

# Transport Acquisition Recommendation

DHL Supply Chain Brazil



Team  
Abby Garrett



Team  
Suzana Iacob



Manager  
Rafaela Braga



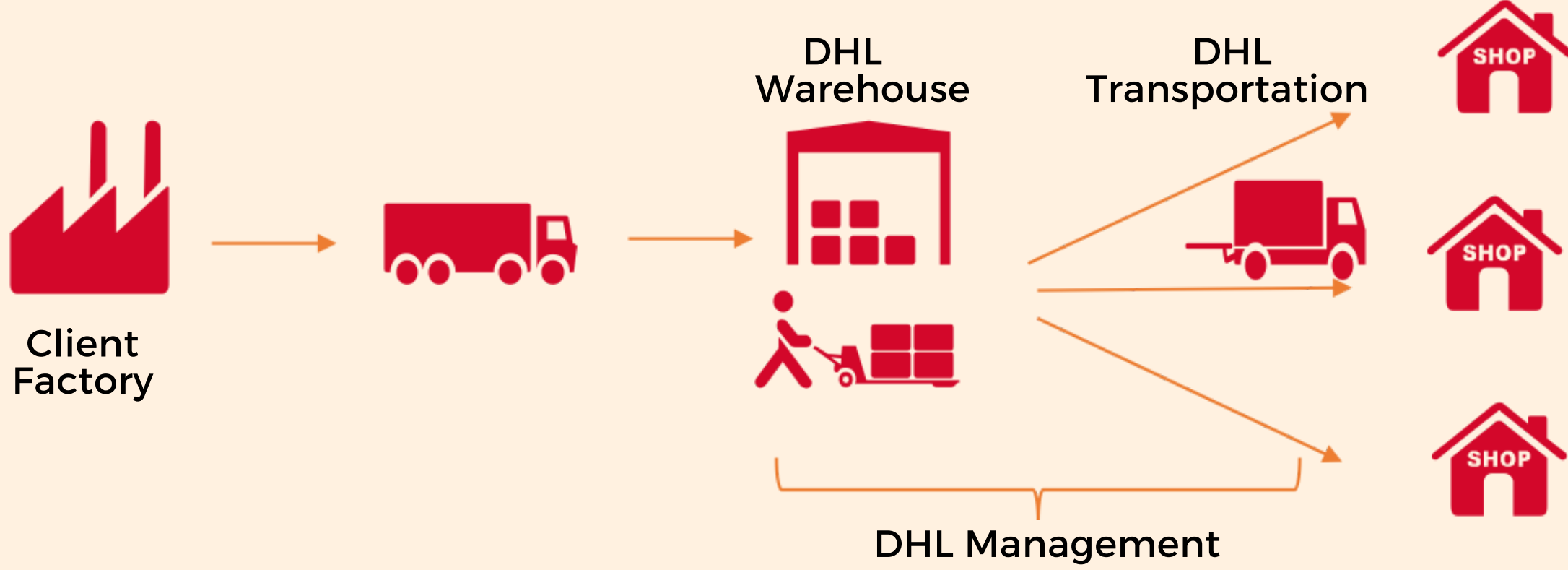
Advisor  
Alexandre Jacquillat

## 1 PROBLEM STATEMENT

DHL Supply Chain executes a range of Third-Party Logistics services, including **Warehouse and Transportation**

Not all DHL Warehouse clients have DHL as their **Transport Service Provider (TSP)**, which is a big financial opportunity to **increase DHL's client base**

DHL Sales has no insight regarding which clients they should target, having a reactive approach to the client acquisition process (i.e. the client initiates the transition)

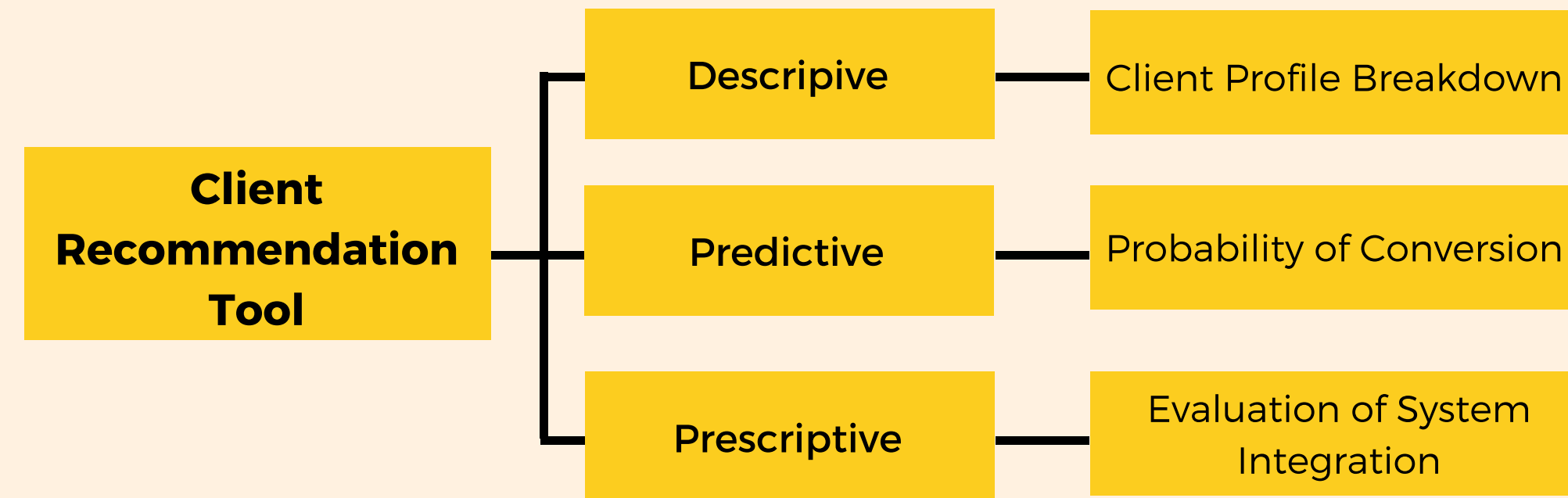


## 2 SOLUTION

**Aim:** recommend which Warehouse-only clients to be acquired by the Transport division

Advanced analytics are combined with business insights into a comprehensive recommendation tool

The recommendations are offered directly to the DHL Sales team via interactive dashboards

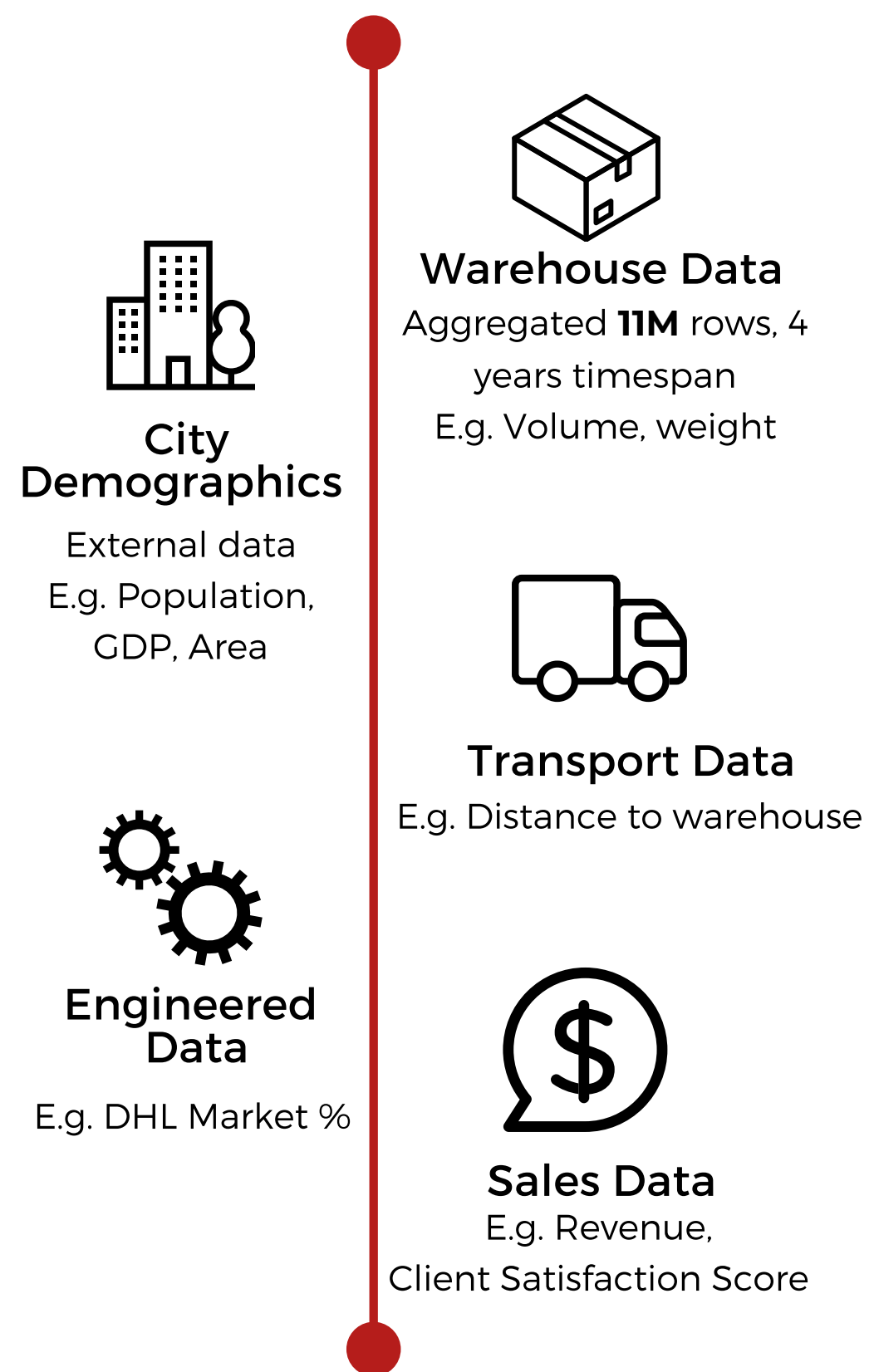


## 3 DATA GATHERING

We worked with the full DHL organization to create a **comprehensive dataset** with relevant data protection requirements

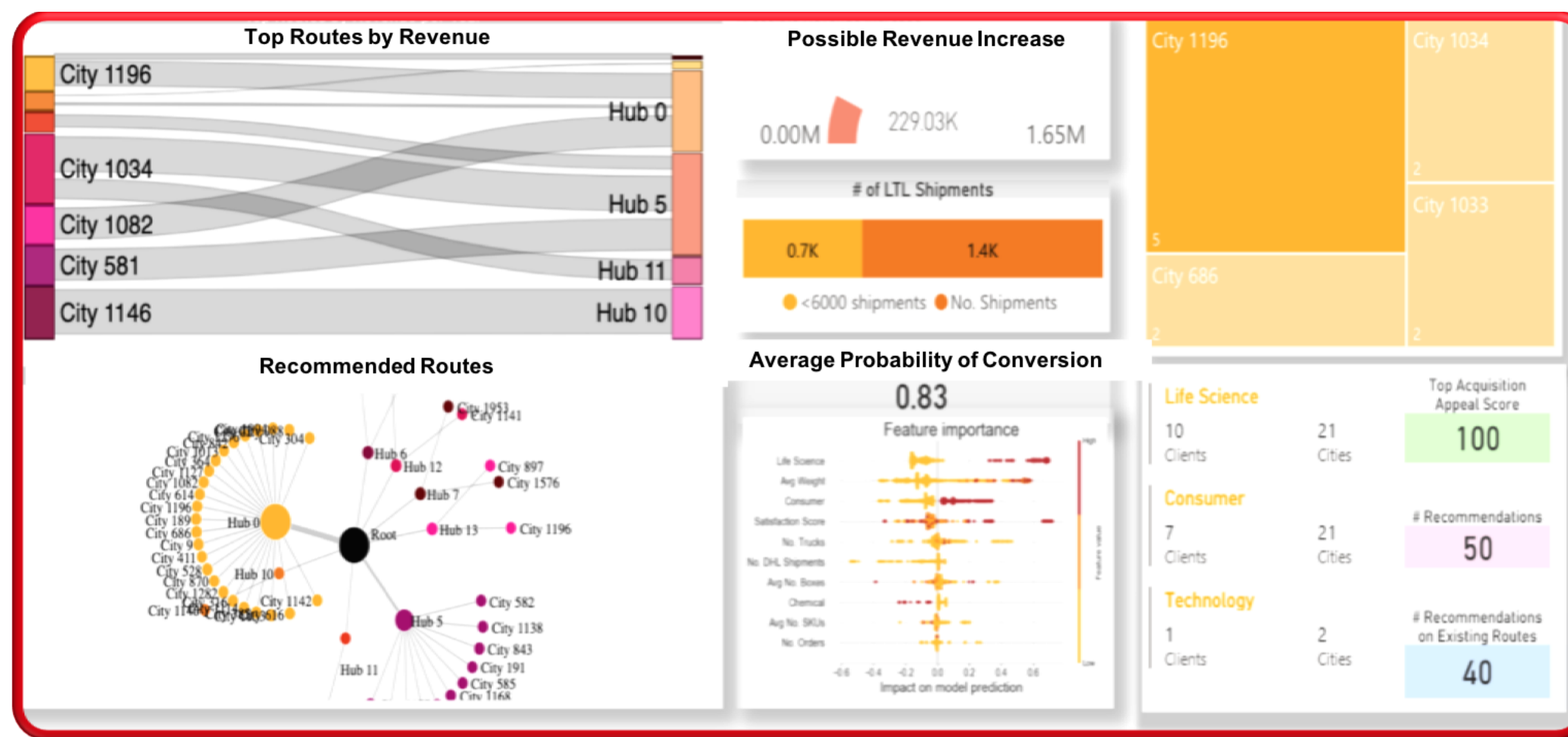
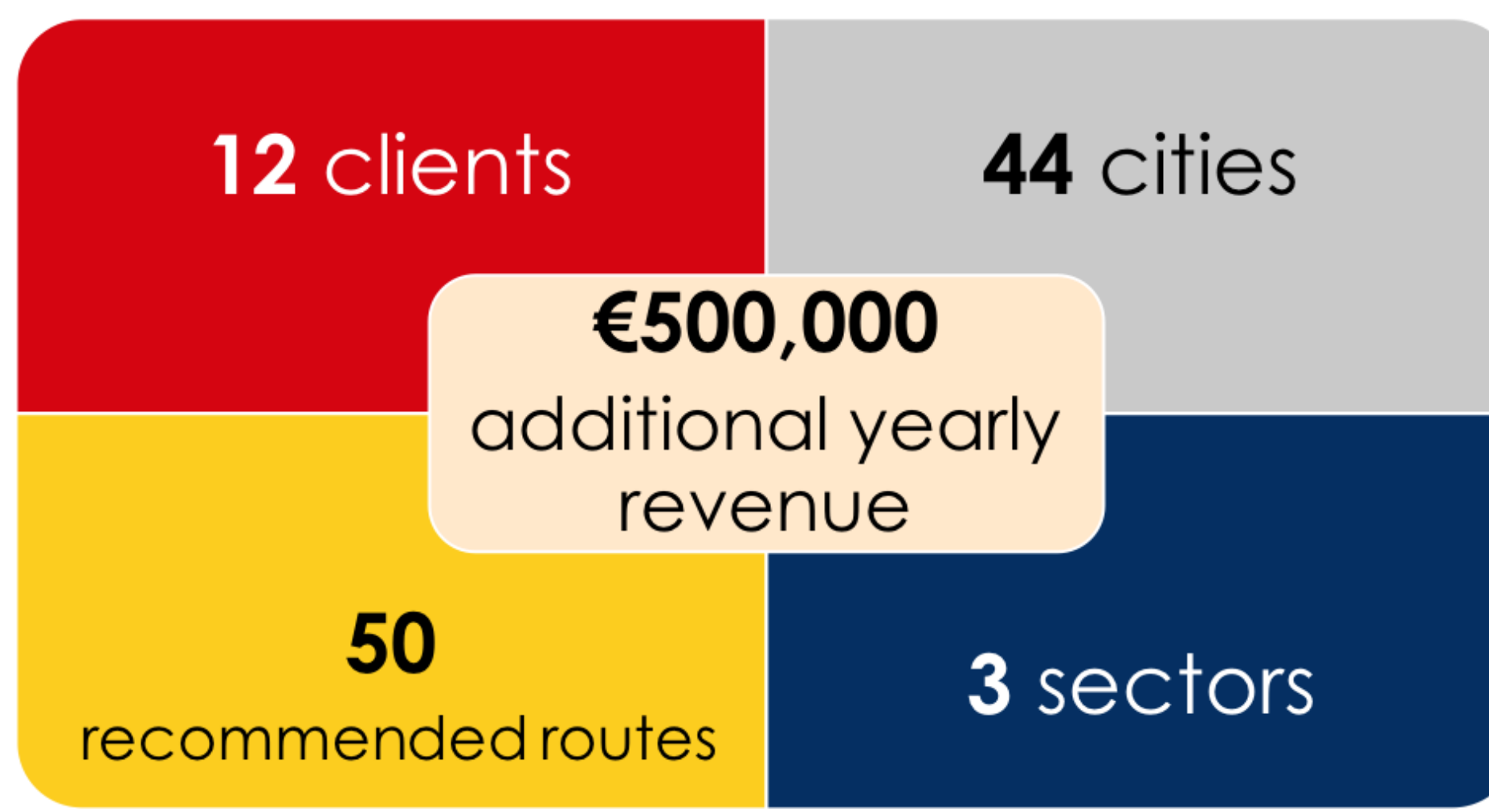
Extensive **data cleaning**: outlier detection, data imputation, fuzzy matching for textual data (city), feature engineering

Final dataset: **15,000 rows, 35 features** after data expansion (section 5)



## 4 TRANSPORT ACQUISITION FINAL RESULTS

Obtained from predictive and prescriptive analysis

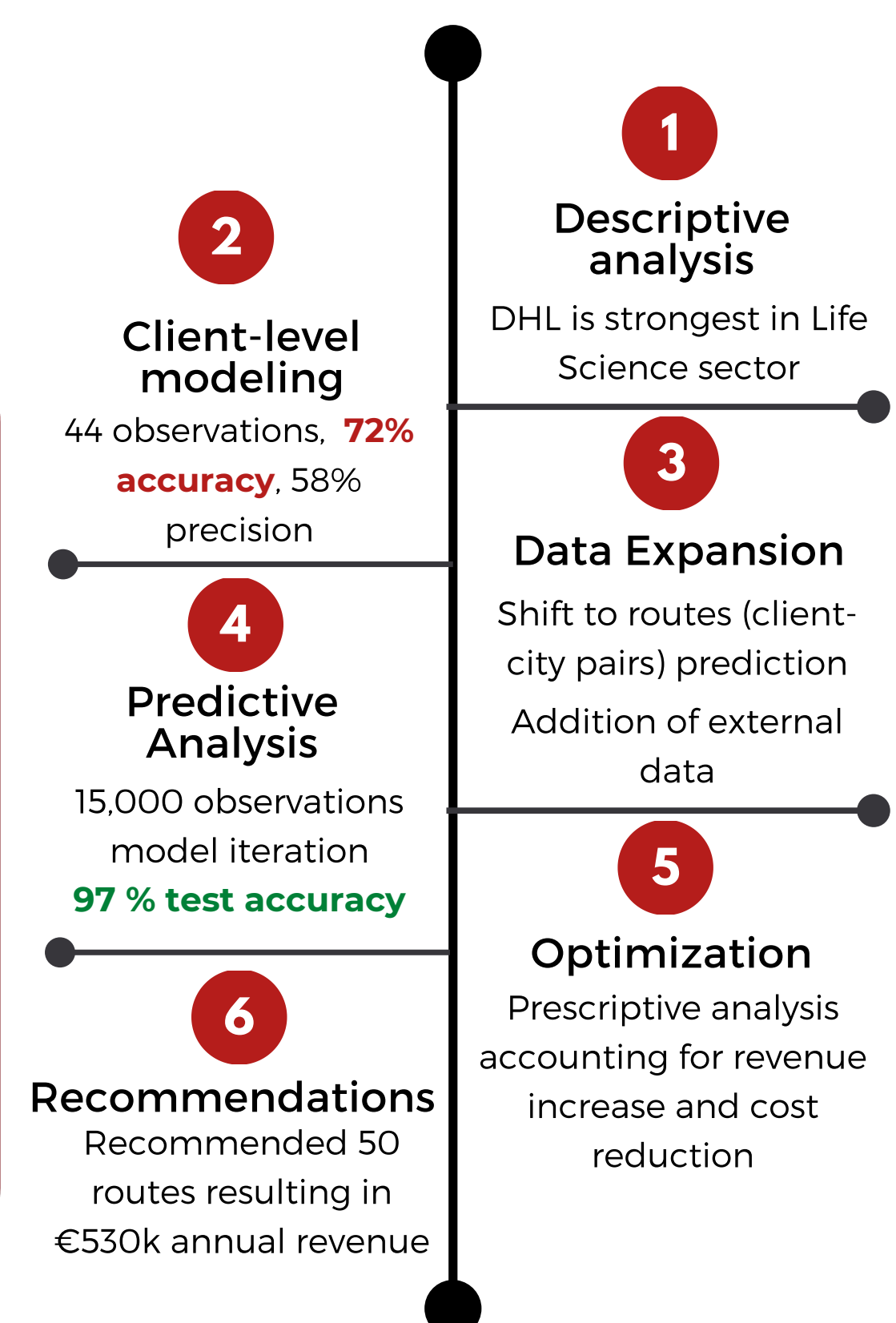


## 5 MODEL AND DATA IMPROVEMENTS

**Iterative and incremental analysis process**  
Initial predictive modeling had poor performance and high variance (only 44 observations)

It was realistic and advantageous for DHL to acquire **only part of a client's transport (route)**

This shift to **route-prediction** was the turning point in the project



## 6 PREDICTIVE ANALYSIS

Machine learning models were used to predict **whether a route is serviced by DHL**

Routes predicted to be TSP by DHL but are not (false positives) are flagged as acquisition targets

**State-of-art interpretability methods** (SHAP) were used to foster confidence in the results

**Model selection** was an iterative process involving **technical and business requirements**. The *no-sector* model provided the most value to DHL for expanding outside the Life Science sector

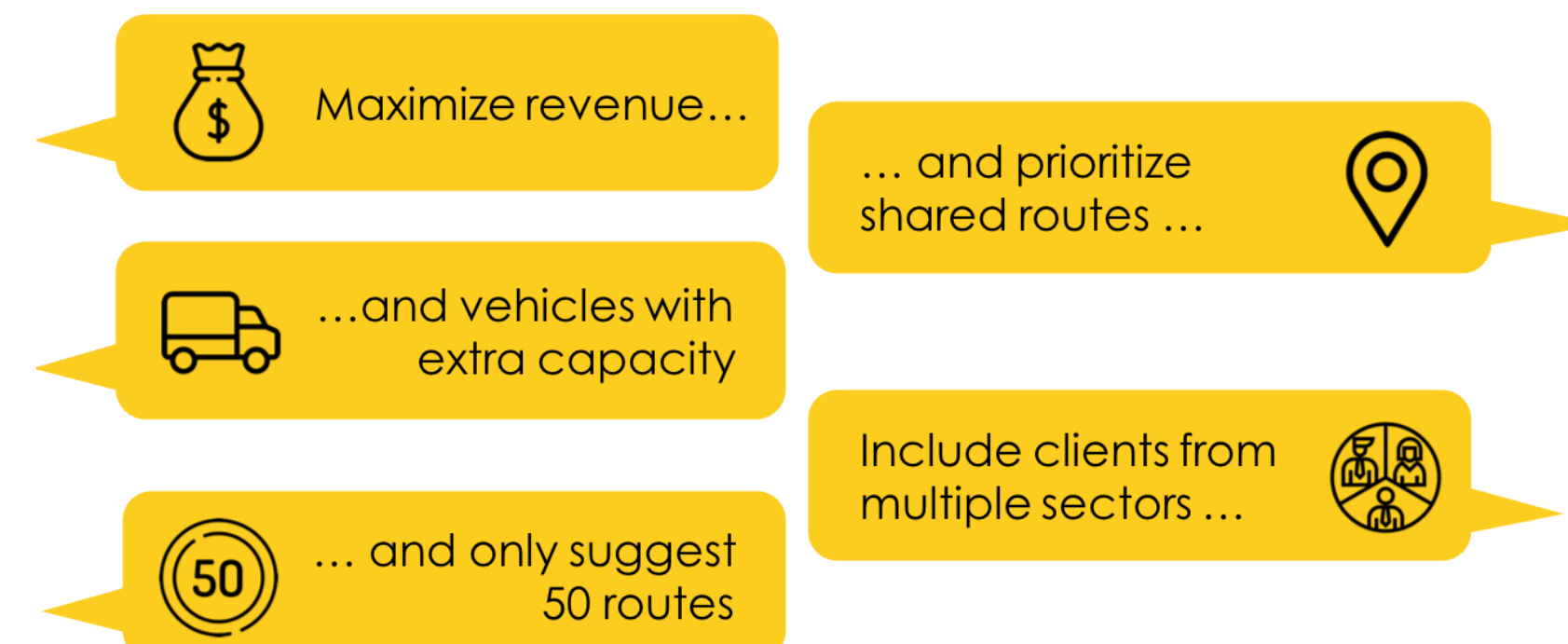
Model	Data	Interpretability	Business value	Performance
Decision Tree	Initial client data (44 rows)	✓	✓	72 %
Decision Tree	Full Data (15k rows)	✓	✓	96 %
Random Forest	Full Data	✓	✓	97 %
Decision Tree	Excluding the sector variable	✓	✓	95 %

## 7 PRESCRIPTIVE ANALYSIS

We refine the recommendations from the predictive model with added business requirements via a **mathematical integer optimization implementation**

The inputs are the **false positives from predictive analysis**, in addition to route data (revenue, # shipments, vehicle capacity, sector, etc.)

The **multi-objective optimization** balances revenue maximization and cost synergies



## 8 RESULTS AND BUSINESS IMPACT

**Recommendations include a variety of clients, cities and sectors**

**Revenue increase:** The 50 recommended routes account for an yearly revenue increase of almost €500,000

**Cost synergies:** We prioritize routes shared between clients and vehicles with spare capacity, enabling fixed cost to be shared among clients

**User-friendly visualizations:** The results are delivered in PowerBi, enabling the IT and Sales teams to interact with the data in an intuitive manner

**Data management:** The project revealed various improvement strategies for the DHL data storage and management processes

**Analytics knowledge sharing:** As the first data science project within DHL Supply Chain Brazil, skills and expertise gained by the team bring important future value

15K

Observations

97%

Best Model Accuracy

+25%

Overall Accuracy Improvement

50

Routes Recommended

€ 500K

Yearly Revenue Increase