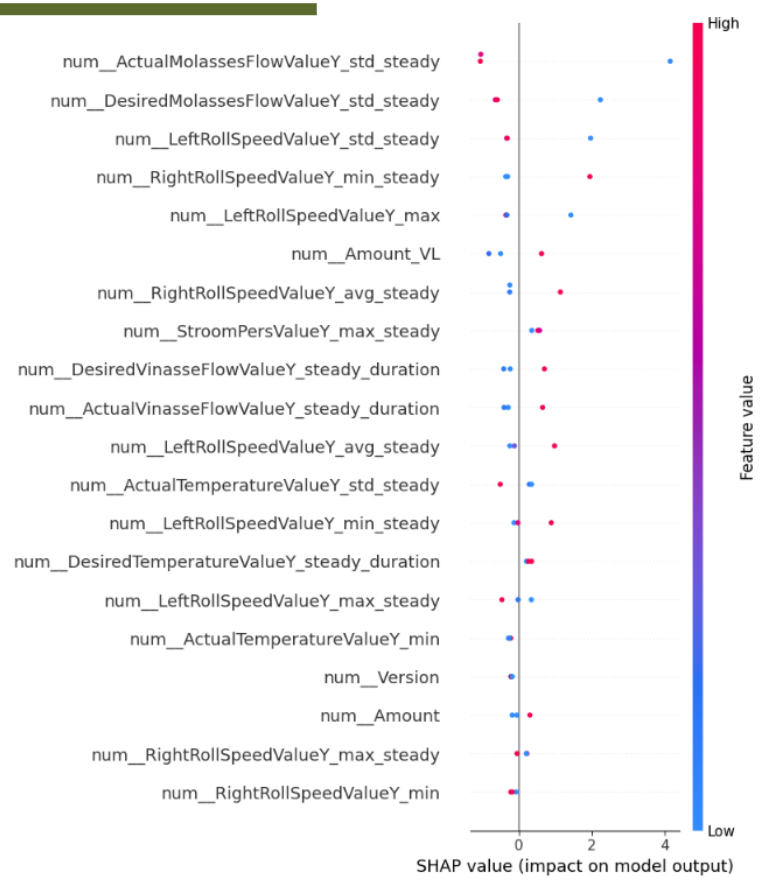


Data Approach

Iteration 1	Iteration 2	Iteration 3
Data Export & Preparation	Data Modelling & Base Exploration	**Data Advanced/Diagnostic Exploration**

- Investigating influence of parameters on quality
  - Using statistical analysis
  - Pattern matching

- Impact of different parameters can clearly be visualized and seen



Data Approach

Iteration 1	Iteration 2	Iteration 3	Iteration 4
Data Export & Preparation	Data Modelling & Base Exploration	Data Advanced/Diagnostic Exploration	**Use Case Validation & Delivery**

- Validate results
- Transpose Insights into Decision Taking Items (Presentation)

→ Arvesta Data Platform as central platform to combine data of our diverse OT systems is the factories

Conclusion

Overal Conclusions

The Arvesta Data Platform can enable data driven decision making in the Manufacturing domain

Our POC’s show the data gaps that need improvement before we can industrialize the solution

(Correct) Data leads to insights & value-adding actions

A data platform can enable & accelerate POC’s when used smartly

Questions ?