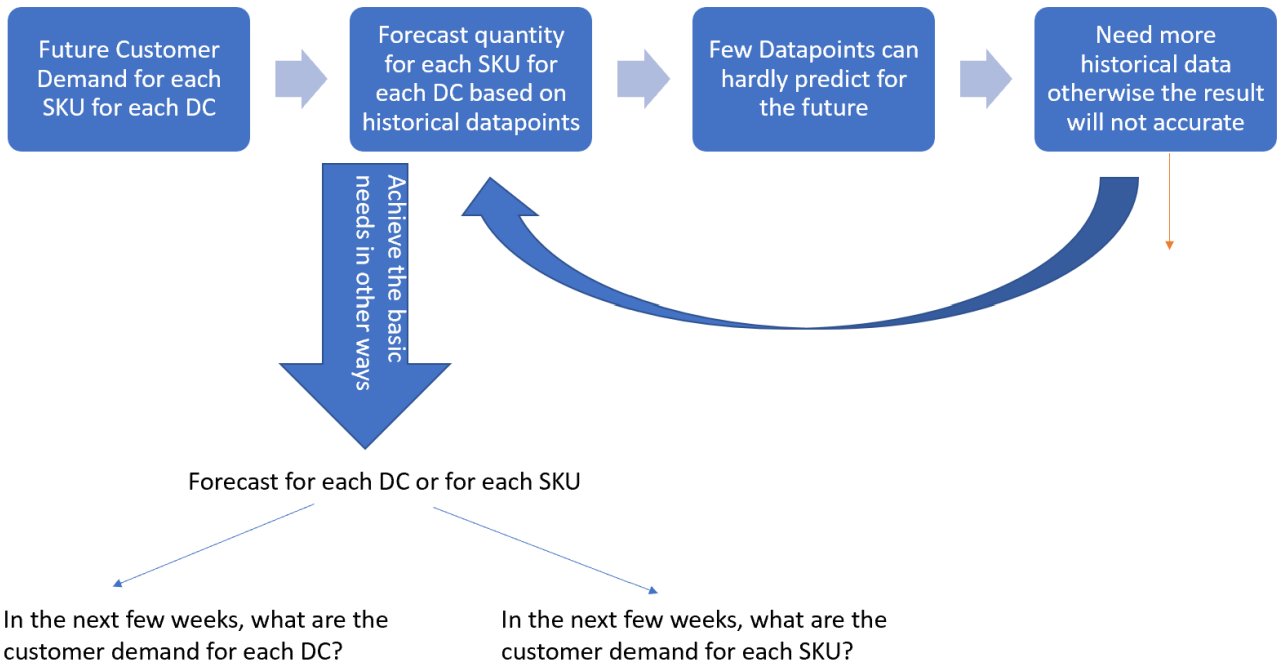
Environment Deploy

- two dataset (I renamed the file for accessing easily)
    1. royalcanin.xlsx
    2. rc.xlsx

```
try:
    from google.colab import drive
    drive.mount('/content/drive', force_remount=True)
    COLAB = True
    print("Note: using Google CoLab")
    %tensorflow_version 2.x
except:
    print("Note: not using Google CoLab")
    COLAB = False
```

```
Mounted at /content/drive
Note: using Google CoLab
```

```
file='/content/drive/My Drive/projects/royalcanin.xlsx'
file_path='/content/drive/My Drive/projects/rc.xlsx'
```



Key Obj:

A. Understand Royal Canin's current product demand by reviewing and analysing their customer demand data. The team will utilize historical demand to forecast future

customer demand.

here we find for each dc, the datapoints of each sku are few

What variables we can use now?

- Order Date (d)
- Order Quantity

What we need?

- volume
- price
- safety stock

If we want to predict the demand for future date without other variables/factors to indicate, we should use time-series analytics

- **classical method: ARIMA (use time lag to do forecasting); relevant article**
  - we need to test stationarity for better forecasting results
- **new tech: Deep Neural Network, like CNN & LSTM; tutorial handout**
  - we can use more variables to perform - more accurate (in practical but hardly understand how does it work)

B. Identify the optimal inventory levels at each of Royal Canin's 8 distribution centers for each of their SKUs by analyzing the relevant demand and supply chain data. The team will create recommendations for amount of safety stock held at the distribution centers to best meet the demand for their customers.
if we want to find the optimal inventory, we can use non-linear programming optimization model

- **define an objective: e.g. max the profits / min the total cost**
- **understand our decision variables: change the variables to meet the objective**
- **find the best result: constraints / limitations**

$$e.g. y = a + b * x_1 + c * x_2 + d * x_3$$

where:
x1 <= c;
x2 <= c;
x3 >= c;

C. Share additional insights that can inform Royal Canin's future distribution strategy, especially as they plan for future changes in their distribution network.

Dataset 1

Data Preprocessing

- *notice:*

    1. null value
    2. combine **orlando** into **atlanta**, miami will be excluded
    3. date type

↳ *45 cells hidden*

Time Series Forecasting Model

- important article

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DATA-2

- Info Extraction

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