Take-Home Assignment

AI & Data Scientist – F. Schumacher & Co.

Background

F. Schumacher & Co. is a leader in luxury home furnishings, with a strong focus on craftsmanship, design, and customer experience. As part of our data and digital personalization strategy, we are exploring ways to better leverage customer, product, and transactional data to drive more relevant personalization, improve product recommendations, and support revenue growth.

This take-home assignment is designed to assess your **analytical thinking**, **business understanding**, and **ability to structure data-driven solutions**, rather than to test any specific tools or technologies.

Objective

Using the provided datasets, you are asked to:

1. Explore and analyze customer behavior across sales and sample activity
2. Identify meaningful customer insights and opportunities for personalization
3. Propose data-driven approaches for customer segmentation and product recommendations
4. Clearly articulate how your proposed solutions could deliver measurable business impact

You are **not expected to build production-ready models**. Simplicity, clarity, and sound reasoning are preferred over complexity.

Time Expectation

- The assignment is designed to require **no more than one working day**.
- You will have **one week** from receipt of the assignment to submit your work.

Deliverables

Required

- A **presentation deck (6–10 slides maximum)** intended for a mixed audience of data, product, and business stakeholders.
    - The deck should clearly explain: Your approach, Key insights, Recommendations, Business implications

Optional

- Code, notebooks, or additional analyses may be included as an appendix or shared separately if you wish. These are **not mandatory** and will not be evaluated independently of your presentation.

Business Questions

You are free to structure your work as you see fit, but your analysis should aim to address the following high-level questions:

1. Customer & Process Understanding & Segmentation

- How would you segment customers based on their behavior, preferences and value?
- What are the defining characteristics of each segment? How could these segments be used to support personalization, marketing, or commercial decision-making?
- What is the average Sample Conversion to Product Sales? What are the possible definitions and what are important dimensions to assess?

2. Product Affinity & Recommendations

- Based on customer interactions with products (sampling and purchasing), how would you approach product recommendations?
- What types of recommendation logic or models would be most appropriate given the data?
- How could sampling behavior be used as a signal of customer intent?

3. Measurement & Business Impact

- How would you measure the success of personalization or recommendation initiatives?
- What KPIs would you track?
- How would you test, iterate, and improve these solutions over time?

Optional (Stretch)

- How could AI or Generative AI techniques enhance personalization or product understanding using this data?

Data Dictionary

You are provided with three datasets representing **customer transactions (sales and samples)**, **product attributes**, and **customer (trade account) information**.

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1. Transactions Table (Sales & Samples)

This table contains all customer–product interactions, including **sales transactions** and **sample requests**.
Both transaction types are stored in the same table and can be distinguished using the type column.

Column Name	Description
id	Unique identifier of the transaction record
order_id	Order identifier (may be shared across multiple items)
trade_account_id	Unique identifier of the customer or trade account
item_number	Unique identifier of the product
shipped_dt	Date the item or sample was shipped
origin	Origin of the transaction (e.g. External = Web, Internal = Sales Representatives, Showroom)
type	Transaction type (e.g. SALE, SAMPLE)
netrevenue	Net revenue generated by the transaction (typically populated for sales; 0 or NULL for samples)
quantity	Quantity sold or number of samples requested

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2. Product Master Table

This table contains descriptive attributes for each product.

Column Name	Description
item_number	Unique identifier of the product
price_usd	Product list price in USD
arrival_date	Date the product became available
category_name	High-level product category
color_name	Specific product color
classification	Product classification
subclass	More granular product grouping
scale	Pattern or design scale
color_family	Color family (e.g. Blue, Neutral, Warm)
motif	Pattern motif or design theme

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3. Trade Account (Customer) Table

This table contains information about customers or trade accounts.

Column Name	Description
trade_account_id	Unique identifier of the trade account
business_type	Type of business (e.g. Designer, Architect, Retailer)
created_at	Date the trade account was created
Region	Geographic region of the account