

SALES FORECAST 2024: PREDICTIVE MODELING FOR UNIEURO'S FULL PRODUCT PORTFOLIO



AN INTEGRATED ANALYTICS APPROACH TO SUPPORT
PRICING, PURCHASING, AND PROMOTION DECISIONS

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PRESENTED BY:

ANALaura Granata
Daniele Lupico
Gabriele Rizzo

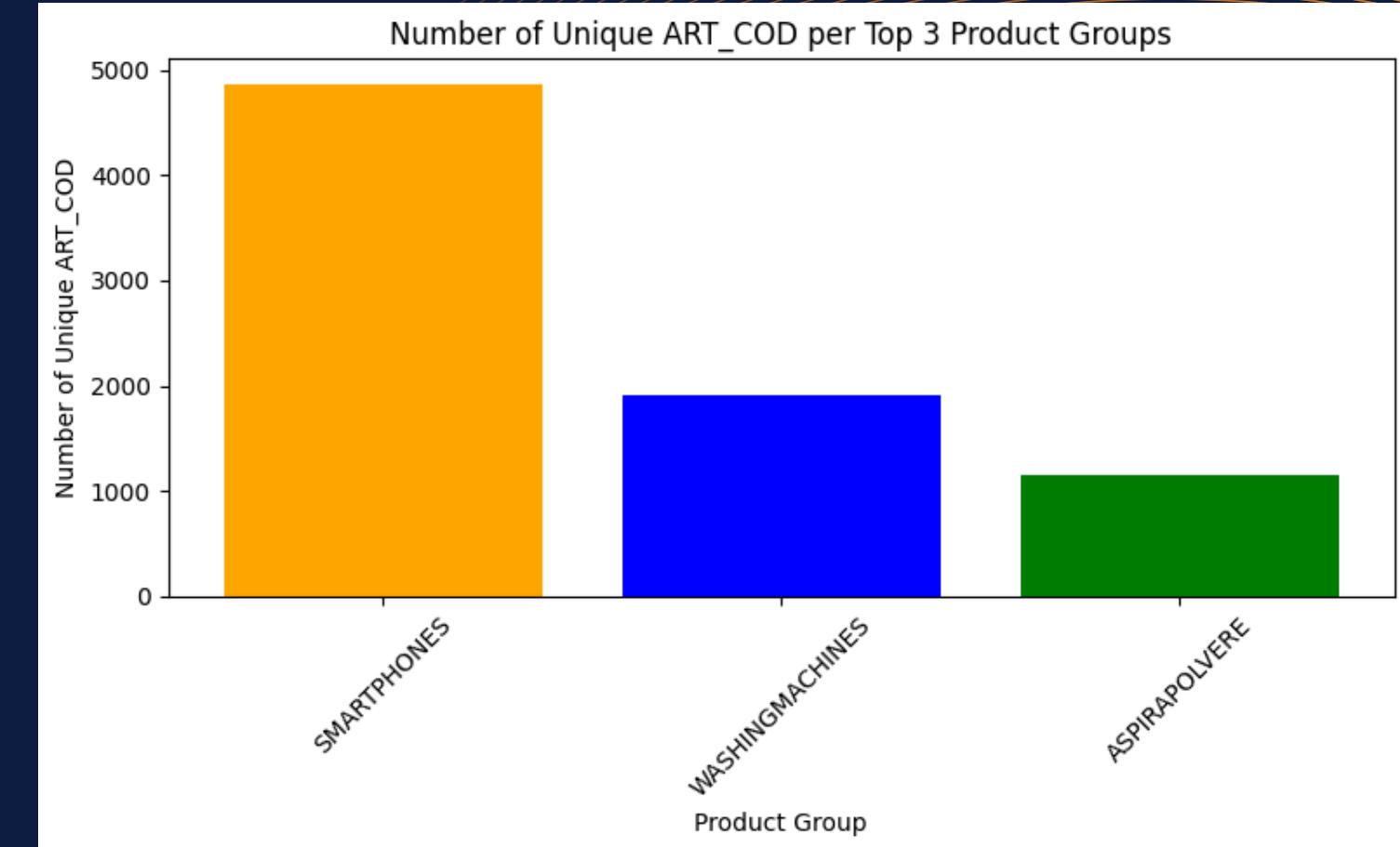
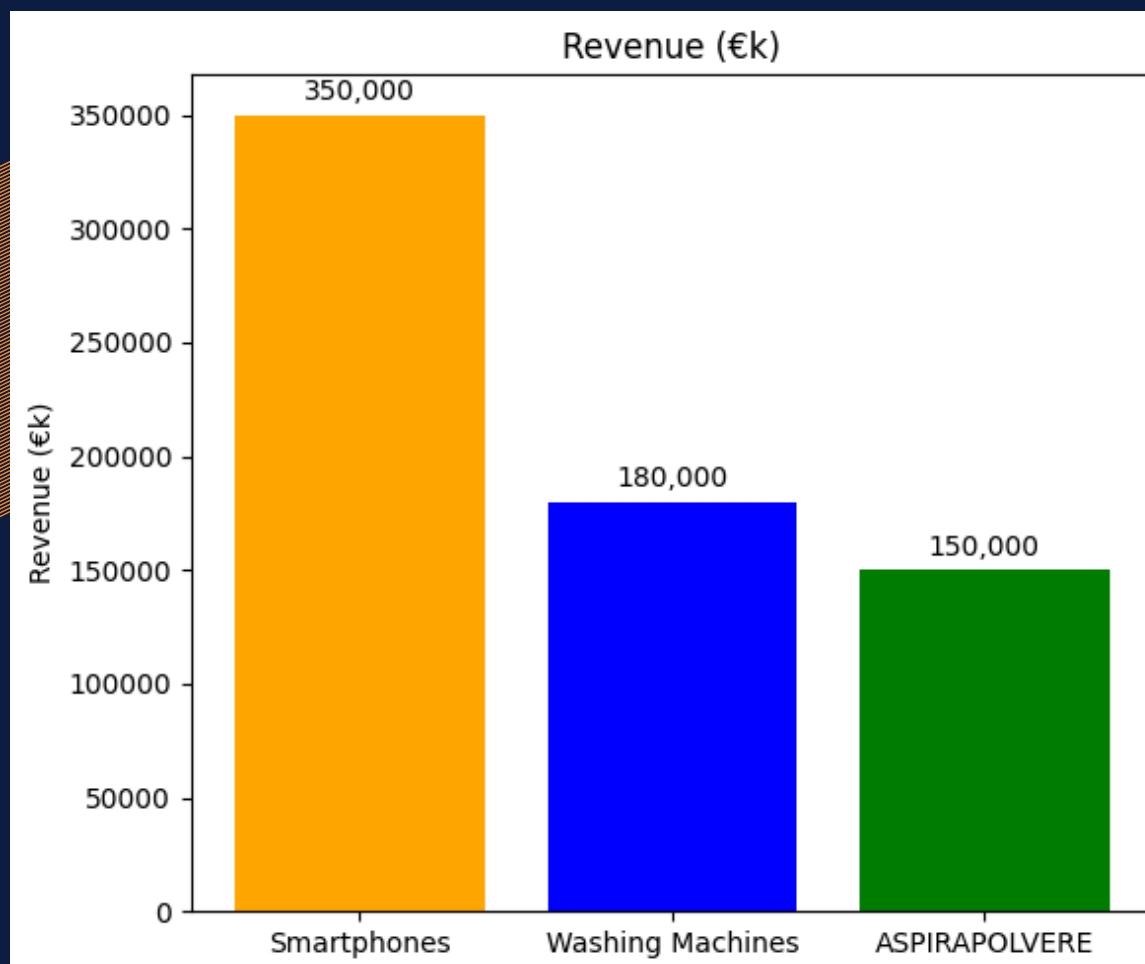
Business Context - Key Product Groups

Unieuro operates in the Italian consumer electronics market, characterized by:

- Fragmentation (tech superstores ~50% market share)
- Customer preference for proximity shopping, despite online growth (online penetration ~25% vs. mature markets >40%)

Three strategic Product Groups for Unieuro:

- Smartphones (Telecommunication)
- Washing Machines (Large Domestic Appliances)
- Vacuum Cleaners (Small Domestic Appliances)



Key figures (2017-2023):

- **Smartphones:**
 - ~ 4860 unique products
 - Highest sales volume among product groups
- **Washing Machines:**
 - - 1903 unique products
 - Stable revenue, with seasonal peaks (Black Friday, Christmas)
- **Vacuum Cleaners**
 - - 1157 unique products
 - Post-pandemic growth, increasing model variety

The Data Foundation - Building the Base

LEVERAGED
CORE
INTERNAL
DATASETS:

ANAGRAFICA_PRODOTTI

PRODUCT DETAILS &
HIERARCHY



INFORMAZIONI_BUSINESS

PRICING, PROMOTIONS,
GRID STATUS



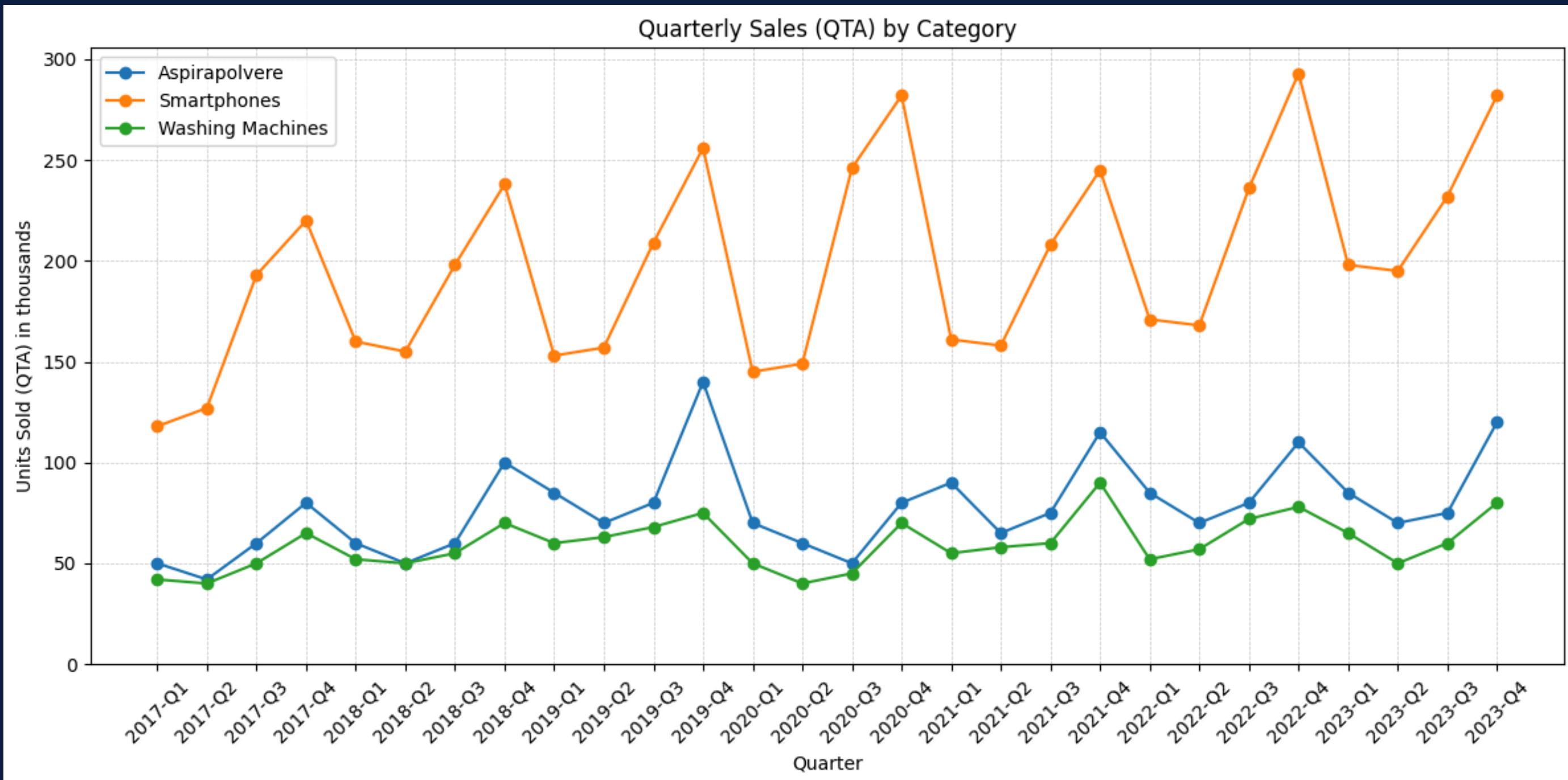
RISULTATI_ANNAMESE

HISTORICAL SALES AND
REVENUE

Key Data Challenges & Solutions:

- **Integrating Diverse Data:** Merging these datasets required careful handling of product codes (ART_COD, ITEM_ID) and time periods (ANNAMESE) to create a unified view.
- **Handling Missing Information:** Significant gaps existed, particularly in historical pricing (PREZZO_LISTINO_MEDIO) and promotional grid details (GRIGLIA_DAYS, STATO_GRIGLIA). We addressed this by intelligently filling gaps using safe techniques.
- **Data Quality:** Identified and removed duplicate entries arising during merges to ensure data integrity.

HERE IS WHAT WE UNDERSTOOD AFTER THE CLEANING PHASE



TEMPORAL TRENDS:

- BLACK FRIDAY
- CHRISTMAS

SAME PICKS
BUT DIFFERENT
MAGNITUDE

PANDEMIC-RELATED
GROWTH

OUR APPROACH - FROM SIMPLE BASELINES TO ADVANCED MODELS

- **Target:** Predict units sold (QTA) per product during 2024.
- **Benchmarks:** Established simple baselines (e.g., weighted avg, Holt-Winters) for comparison.
- **Feature Engineering**
 - Created richer features beyond raw historical data:
 - Recent performance & trends indicators.
 - Product lifecycle tracking (time since launch).
 - Price Ratio.
 - Seasonality (monthly, Q3/Q4 importance).
 - Promotional activity (flyers).
- **Modeling Journey:** Shifted from Time Series to Machine Learning (primarily XGBoost, briefly LightGBM) to leverage engineered features. Iteratively improving feature weighting, emphasizing recent year and Q3-Q4.
- **Training, validating and testing:** Rigorously tested by training on data up to 2022, validating 2023 and forecasting 2024.

HISTORICAL SALES DATA
(2017-2023)

SIMPLE BENCHMARKS
(PREDICT 2023 BASED
ON PAST)

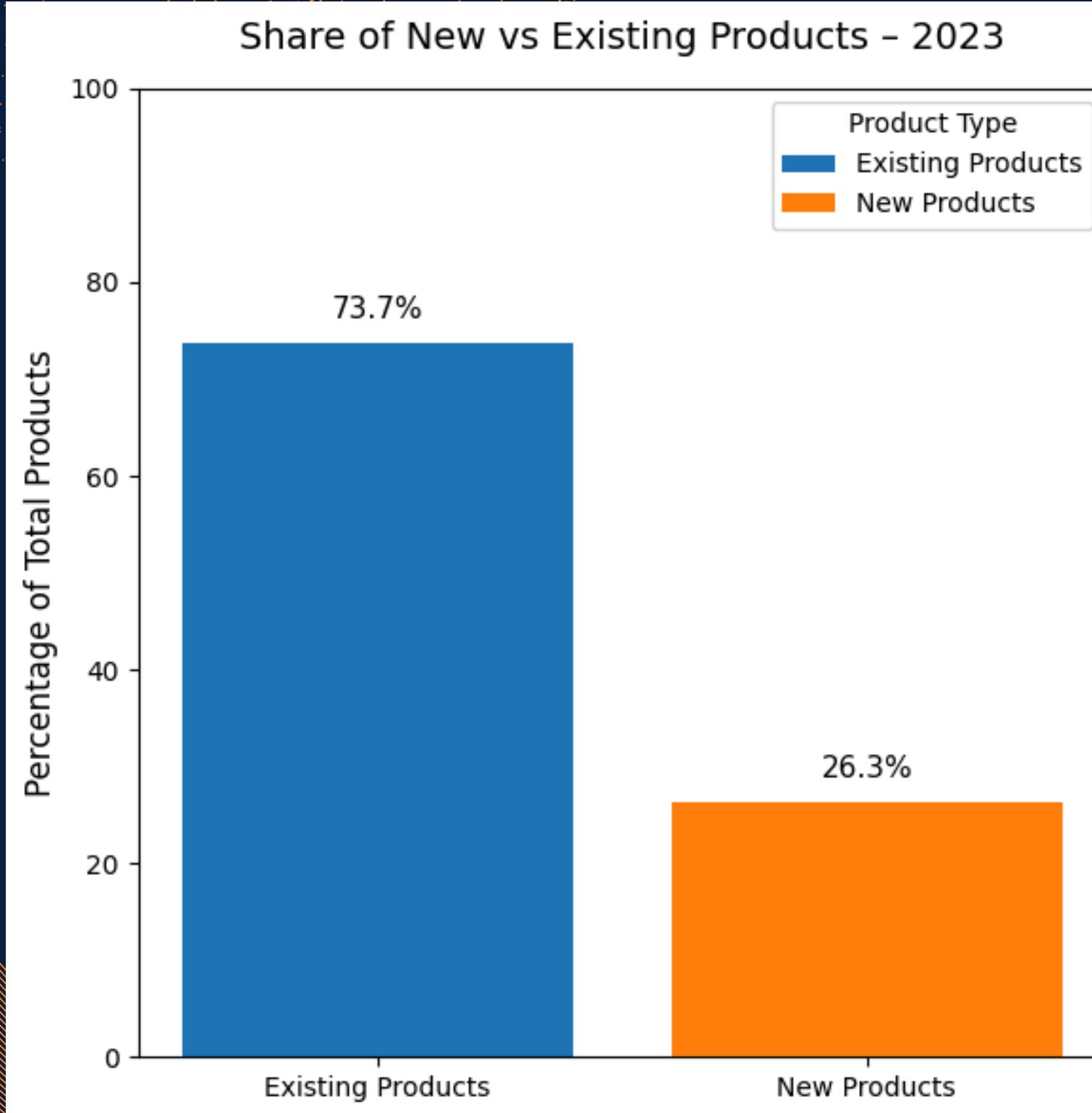
FEATURE ENGINEERING
(LAGS, TRENDS, PRICE
RATIOS, SEASONALITY)

MACHINE LEARNING
(XGBOOST)

HANDLES COMPLEX
RELATIONSHIPS,
INCORPORATES MORE
DRIVERS

IMPROVED 2024
FORECAST

ADDRESSING CHALLENGES & THE 2024 FORECAST STRATEGY

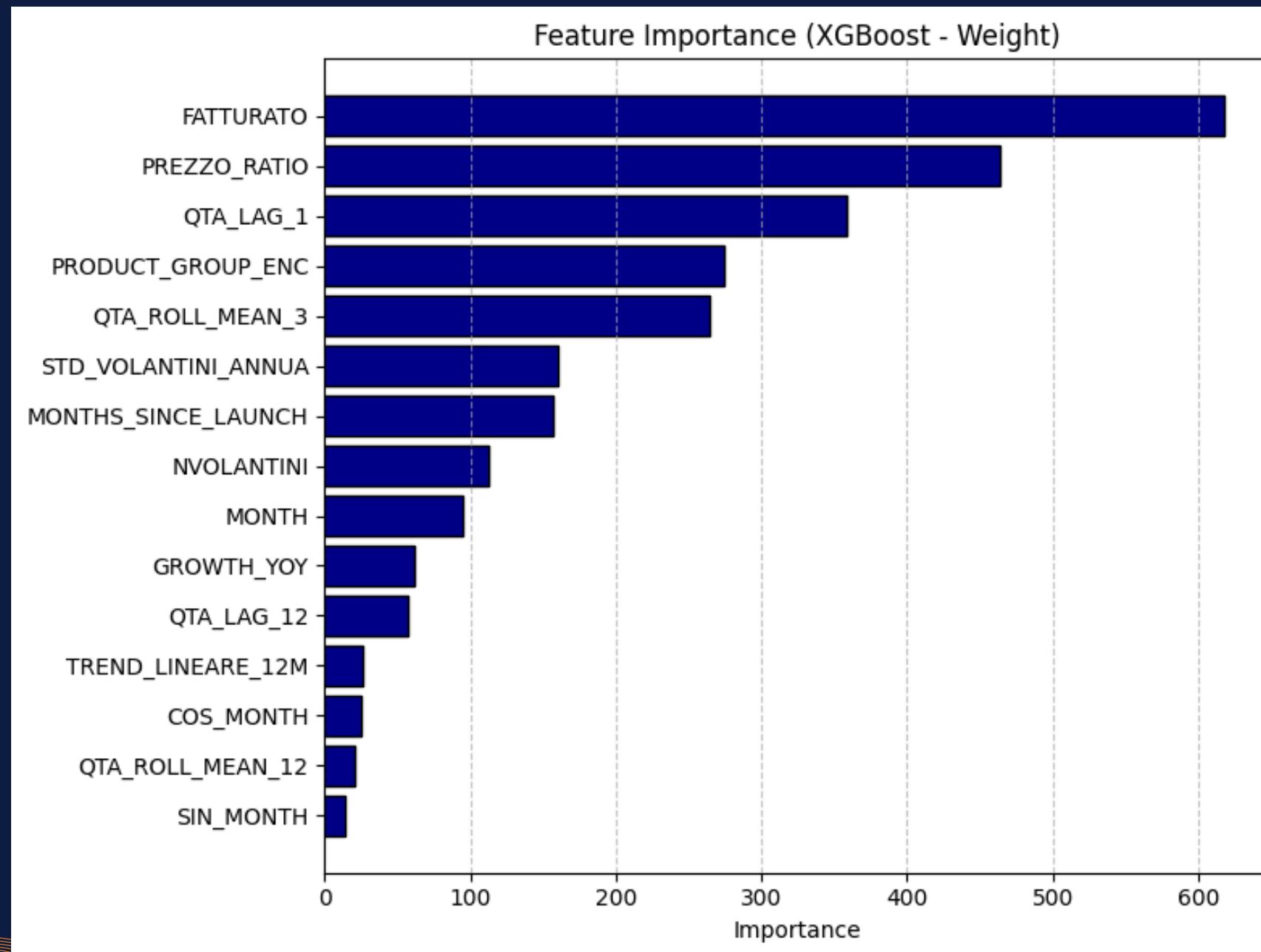


The New Product Challenge: We discovered ~26% of products sold in 2023 were actually new that year. Forecasting these items with no history is inherently difficult.

Dual Forecasting Strategy for 2024:

- Existing Products: Apply the refined XGBoost model.
- New Products: Simpler approach with Uplift model.

CORE RESULTS - OUR 2024 FORECAST



Significant Improvement (for products with history):

Our final Hybrid model achieved an RMSE of 977,69.

This indicates a discreet ability to predict established product performance.

Key Drivers Identified

The model confirmed the importance of:

- Product's own sales history (FATTURATO, QTA - caution needed here).
- Product maturity (MONTHS_SINCE_LAUNCH).
- Pricing relative to list (PREZZO_RATIO).
- Promotional activity (NVOLANTINI).
- Product category (PRODUCT_GROUP_ENC).

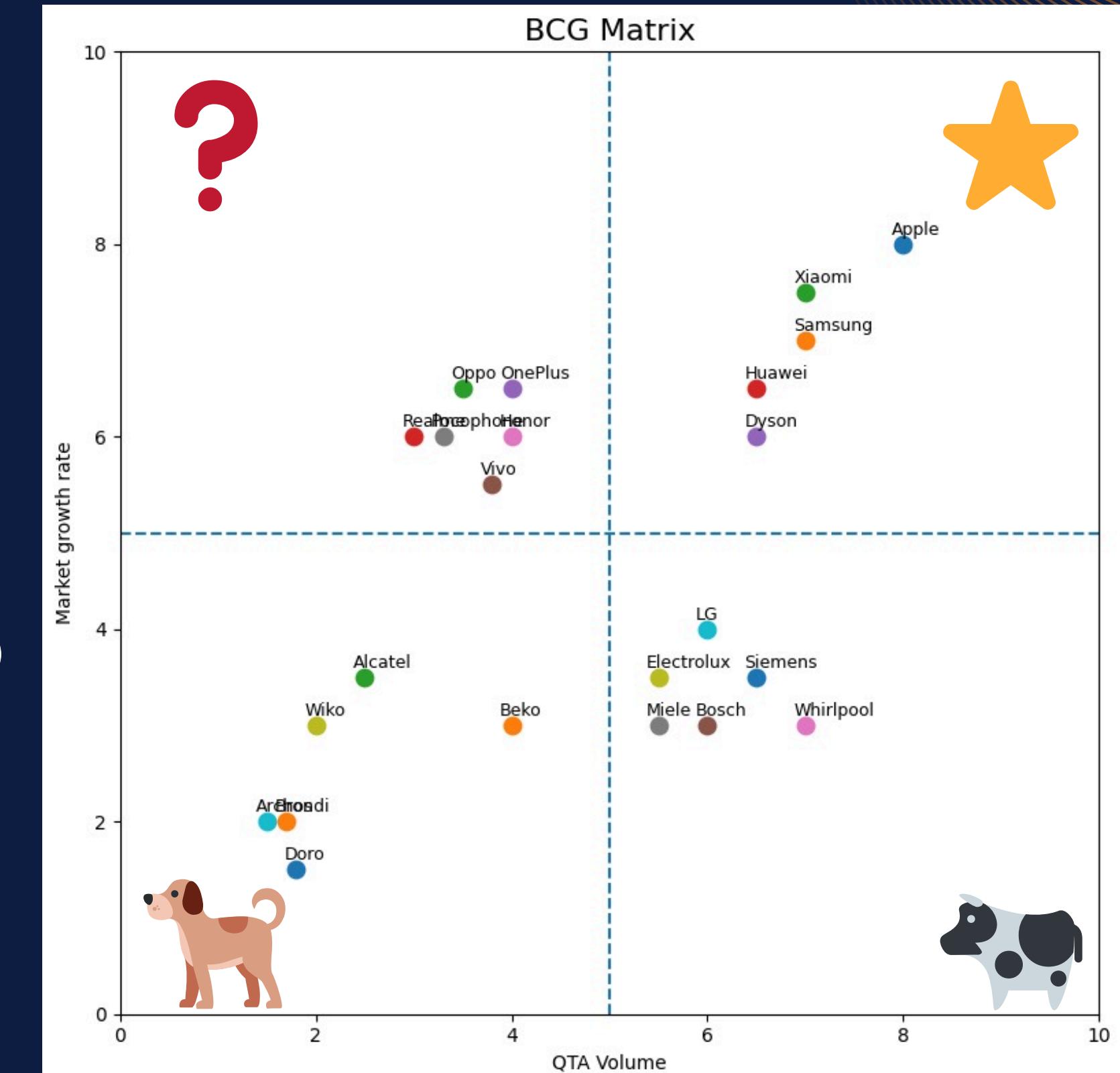
BUSINESS APPLICATIONS & STRATEGIC INSIGHTS

Strategic Planning & Pricing → BCG MATRIX

IDEA: classify brands based on forecast growth & volume.

Identify potential 2024 growth drivers vs. underperformers.

Inventory Optimization: More reliable forecasts (especially for established products) enable better stock allocation, reducing both overstocking and costly out-of-stocks (potential losses of customers), particularly in peak Q3/Q4.



CONCLUSION & NEXT STEPS

Improving the model in order to achieve greater efficiency, which we consider the key to a good forecast that can help with decision-making processes at multiple levels (marketing, sales, inventory optimisation...)



Segmenting the BCG matrix no longer by BRAND but by individual ART_COD.

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