# Clustering Customers and Products for Bartex-pol

Bartłomiej Ramotowski

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# About Bartex-Pol:

## OVERVIEW

- Bartex-Pol is a regional distributor of office supplies
- Operates across several regions, serving both business and individual customers
- Product range includes office supplies, technology and furniture.

## BUSINESS CHALLENGE

- Manages a large number of products and customer accounts
- Lacks clear visibility into which customers and products are most profitable
- Decision-making currently relies on basic sales totals and intuition

# Project Goal & Deliverable

## PROJECT OBJECTIVE:

Apply clustering techniques to segment the portfolio and uncover hidden patterns that can inform strategic actions.

## THE ANALYSIS AIMS TO

- Identify high-value customer segments based on sales behavior and profitability
- Detect profitable and underperforming product groups
- Enable targeted strategies across marketing, pricing, and inventory planning

## DELIVERABLE

A clustering-based segmentation model supported by actionable business recommendations

# Dataset & Approach

## DATA:

- Transactional data from the Superstore dataset
- Includes: customer ID, product info, sales, profit, quantity, discount, shipping cost, category, segment
- Preparation: aggregation, normalization, one-hot encoding

## APPROACH:

- Applied K-Means clustering separately to:
  - Customer-level features (sales, profit, quantity, segment, etc.)
  - Product-level metrics (profit, sales, margin, category, etc.)
- Visualized clusters using pairplots and performance summaries

# Unsupervised Learning – Clustering

There was no pre-existing target variable
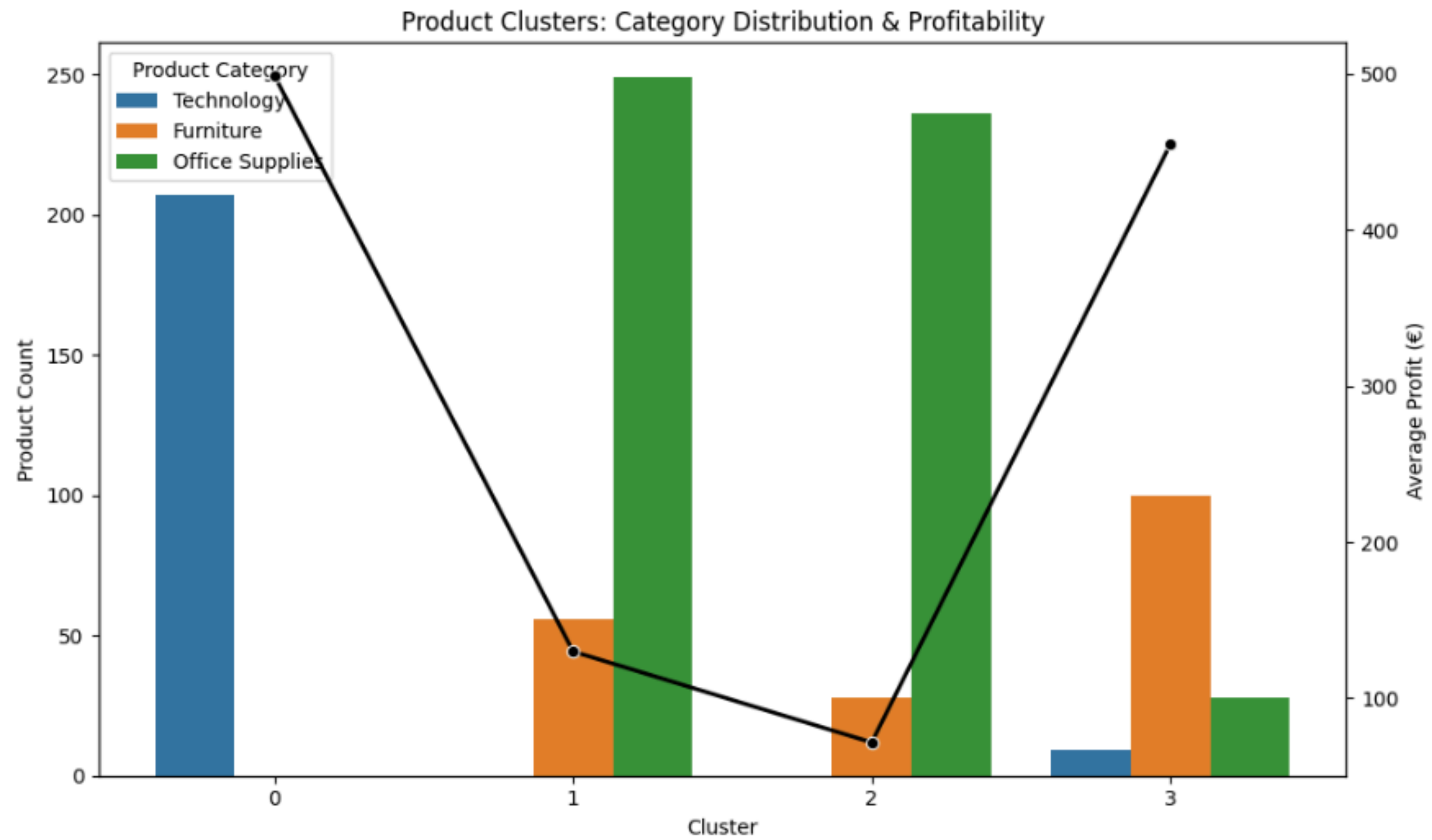(e.g., no "label" for profitability class)

## CLUSTERING

- Identifies natural groupings in data
- Allows for segment-specific strategies:
    - High-value vs. low-value customers
    - High-profit vs. low-performance products

# Product Clustering



Product Clusters: Category Distribution & Profitability

# Product Clustering

| Cluster | Products Profile | Avg Profit (€) | Interpretation & Strategy |
|:---:|:---|:---:|:---|
| **0** | Mostly Technology | €500 | Top-performing group — promote, prioritize inventory |
| **1** | Mostly Office Supplies + Furniture | €130 | High volume, low margin — use bundling or discounts |
| **2** | Mostly Office Supplies | €70 | Review – potential for phase-out or cost control |
| **3** | Mixed: Furniture-heavy | €450 | Premium niche – retain, but manage inventory carefully |

# Customer Clustering



Customer Clusters: Segment Distribution & Profitability
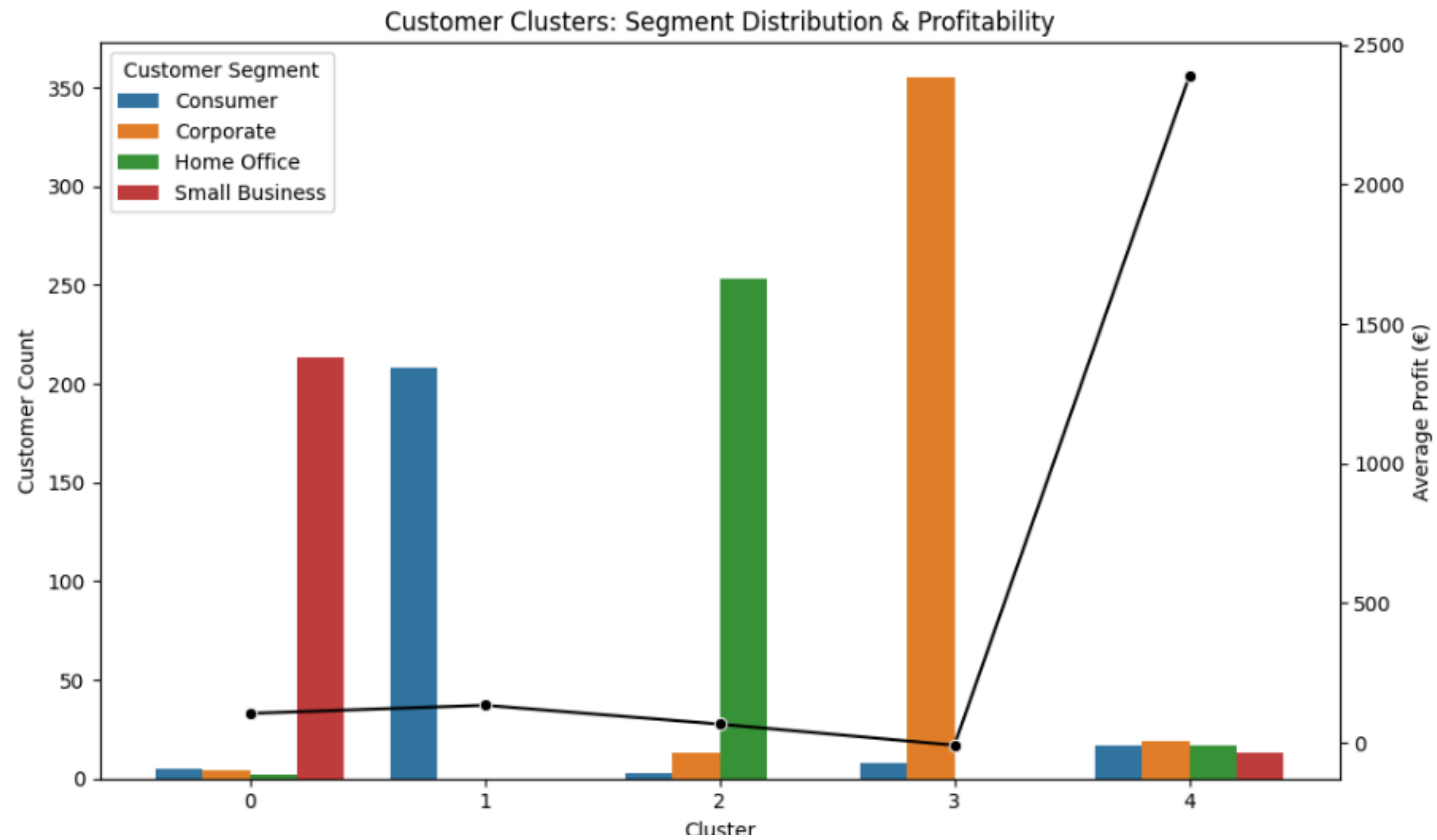
# Product Clustering

| Cluster | Customer Profile | Avg Profit (€) | Strategy Recommendation |
|---|---|---|---|
| 0 | Small Business – moderate spenders | 105 | Retain with automated engagement and cost-efficient support |
| 1 | Consumer – lower quantity, average profit | 134 | Target with light personalization or basic loyalty incentives |
| 2 | Home Office – high unit price, low profit | 67 | Explore upselling or adjust pricing to lift margin |
| 3 | Corporate – decent sales, negative profit | –8 | Investigate loss drivers (shipping, discounting, returns) |
| 4 | High-volume, premium customers (mixed segment) | 2387 | Prioritize with loyalty programs, premium service, and CRM focus |

# Strategic Recommendations – So What?

## PRODUCTS

- Promote high-margin product clusters (e.g., technology)
- Use bundling or volume discounts for low-margin, high-volume items
- Consider phasing out underperforming products

## CUSTOMERS

- Focus on high-value clusters (high sales, high profit)
- Automate engagement for low-margin or low-activity groups
- Investigate and address unprofitable segments

# Project Summary – What Was Done

## SCOPE OF WORK

- Collected and prepared transactional data from the Superstore dataset
- Applied K–Means clustering to customer– and product–level features
- Created segment profiles based on sales, profit, quantity, and margin
- Visualized and analyzed clusters for insights

## KEY DELIVERABLES

- Cleaned, aggregated, and enriched data
- Cluster summary tables for customers and products
- Visual breakdowns by segment and category
- Strategic recommendations for each cluster group

# Thank you!