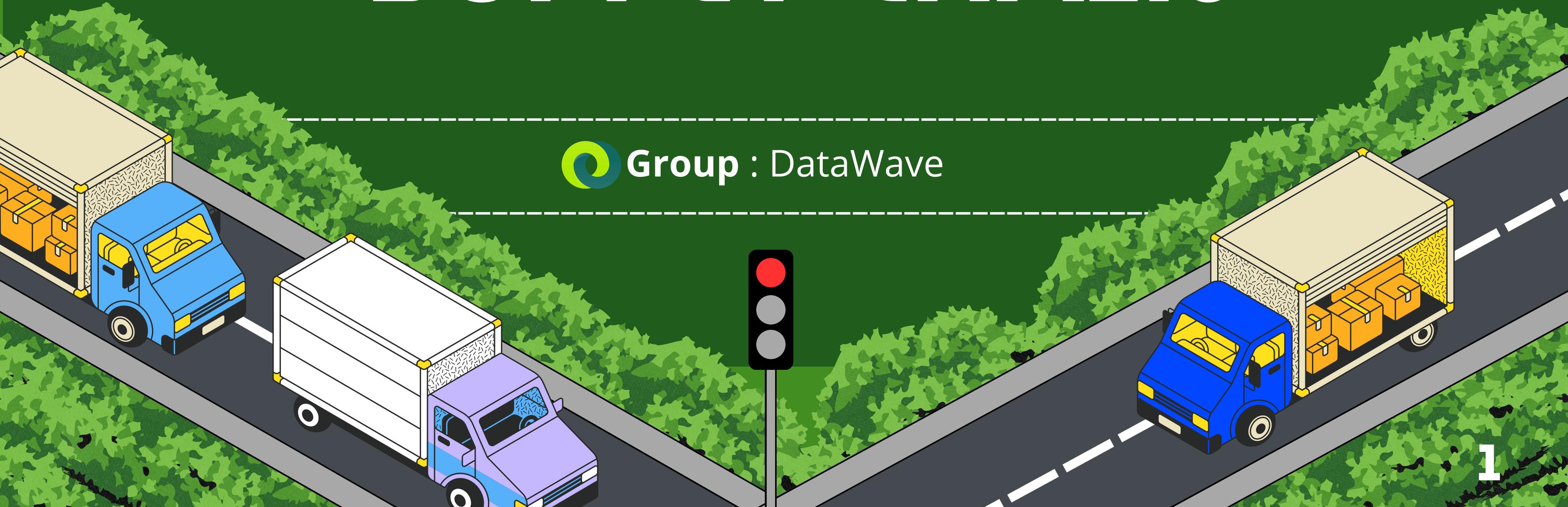


COSMETIC SUPPLY CHAIN

 Group : DataWave



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01 Introduction

- Overview of the project and its business impact
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- Business and technical objectives
- Benefits

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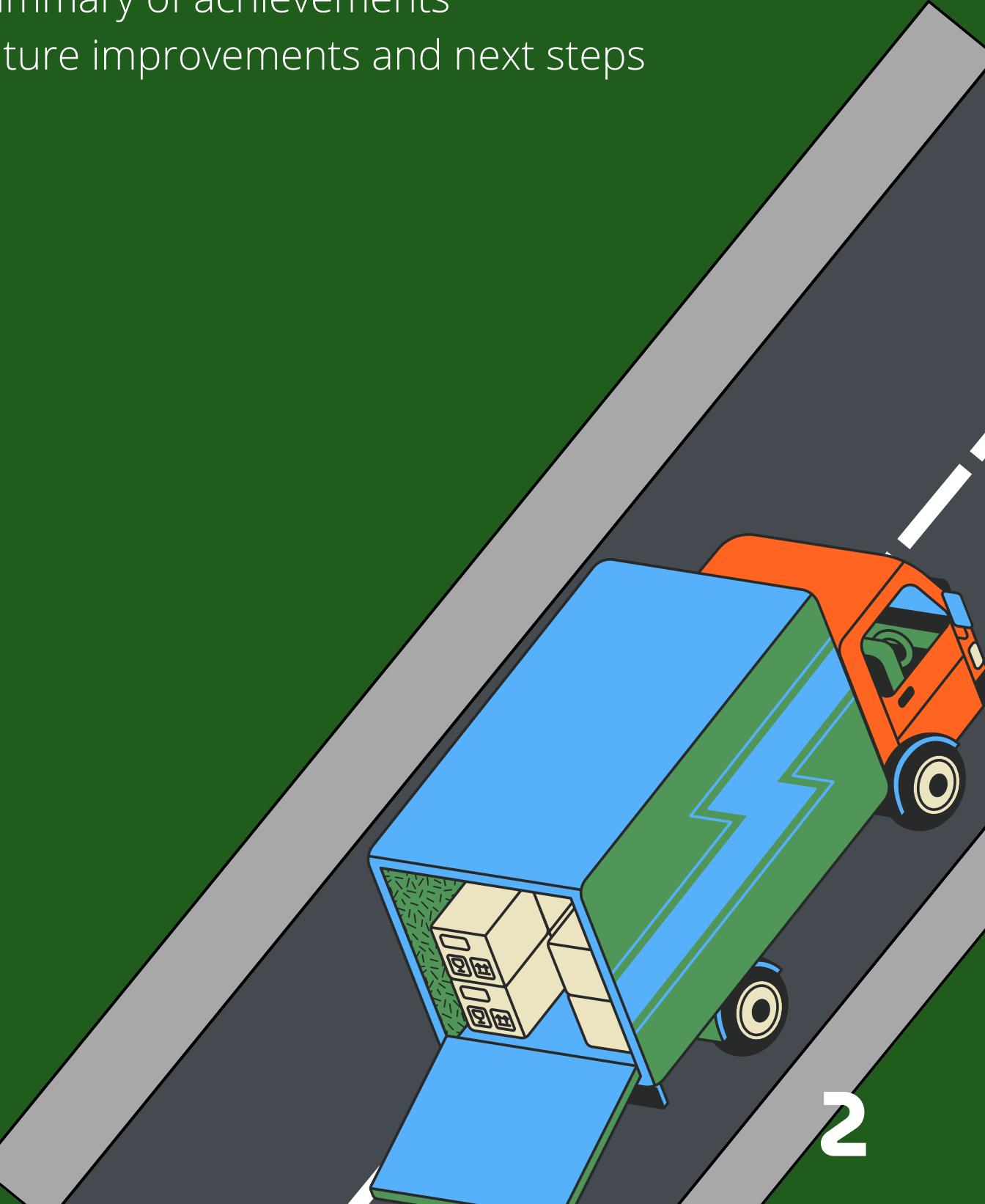
- Identified data sources (internal & external)
- Data collection methods
- Data quality assessment
- Key insights derived from the data

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- Overview of the BI architecture (Data Flow Diagram)
- Staging area setup and data processing workflow
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- Summary of achievements
- Future improvements and next steps



TEAM MEMBERS



Mohamed Oussama Ayadi



Aziza Kallel



Dina Gharbi



Bilel Dabbech



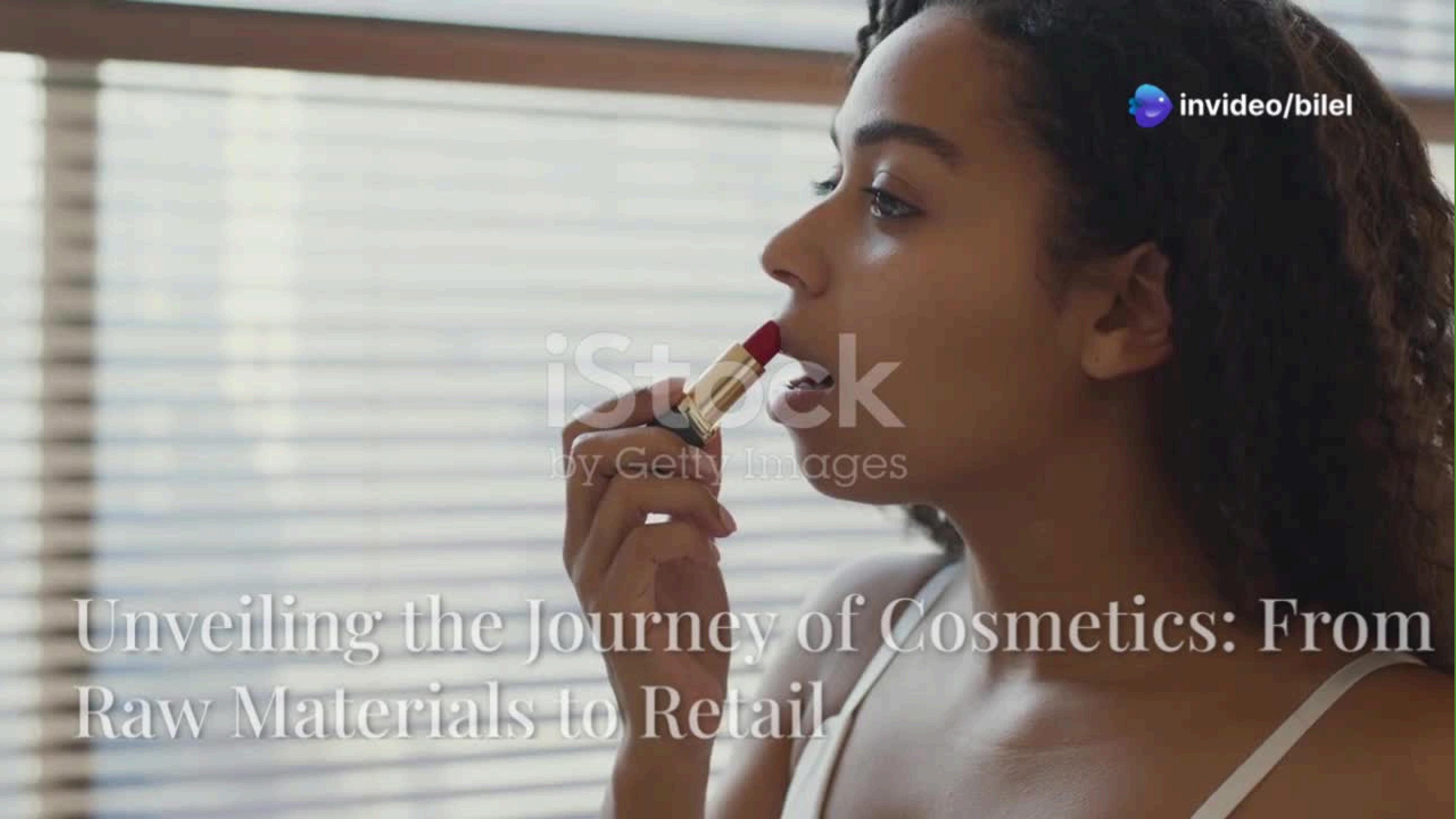
Mariem Boudhina



Malika Gharbi

INTRODUCTION



A close-up photograph of a woman's face in profile, facing right. She has dark hair pulled back and is applying red lipstick to her lips with a gold-colored tube. Her eyes are closed, and she appears to be in a relaxed setting with a window showing a blurred view in the background.

istock
by Getty Images

Unveiling the Journey of Cosmetics: From Raw Materials to Retail

Cosmetic Supply Chain Overview

The cosmetic supply chain is a multi-stage system involving raw material sourcing, manufacturing, distribution, and retail. Due to the fast-evolving beauty industry, companies must maintain agile and efficient operations to meet changing demands.



Key obstacles in the cosmetic supply chain

- **Demand variability:** Trends in cosmetics change rapidly, making it difficult to predict sales accurately
- **Inventory management issues:** Overstocking leads to high holding costs, while stockouts result in lost sales and customer dissatisfaction.
- **Lack of real-time visibility:** Without up-to-date data, decisions are made based on past information instead of current situations.



OVERVIEW OF THE PROJECT AND ITS BUSINESS IMPACT



Optimizing the cosmetic supply chain boosts efficiency, reduces costs, and enhances customer satisfaction by ensuring smoother operations and timely deliveries.

Leveraging BI and AI provides real-time insights into inventory, sales trends, and customer preferences, enabling quicker, more adaptable decisions and reducing stock issues.

KEY BUSINESS CHALLENGES ADDRESSED

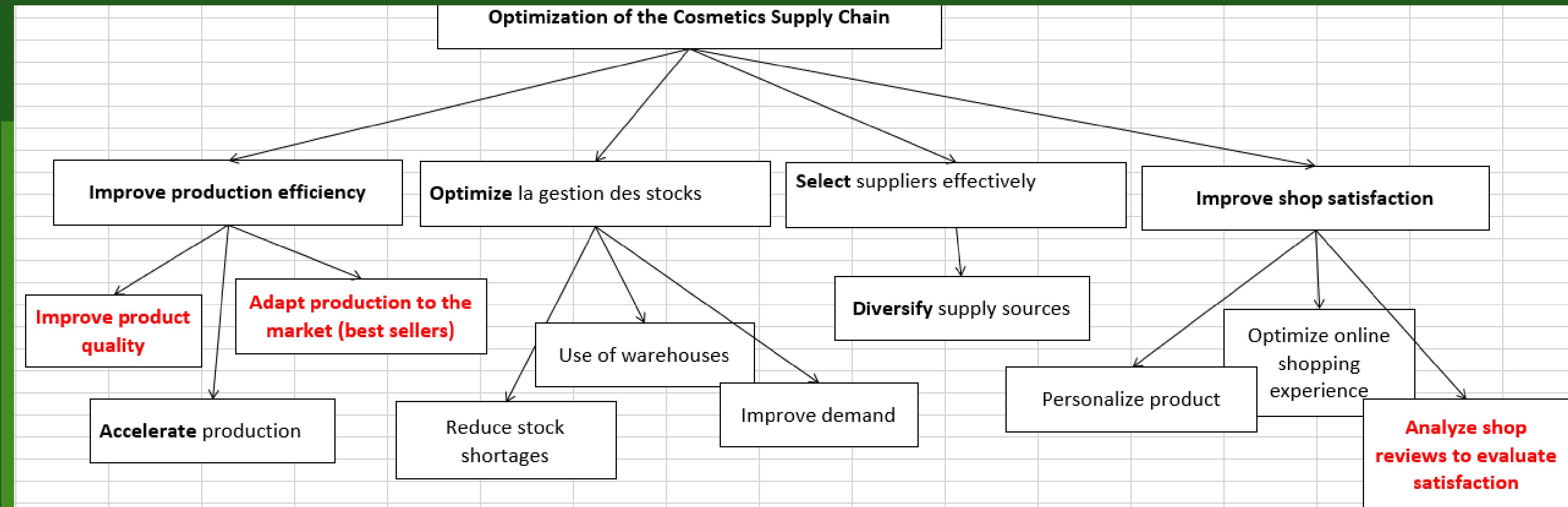
- **Lack of visibility into inventory and demand:** Difficulty in predicting product demand leads to inefficiencies in stock management.
- **Slow decision-making processes:** Companies struggle to react to market changes due to fragmented data.
- **Inconsistent customer experience:** A lack of real-time feedback analysis affects product development and marketing strategies.

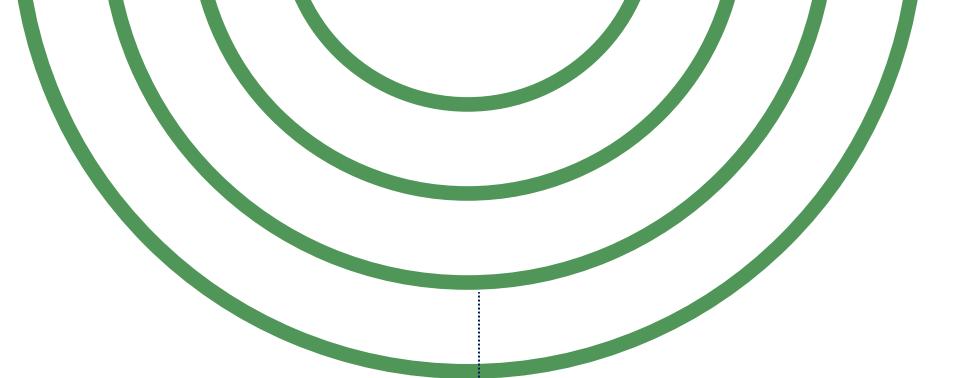




BUSINESS & TECHNICAL OBJECTIVES

EQUivalence TREE:





BUSINESS OBJECTIVES:

- **REDUCE SUPPLY CHAIN COSTS BY OPTIMIZING STOCK LEVELS.**
- **IMPROVE PRODUCT AVAILABILITY TO ENHANCE CUSTOMER SATISFACTION.**
- **INCREASE REVENUE THROUGH BETTER MARKET ALIGNMENT AND DEMAND FORECASTING.**

TECHNICAL OBJECTIVES:

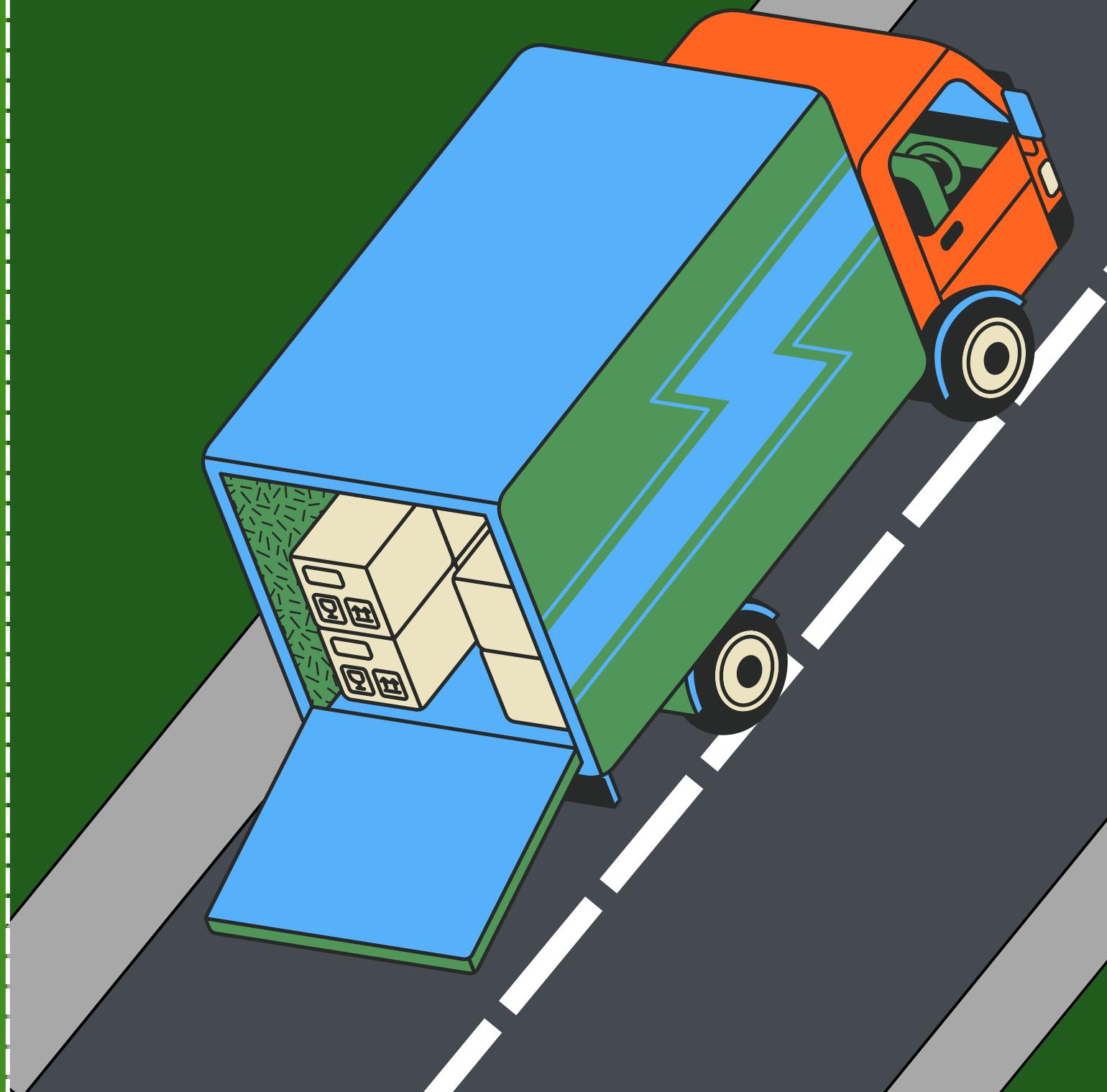
- **DEVELOP A CENTRALIZED BI SYSTEM FOR REAL-TIME DATA ANALYSIS.**
- **IMPLEMENT AI-DRIVEN MODELS FOR DEMAND FORECASTING AND CUSTOMER FEEDBACK ANALYSIS.**
- **AUTOMATE DATA PROCESSING TO ENSURE ACCURACY AND EFFICIENCY.**



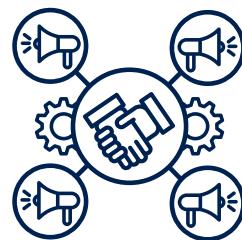
EXPECTED BENEFITS FOR THE COMPANY:

- Higher profitability through cost reduction and sales optimization.
- Increased agility in responding to market trends.
- Improved operational efficiency with automated data workflows.
- Enhanced competitiveness through better decision-making.

DATA COLLECTION & QUALITY



Data Sources (Internal)



1

Excel Files

- **Cosmetic Products:** Product details, base materials, and dosage.
- **Inventory:** Warehouse locations & stock levels.
- **Production Dates:** Manufacturing timelines.
- **Materials & Units:** Base material categories & measurements.

2

JSON Files

- **Products:** Pricing, expiration, and base materials.
- **Orders:** Order details, shop info & shipping.

3

PDF Files

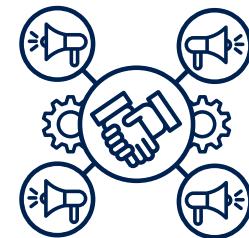
facture: Billing details, products, and total amounts.

4

.BAK Files

- **Warehouses:** Locations & capacities.
- **Suppliers & Shops:** Contact & location info.

Data Sources (External)



📁 web scrapping

- **Sephora comments and Sheglam comments**: Understanding Customer Preferences
- **supplier Information**: Choosing the Right Suppliers

📁 Kaggle

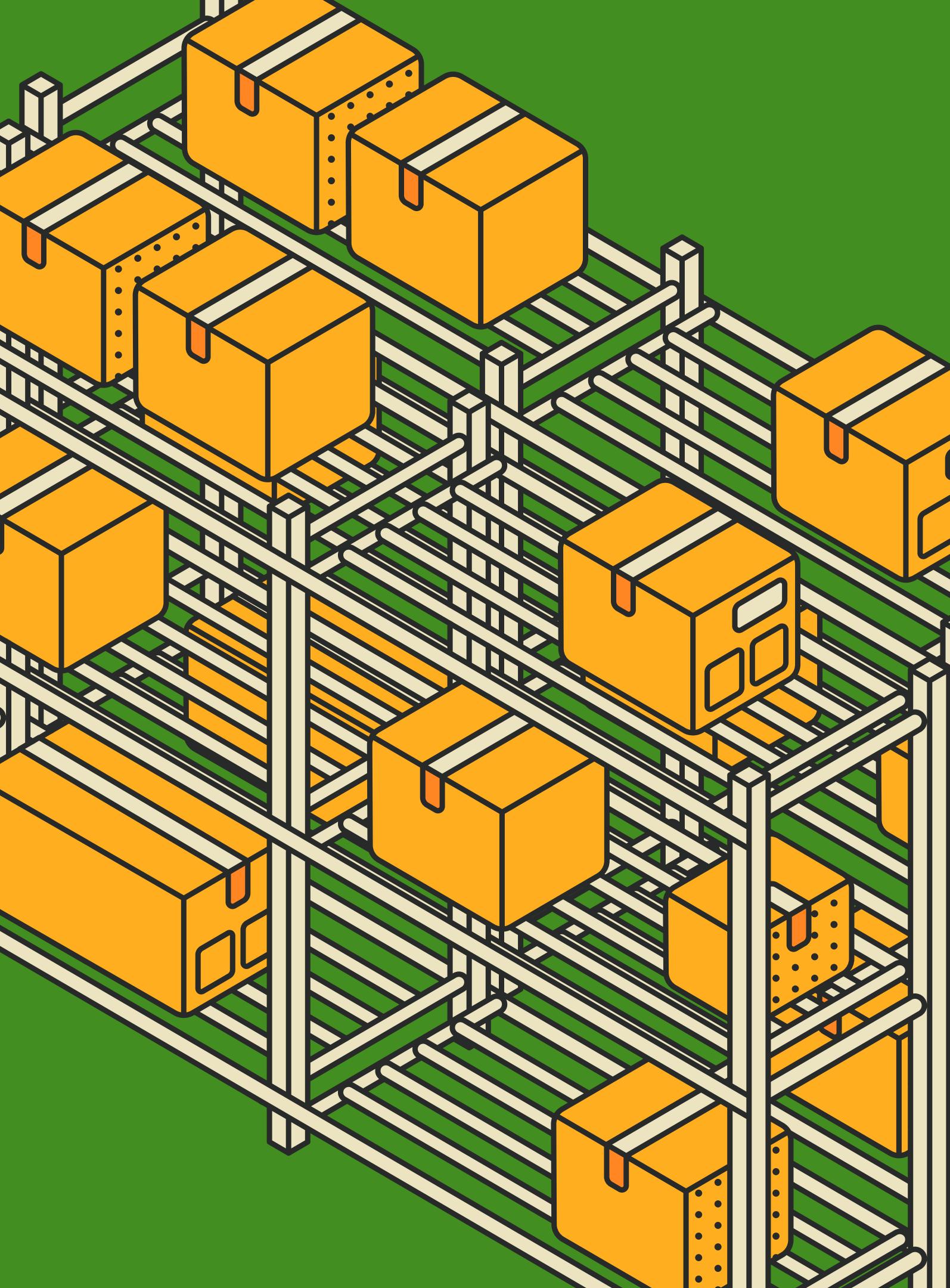
- **Top brands Cosmetic**: Improving Pricing and Marketing
- **most_used_beauty_product_extend**: Better Inventory and Production Planning



DATA COLLECTION METHODS

- **Internal Data:** Utilizing our already existing internal dataset.
- **Web Scraping :** Using BeautifulSoup and Selenium to extract market trends & customer reviews.
- **Kaggle Data :** Utilizing existing datasets for analysis.

DATA QUALITY ASSESSMENT



DATA QUALITY ASSESSMENT

1/ DATA DISCOVERY

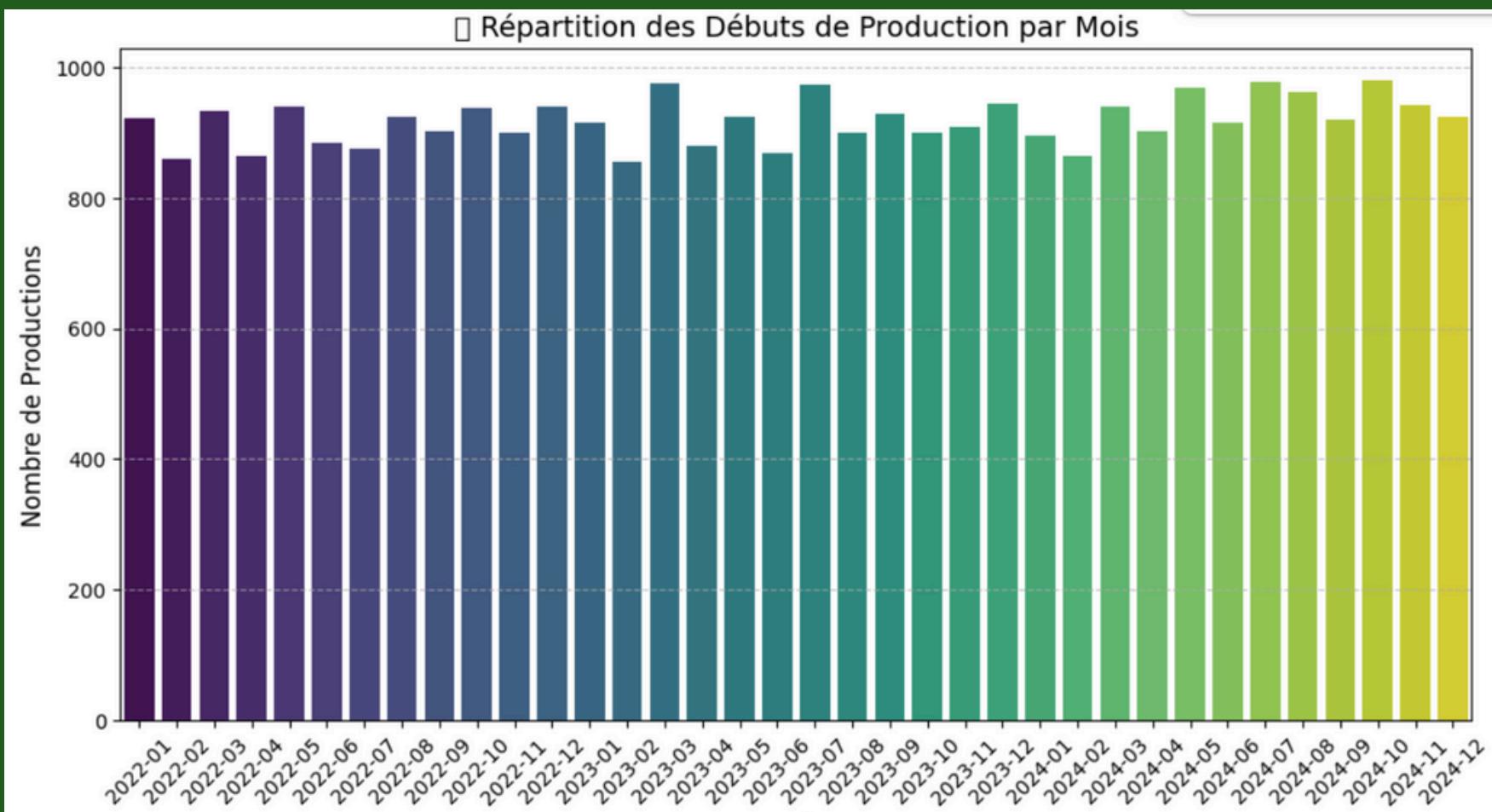
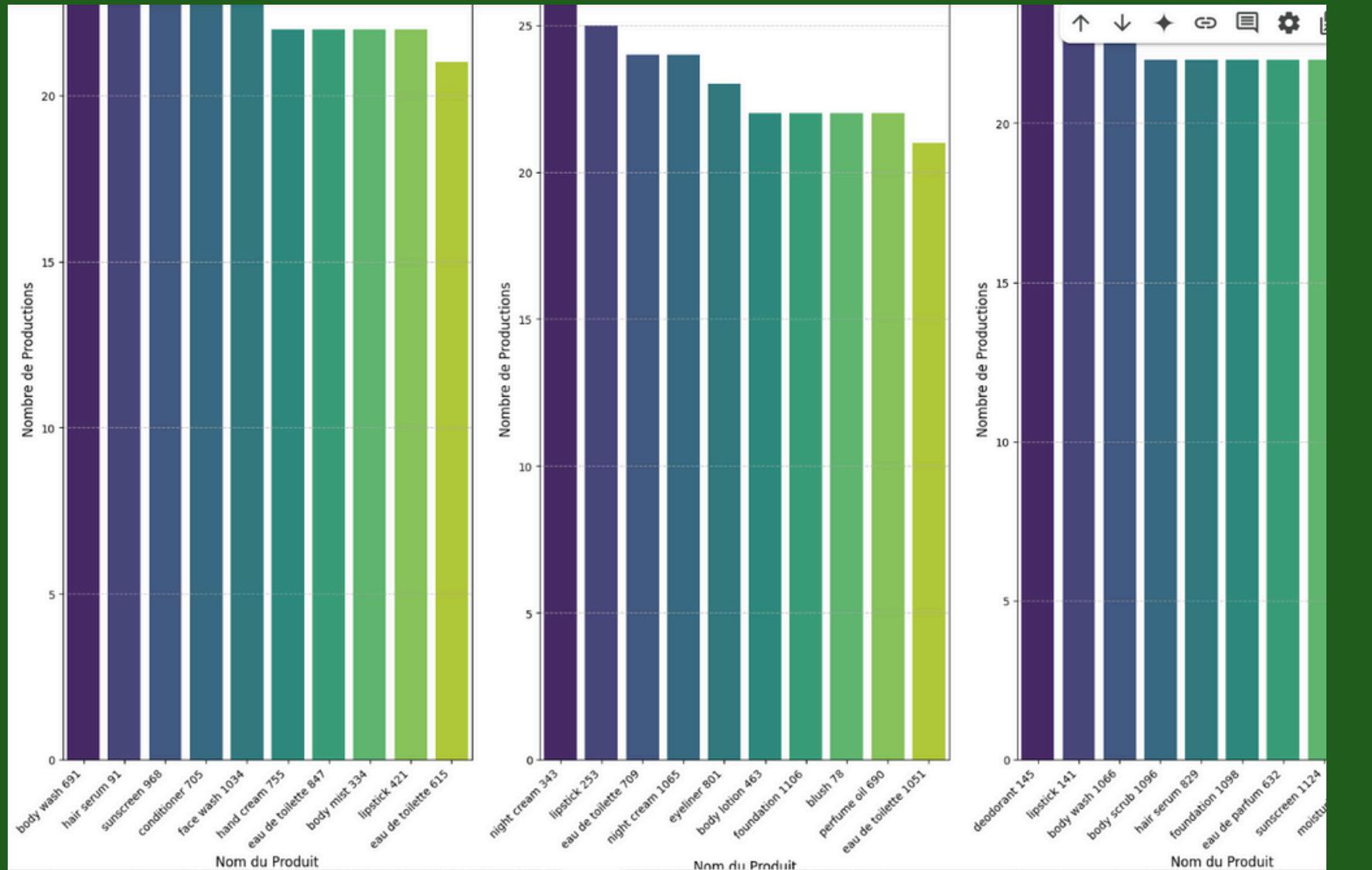
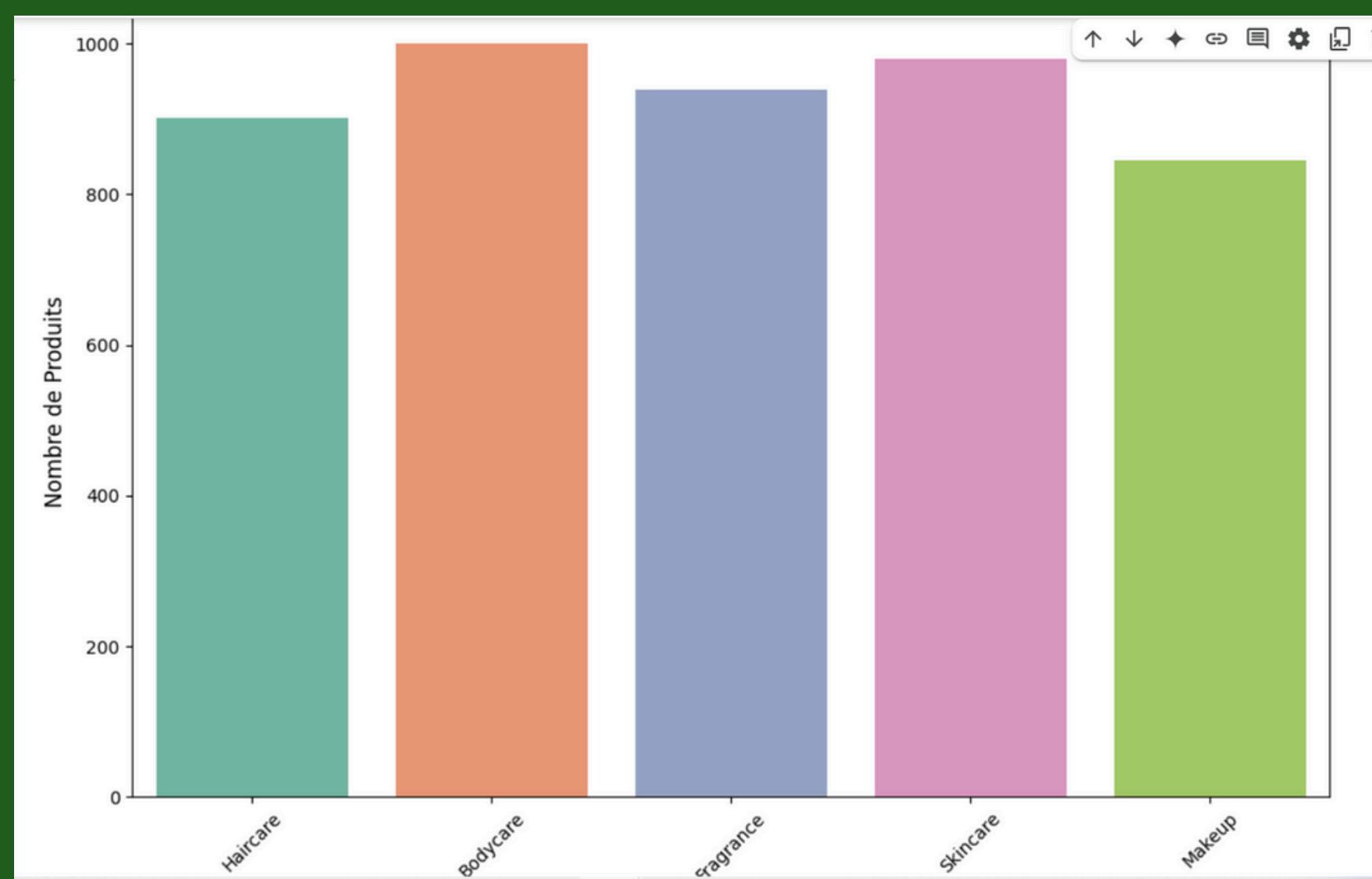


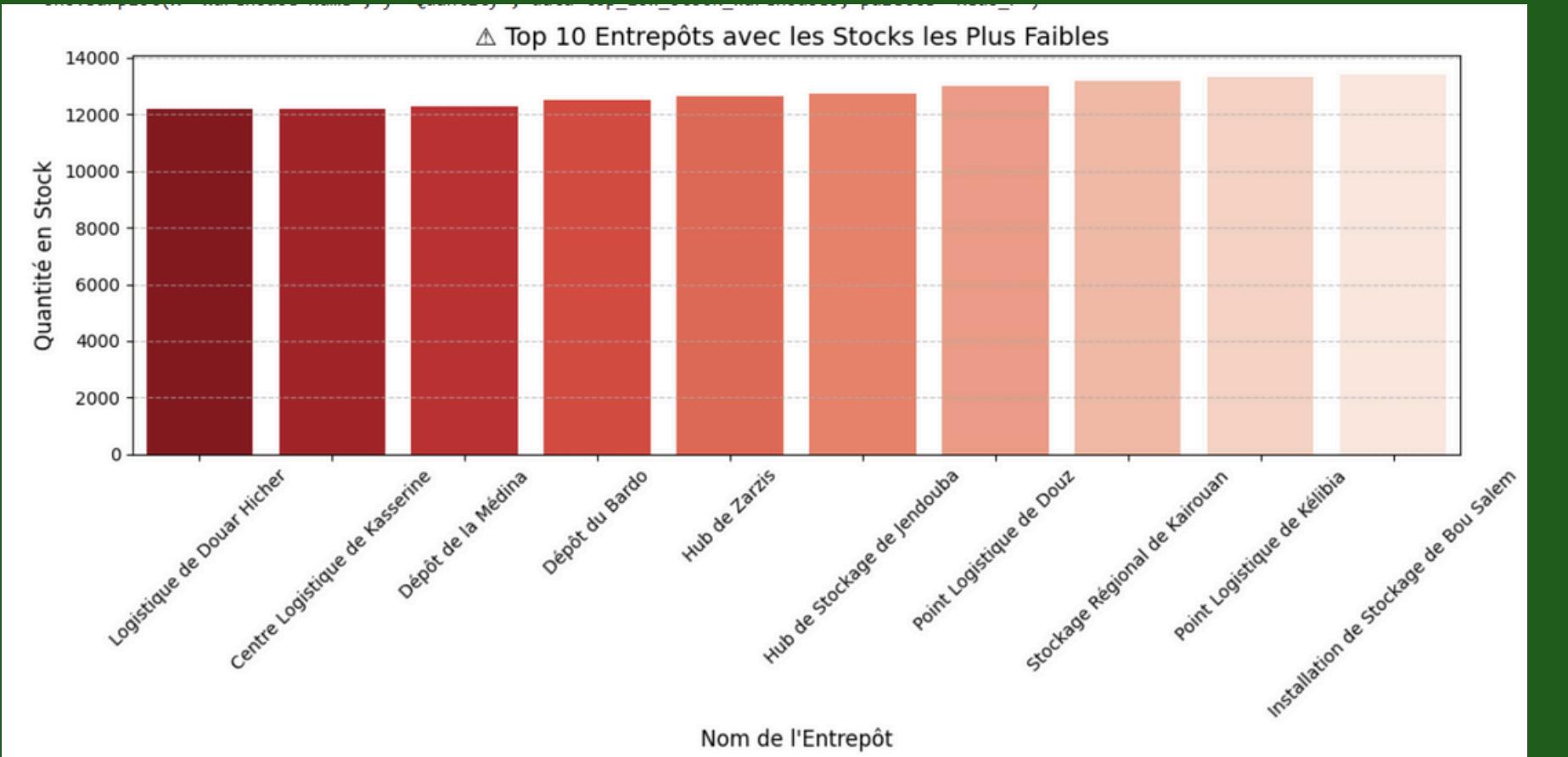
CHART SHOWING THE
NUMBER OF
PRODUCTION STARTS
FOR EACH MONTH



LIST OF PRODUCTS AND THEIR NAMES, SHOWING DIFFERENT ITEMS AND DETAILS.

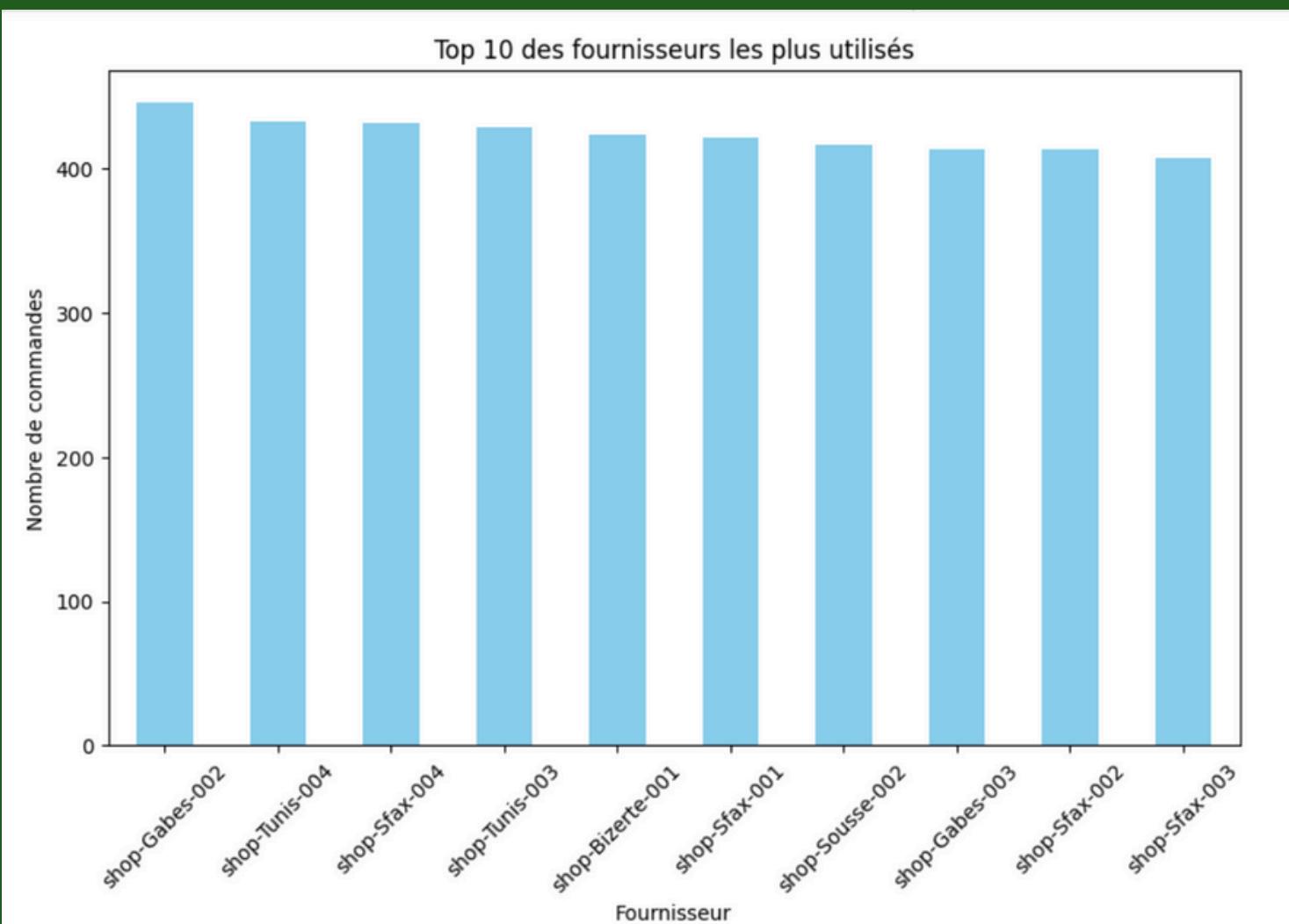


LIST OF PRODUCT NUMBERS PER CATEGORY

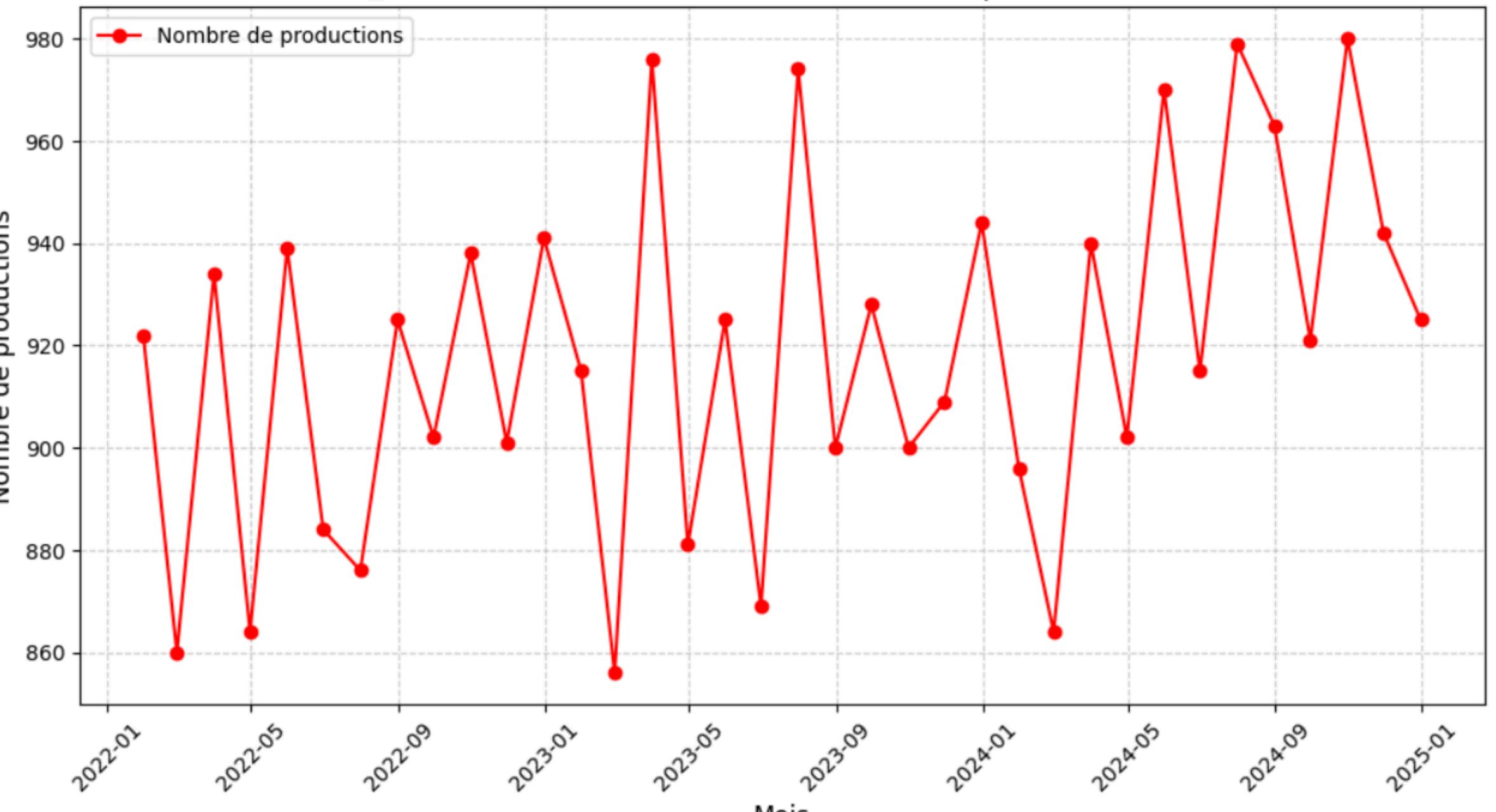


IT HELPS IDENTIFY THE MOST RELIABLE AND FREQUENTLY USED SUPPLIERS OVER THE YEARS

IT PROVIDES INSIGHTS INTO WHICH LOCATIONS MAY NEED IMMEDIATE RESTOCKING TO MEET DEMAND.



Évolution de la Production au Fil du Temps (Mensuelle)



IT TRACKS THE NUMBER OF PRODUCTIONS OVER DIFFERENT MONTHS, PROVIDING INSIGHTS INTO PRODUCTION TRENDS AND PATTERNS OVER TIME. THIS DATA CAN HELP IN UNDERSTANDING SEASONAL VARIATIONS AND PLANNING FUTURE PRODUCTION SCHEDULES.

DATA QUALITY

Production:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 33060 entries, 0 to 33059
Data columns (total 4 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   Product ID       33060 non-null   object  
 1   Product Name     33060 non-null   object  
 2   Production Start Time 33060 non-null   object  
 3   Production End Time 33060 non-null   object  
dtypes: object(4)
memory usage: 1.0+ MB
None
```

Cosmetic Products JSON:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1201 entries, 0 to 1200
Data columns (total 8 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   productid        1201 non-null   object  
 1   productname      1201 non-null   object  
 2   category          1201 non-null   object  
 3   brandname         1201 non-null   object  
 4   unitprice         1201 non-null   float64 
 5   manufacturedate  1201 non-null   object  
 6   expirydate        1201 non-null   object  
 7   basematerials    1201 non-null   object  
dtypes: float64(1), object(7)
```

Inventory:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 48040 entries, 0 to 48039
Data columns (total 5 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   Warehouse ID     48040 non-null   int64  
 1   Warehouse Name   48040 non-null   object  
 2   Location          48040 non-null   object  
 3   Product ID        48040 non-null   object  
 4   Quantity          48040 non-null   int64  
dtypes: int64(2), object(3)
```

```
#   Column           Non-Null Count  Dtype  
--- 
 0   Material ID      2447 non-null   int64  
 1   Material Name    2447 non-null   object  
 2   Material Category 2447 non-null   object  
 3   Unit              2447 non-null   object  
dtypes: int64(1), object(3)
memory usage: 76.6+ KB
None
```

Products:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4665 entries, 0 to 4664
Data columns (total 8 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   Product ID       4665 non-null   object  
 1   Product Name     4665 non-null   object  
 2   Category          4665 non-null   object  
 3   Brand Name        4665 non-null   object  
 4   Material ID      4665 non-null   int64  
 5   Material Name    4665 non-null   object  
 6   Material Category 4665 non-null   object  
 7   Dosage            4665 non-null   int64  
dtypes: int64(2), object(6)
```

EACH DATAFRAME'S
STRUCTURE IS
OUTLINED,
SHOWING THE
NUMBER OF
ENTRIES, COLUMNS,
NON-NULL COUNTS,
AND DATA TYPES.

🔍 Valeurs manquantes par colonne :

📁 Factures PDF:

Référence Facture 0
Magasin 0
Date 0
Fournisseur 0
Produits 0
Total Général 0
dtype: int64

📁 Materials:

Material ID 0
Material Name 0
Material Category 0
Unit 0
dtype: int64

📁 Products:

Product ID 0
Product Name 0
Category 0
Brand Name 0
Material ID 0
Material Name 0
Material Category 0
Dosage 0
dtype: int64

📁 Inventory:

Warehouse ID 0
Warehouse Name 0
Location 0
Product ID 0
Quantity 0
dtype: int64

📁 Production:

Product ID 0
Product Name 0
Production Start Time 0
Production End Time 0
dtype: int64

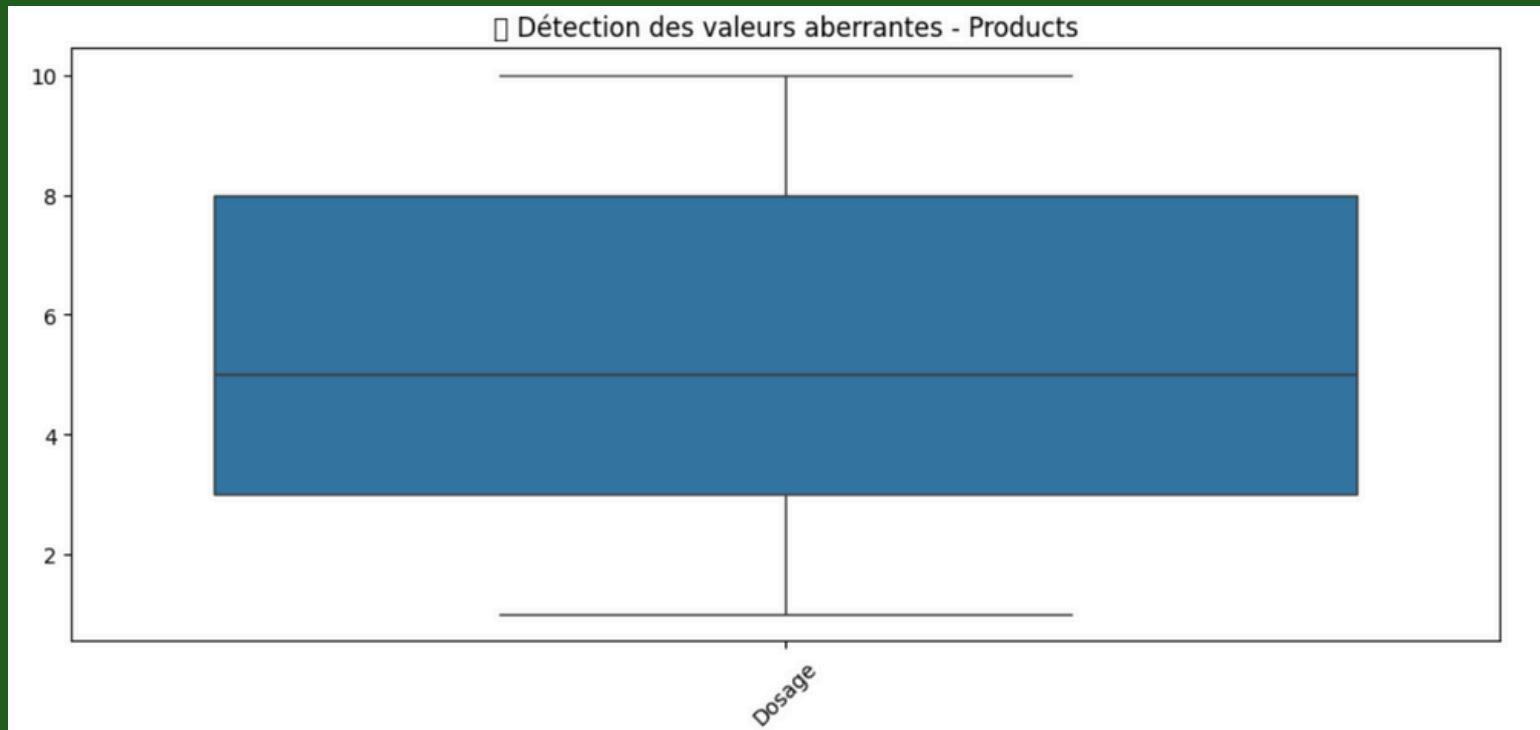
📁 Cosmetic Products JSON:

productid 0
productname 0
category 0
brandname 0
unitprice 0
manufacturedate 0
expirydate 0
basematerials 0
dtype: int64

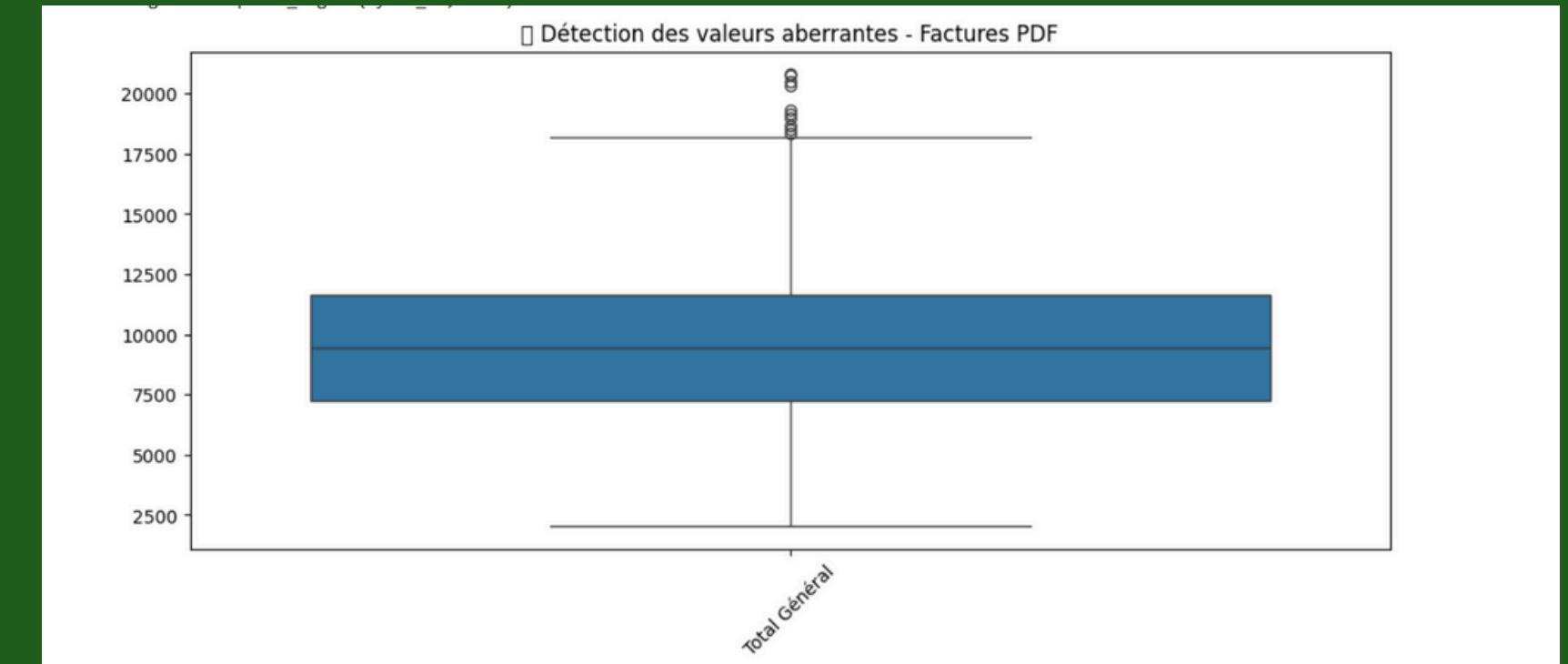
📁 Orders Products JSON:

OrderID 0
OrderDate 0
ShopID 0
ShippingAddress 0
Products 0

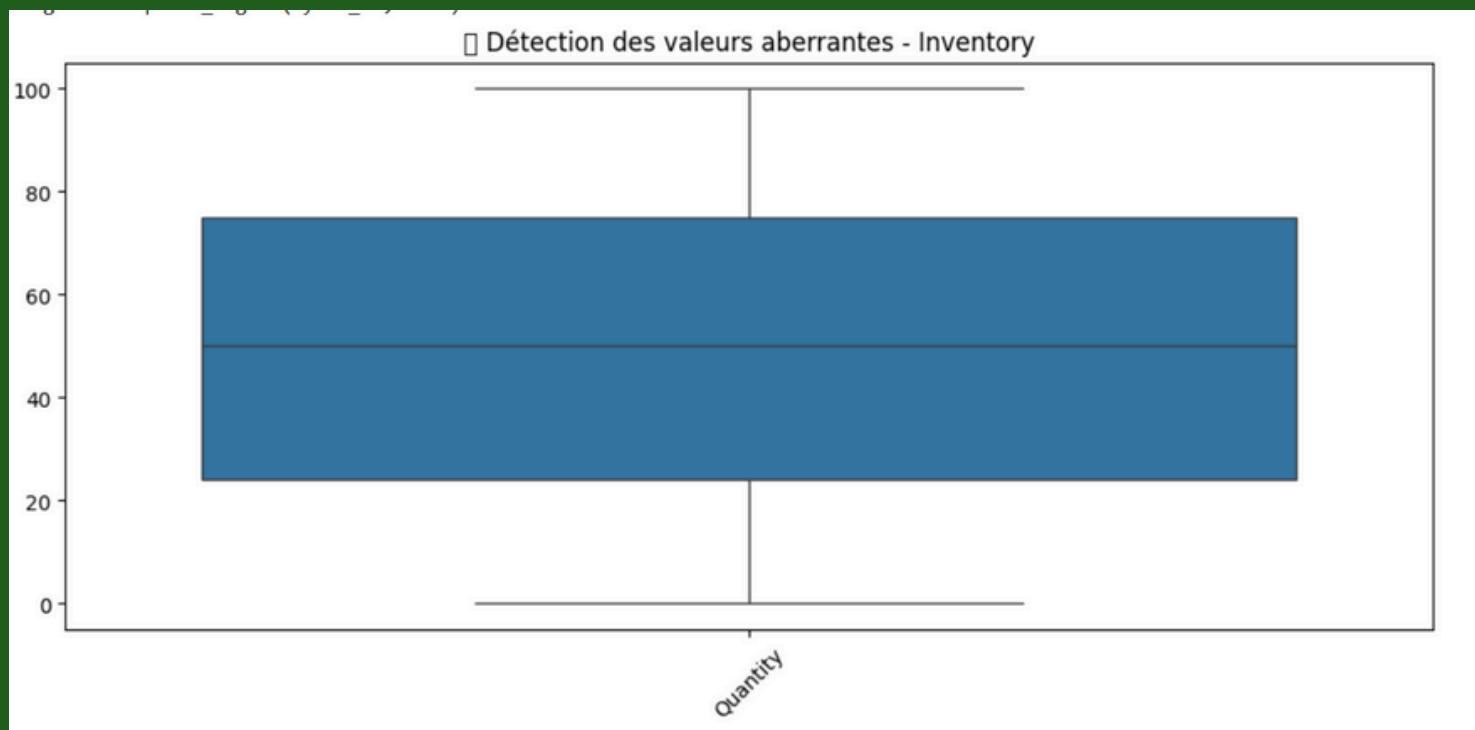
THIS INDICATES THAT
THE DATA IS COMPLETE
AND WELL-
MAINTAINED, WHICH
IS CRUCIAL FOR
ACCURATE ANALYSIS
AND DECISION-
MAKING.



THE DOSAGE VALUES ARE TIGHTLY DISTRIBUTED BETWEEN 2 AND 10, WITH NO VISIBLE OUTLIERS. THE MEDIAN IS AROUND 6.

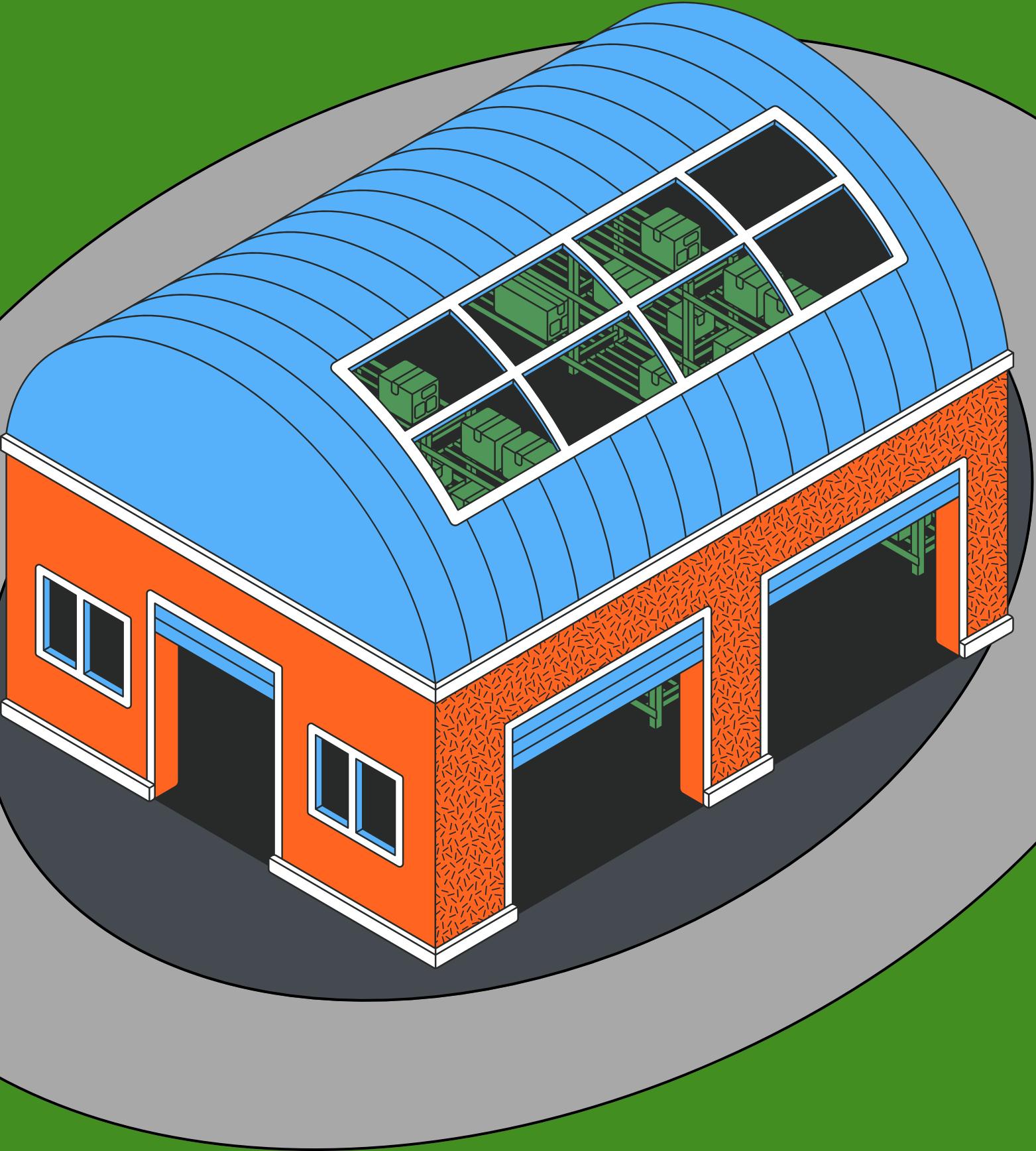


THE DATA DISPLAYS SOME OUTLIERS ABOVE 17,500, WITH MOST VALUES DISTRIBUTED BETWEEN 2,500 AND 15,000. THE MEDIAN IS APPROXIMATELY 10,000.



THE DATA SHOWS NO APPARENT OUTLIERS, AND THE VALUES ARE EVENLY DISTRIBUTED BETWEEN 0 AND 100, WITH THE MAJORITY FALLING AROUND THE MEDIAN NEAR 50.

KEY INSIGHTS DERIVED FROM DATA

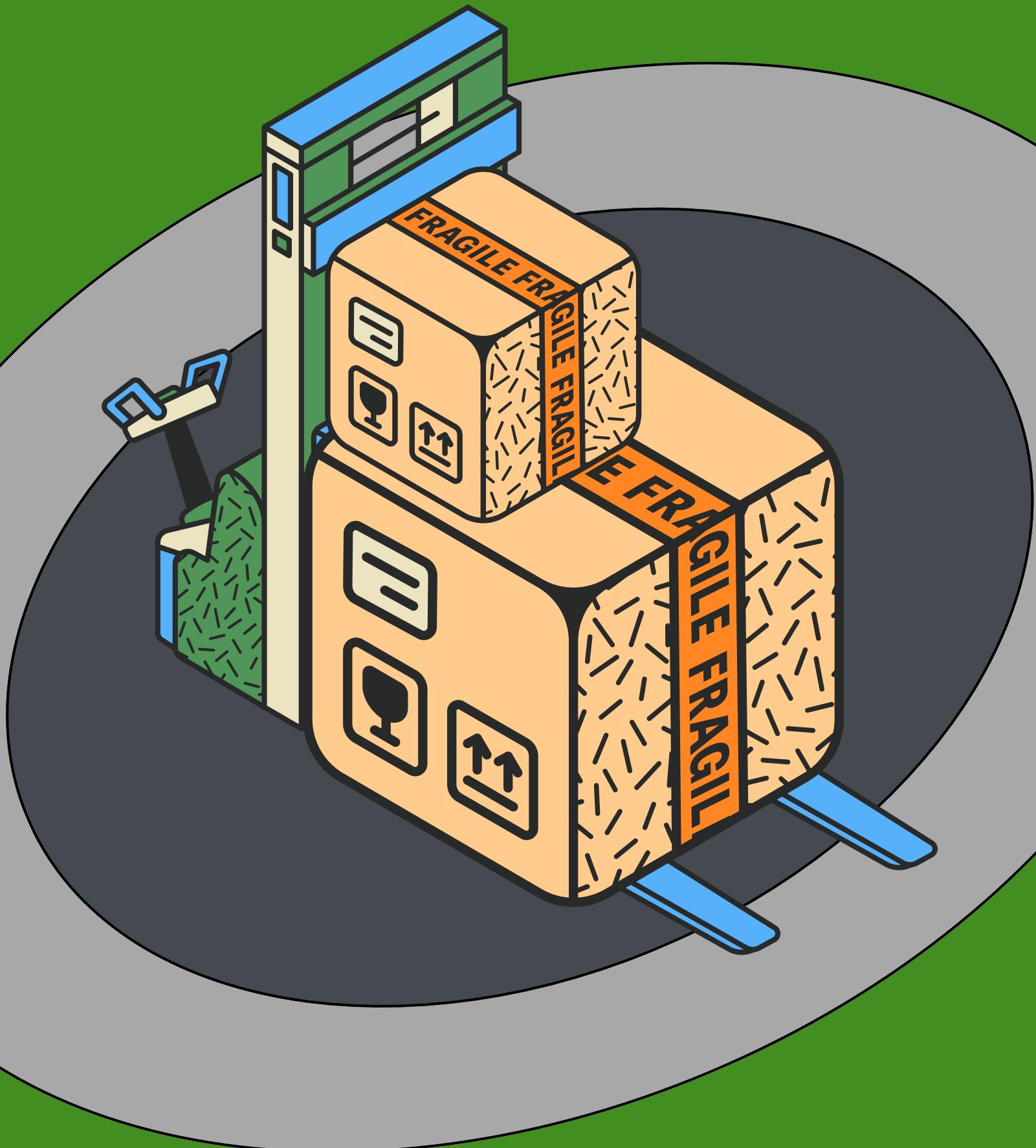




Internal Data Insights:

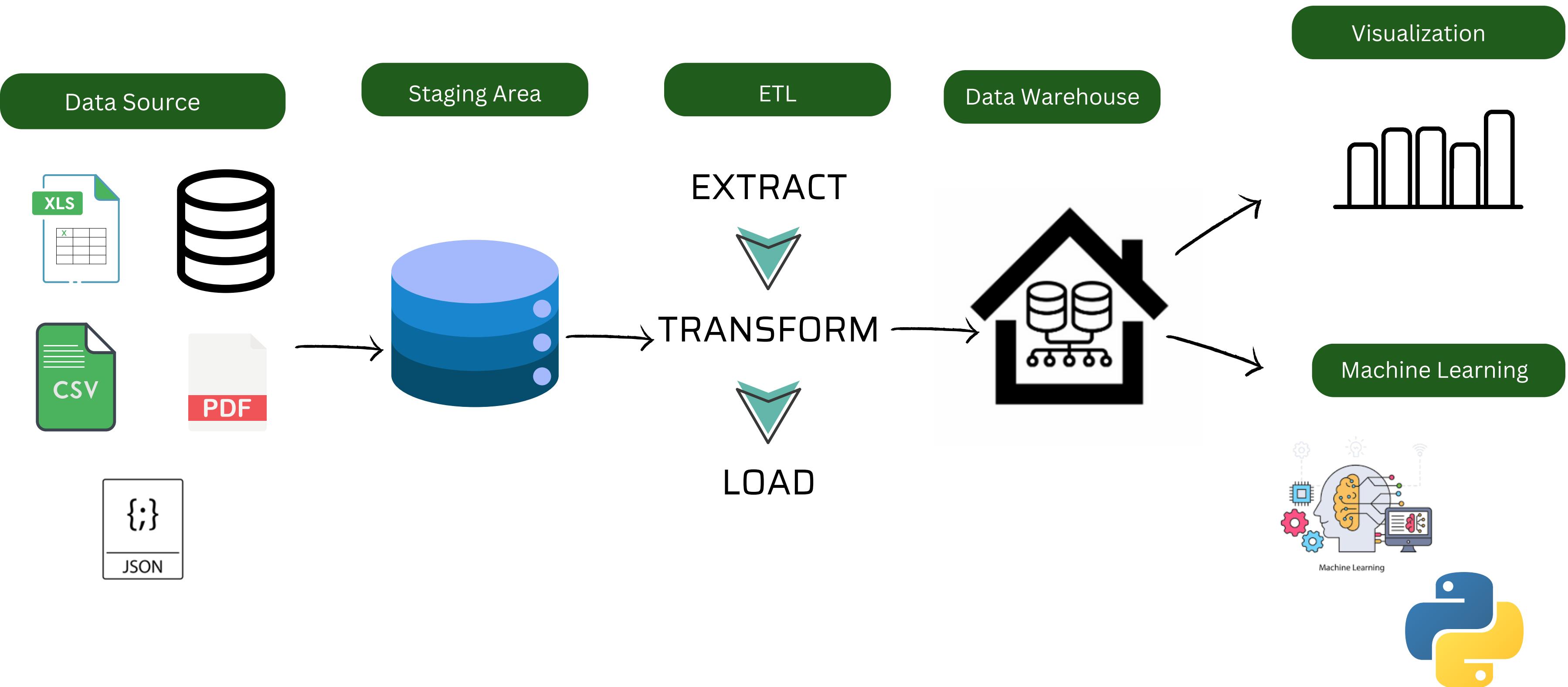
- **Production Optimization:** Identified bottlenecks by analyzing machine downtime
- **Inventory Control:** Monitored high-turnover products to improve stock allocation.
- **Sales & Demand Forecasting:** Predicted demand using historical sales data to optimize restocking.
- **Stock Flow Management:** Balanced warehouse stock levels by tracking product movement.
- **Customer Demand Tracking:** Adjusted manufacturing schedules based on sales data patterns.
- **Better Supplier Management:** Evaluated supplier efficiency based on past order history.

SOLUTION ARCHITECTURE & IMPLEMENTATI ON

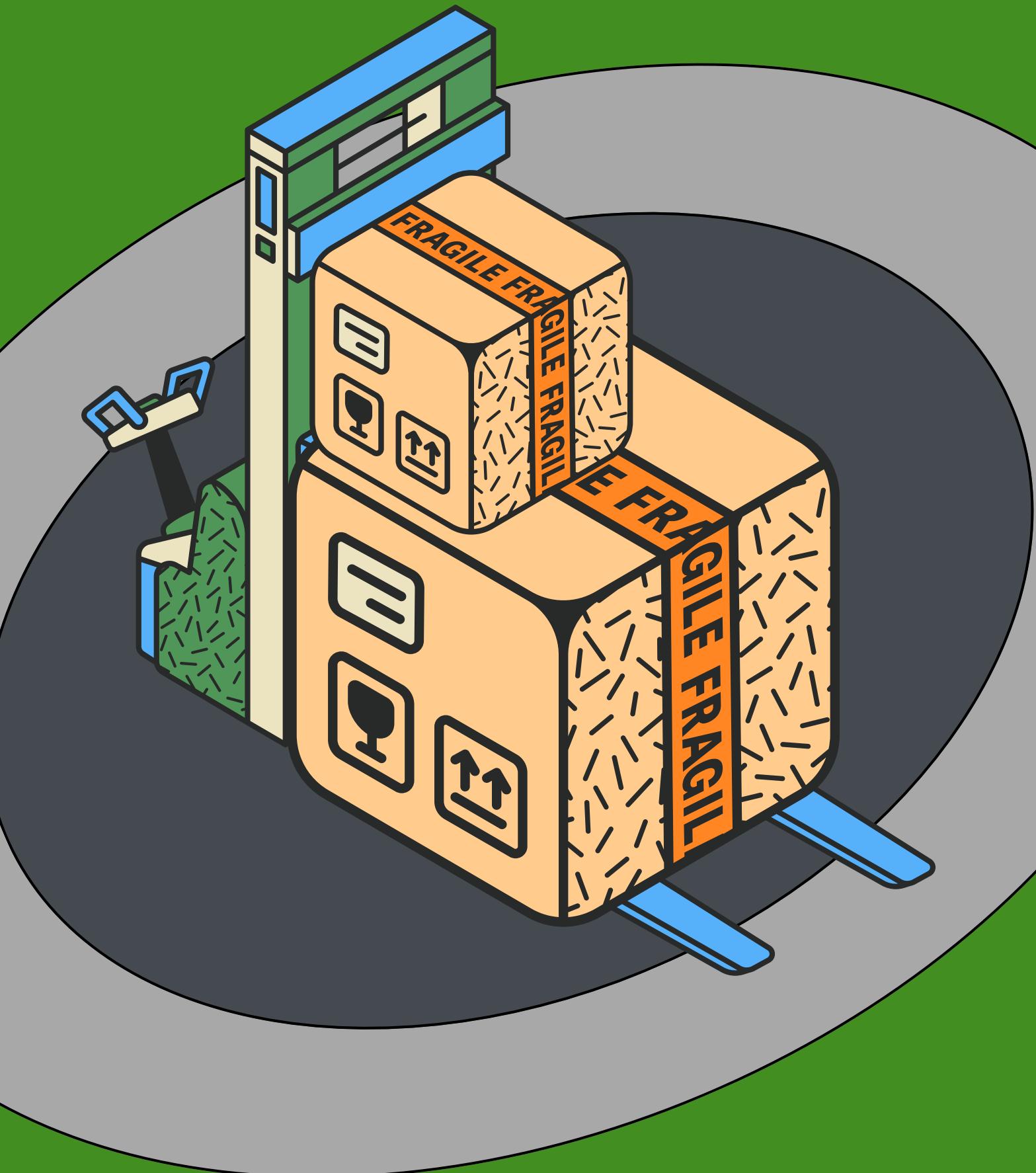




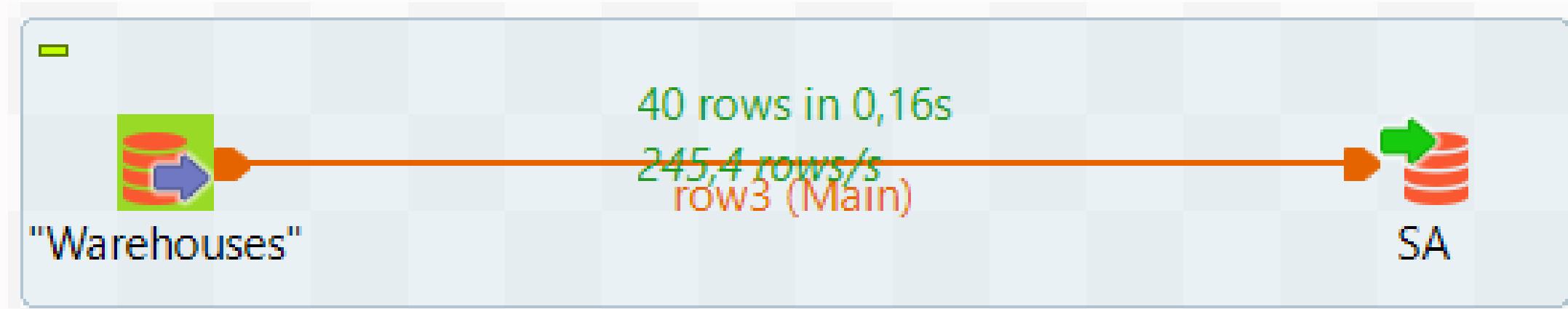
OVERVIEW OF THE BI ARCHITECTURE



STAGING AREA SETUP AND DATA PROCESSING WORKFLOW



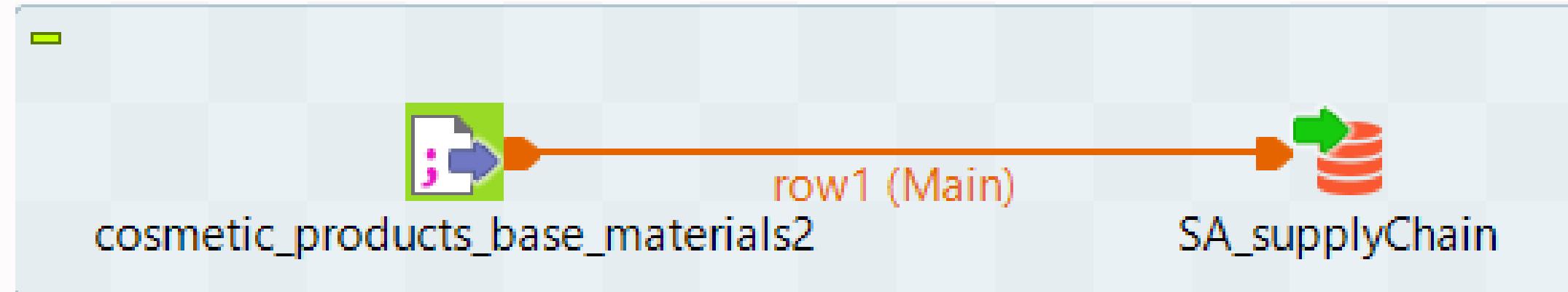
.Bak File



Results Messages

	warehouseid	warehousename	location	capacity
1	1	Entrepôt Central de Tunis	Tunis, Tunisie	500
2	2	Installation de Stockage de Sousse	Sousse, Tunisie	300
3	3	Centre de Distribution de Monastir	Monastir, Tunisie	400
4	4	Hub de Stockage de Gabès	Gabes, Tunisie	250
5	5	Dépôt Nord de Bizerte	Bizerte, Tunisie	350
6	6	Stockage Régional de Kairouan	Kairouan, Tunisie	200
7	7	Centre Logistique de Sfax	Sfax, Tunisie	450
8	8	Dépôt de la Médina	Medina, Tunisie	280
9	9	Hub de Stockage d'Ariana	Ariana, Tunisie	320
10	10	Entrepôt de Gafsa	Gafsa, Tunisie	310
11	11	Centre de Stockage de Tozeur	Tozeur, Tunisie	230
12	12	Hub de Zarzis	Zarzis, Tunisie	260
13	13	Point Logistique de Douz	Douz, Tunisie	240
14	14	Centre de Distribution de Mahdia	Mahdia, Tunisie	340

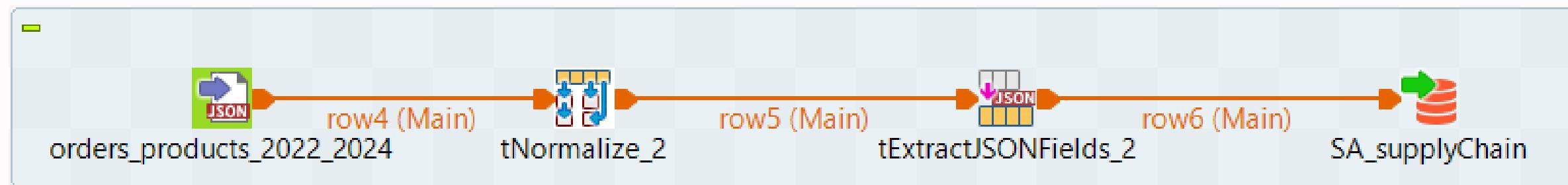
CSV File



Results Messages

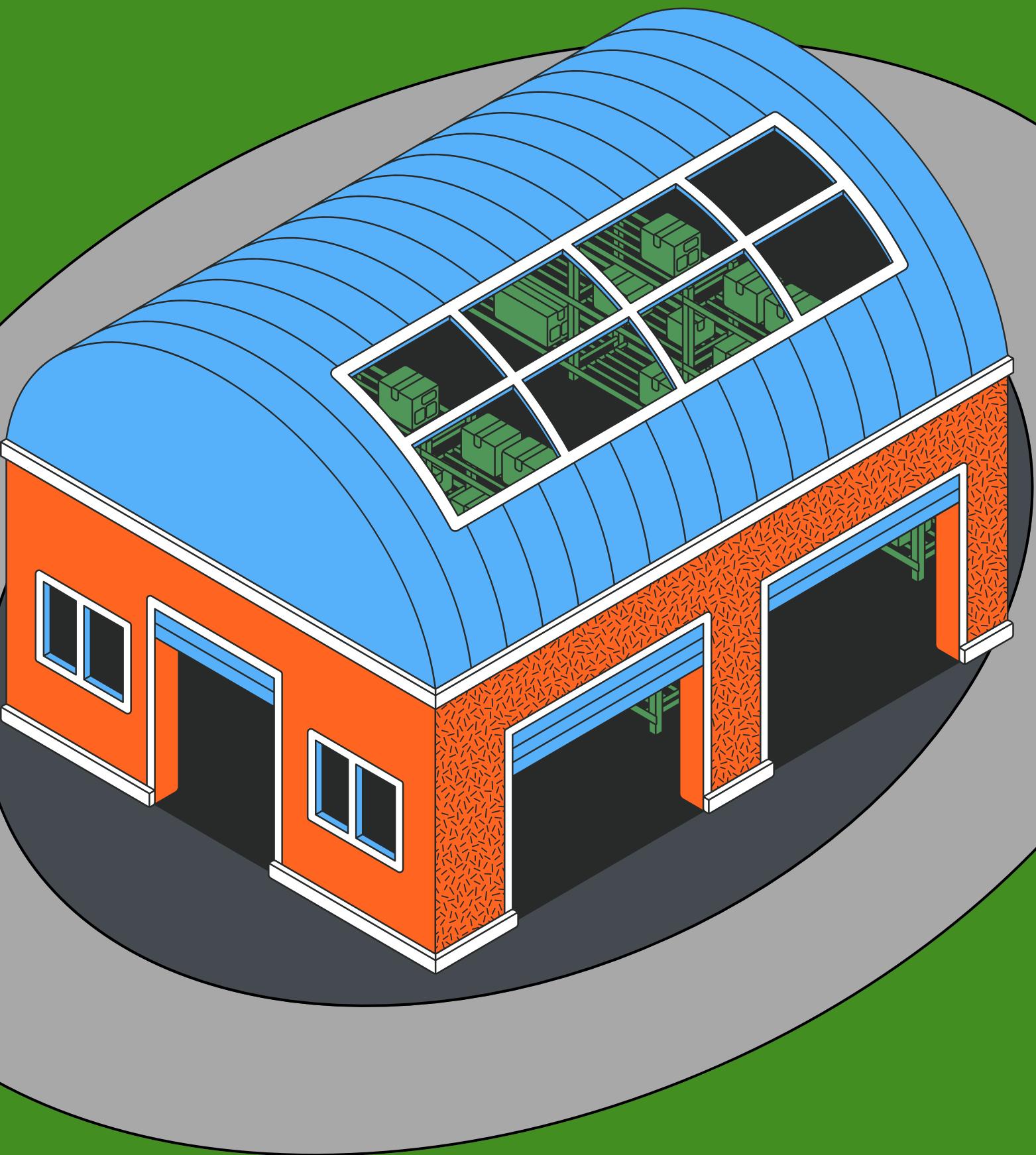
	Product_...	Product_Name	Category	Brand_Name	Material_ID	Material_Name	Material_Category	Dosage
1	PR-001	Hair Serum 1	Haircare	Walker Group	94	Same	Fragrance	8
2	PR-001	Hair Serum 1	Haircare	Walker Group	29	Add	Fragrance	9
3	PR-002	Body Wash 2	Bodycare	Lyons, Zuniga and Wolf	12	I	Color Pigment	8
4	PR-002	Body Wash 2	Bodycare	Lyons, Zuniga and Wolf	33	Section	Essential Oil	9
5	PR-002	Body Wash 2	Bodycare	Lyons, Zuniga and Wolf	22	Mr	Essential Oil	6
6	PR-003	Foot Cream 3	Bodycare	Rogers-Thompson	42	Degree	Preservative	3
7	PR-003	Foot Cream 3	Bodycare	Rogers-Thompson	54	Nation	Color Pigment	4
8	PR-003	Foot Cream 3	Bodycare	Rogers-Thompson	98	Positive	Emulsifier	6
9	PR-003	Foot Cream 3	Bodycare	Rogers-Thompson	63	Above	Fragrance	1
10	PR-004	Conditioner 4	Haircare	Lewis and Sons	46	Music	Preservative	10
11	PR-005	Eau de Toilette 5	Fragrance	Anthony, Colon and Jimenez	86	On	Fragrance	9
12	PR-005	Eau de Toilette 5	Fragrance	Anthony, Colon and Jimenez	66	Rather	Emulsifier	4
13	PR-005	Eau de Toilette 5	Fragrance	Anthony, Colon and Jimenez	71	Itself	Essential Oil	9
14	PR-005	Eau de Toilette 5	Fragrance	Anthony, Colon and Jimenez	51	May	Emulsifier	1

JSON File



	OrderID	OrderDate	ShopID	ShippingAddress	productname	quantit...	productid
1	ORD-00025	2023-07-04	shop-Gabes-004	78 Rue du Commerce, Gabes, Tunisia	Conditioner 403	8	PR-605
2	ORD-00050	2023-02-11	shop-Bizerte-004	123 Rue Habib Bourguiba, Tunis, Tunisia	Hand Cream 500	15	PR-799
3	ORD-00073	2024-04-23	shop-Sousse-002	99 Avenue des Martyrs, Bizerte, Tunisia	Shampoo 838	13	PR-1475
4	ORD-00095	2022-06-10	shop-Sousse-004	45 Avenue Mohamed V, Sousse, Tunisia	Moisturizer 555	20	PR-909
5	ORD-00115	2024-07-13	shop-Bizerte-003	45 Avenue Mohamed V, Sousse, Tunisia	Lipstick 921	18	PR-1641
6	ORD-00136	2022-02-25	shop-Bizerte-002	12 Rue de la Liberté, Sfax, Tunisia	Lipstick 863	15	PR-1525
7	ORD-00160	2022-06-09	shop-Sousse-005	78 Rue du Commerce, Gabes, Tunisia	Hand Cream 358	5	PR-515
8	ORD-00182	2022-10-20	shop-Gabes-001	123 Rue Habib Bourguiba, Tunis, Tunisia	Body Scrub 936	18	PR-1671
9	ORD-00208	2022-09-09	shop-Bizerte-003	45 Avenue Mohamed V, Sousse, Tunisia	Face Serum 994	7	PR-1787
10	ORD-00229	2023-02-11	shop-Sfax-005	123 Rue Habib Bourguiba, Tunis, Tunisia	Body Scrub 1119	9	PR-2037
11	ORD-00247	2023-09-14	shop-Sousse-001	45 Avenue Mohamed V, Sousse, Tunisia	Body Lotion 530	18	PR-859
12	ORD-00271	2024-12-28	shop-Sousse-005	45 Avenue Mohamed V, Sousse, Tunisia	Night Cream 1000	20	PR-1799
13	ORD-00297	2022-01-09	shop-Sousse-005	78 Rue du Commerce, Gabes, Tunisia	Hair Oil 846	9	PR-1491
14	ORD-00318	2022-09-06	shop-Gabes-005	123 Rue Habib Bourguiba, Tunis, Tunisia	Body Lotion 189	17	PR-189

TECHNOLOGIES USED



storage

data integration

Visualisation



AI/ML

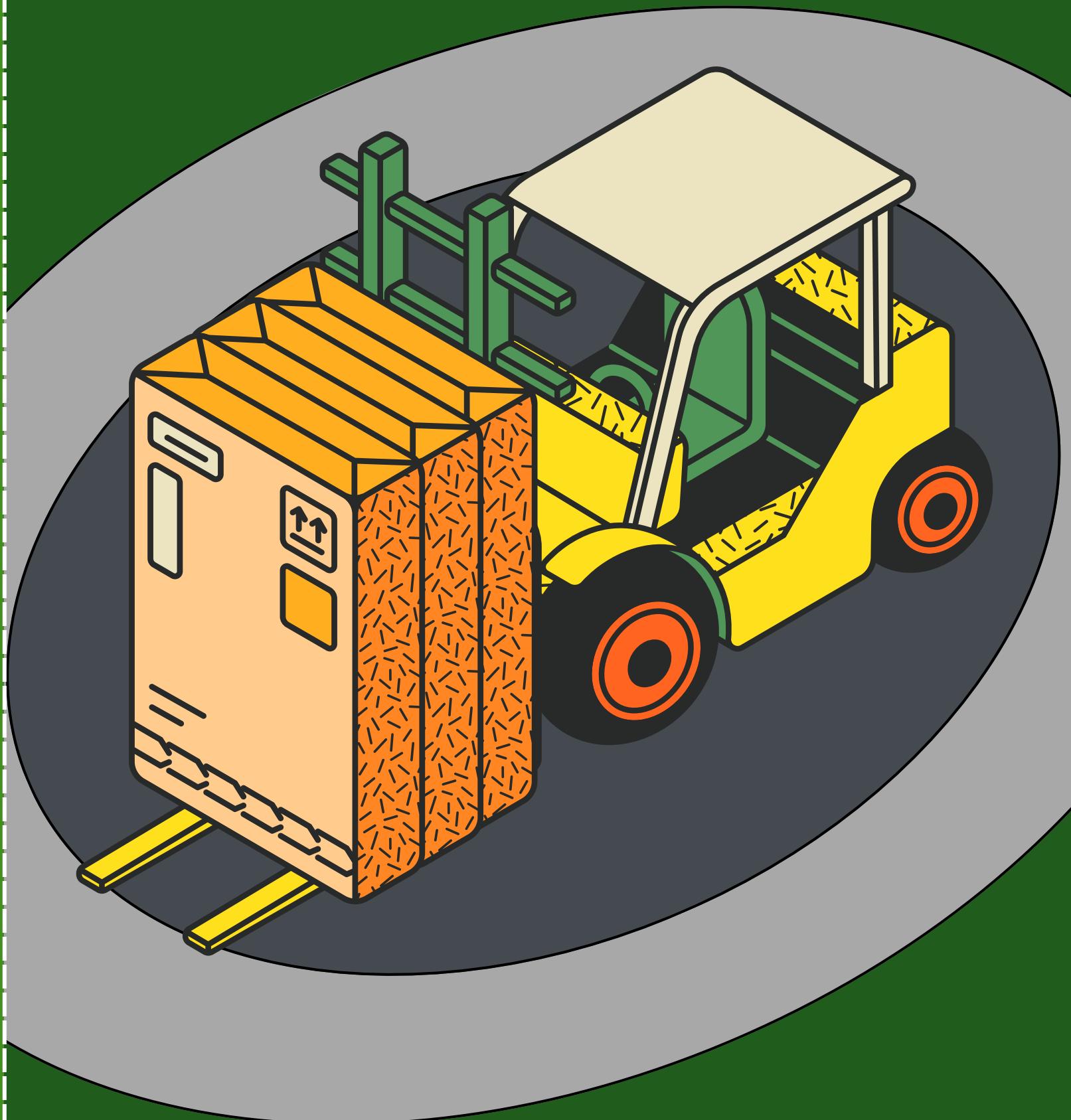
Beautifulsoup



Deployment



DEMONSTRATION OF IMPLEMENTED FEATURES AND INITIAL RESULTS

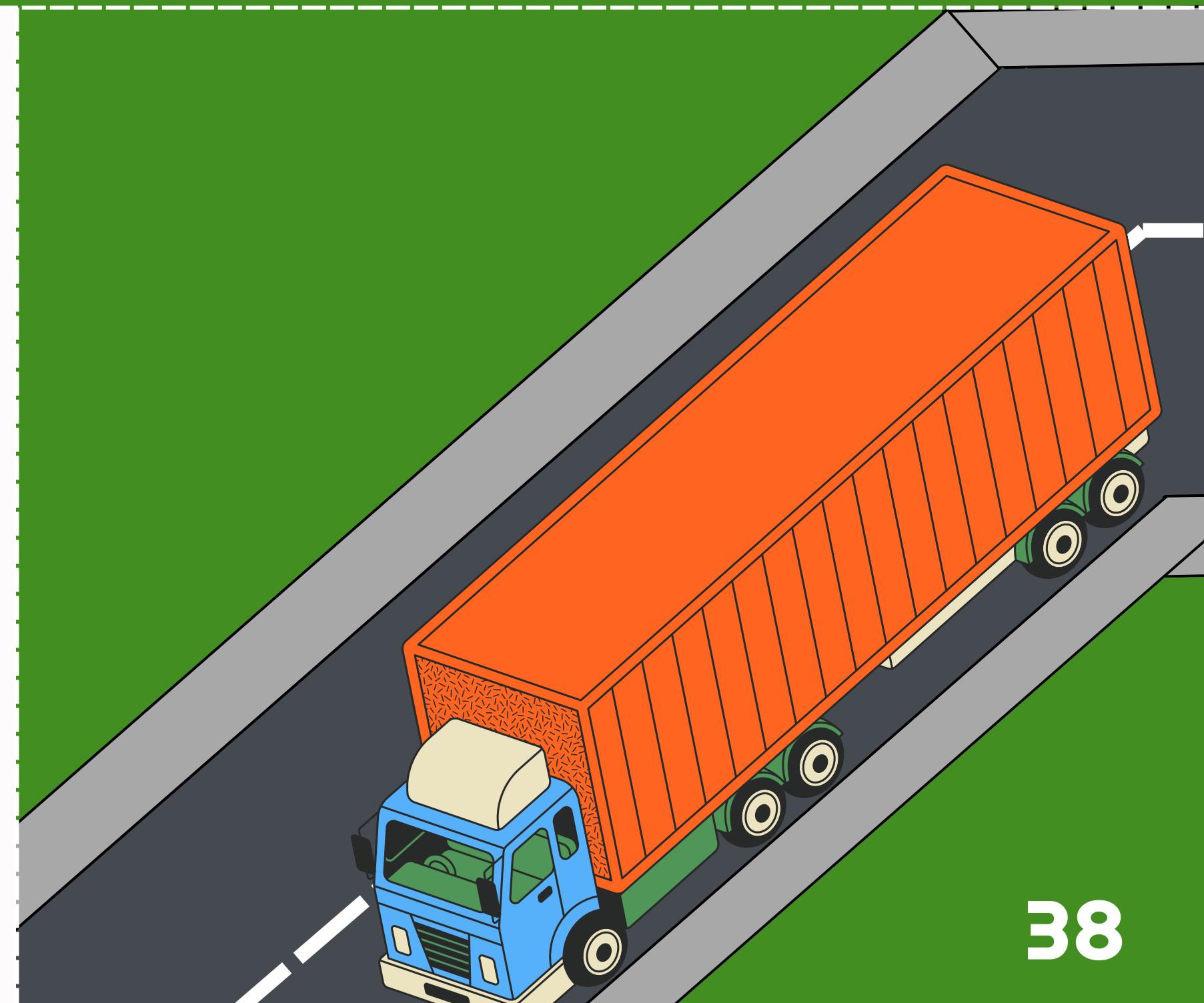




- Implemented Features & Initial Results
Demand forecasting model achieving accurate inventory predictions.
- Automated customer feedback classification for improved product insights.
- reduction in excess inventory through better stock optimization.

SUMMARY OF ACHIEVEMENTS

- *Successful implementation of a data-driven approach to supply chain optimization.
- *Improved inventory management through predictive analytics.
- *Enhanced customer insights with automated sentiment analysis.





FUTURE IMPROVEMENTS

Expanding AI capabilities for dynamic pricing and personalized marketing.
Integration of new data sources for a more holistic market analysis.
Further automation of logistics and procurement processes

CONCLUSION

Optimizing the cosmetic supply chain through BI and AI enables companies to become more efficient, responsive, and customer-centric. With ongoing technological advancements, businesses can continue to refine their strategies and maintain a competitive edge in the beauty industry.

THANK YOU!

