Telling Compelling Data Stories with Power BI in Jupyter Notebooks

Anh Tran

Power BI
Next Step

Sponsors

twoday kapacity

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ITPA consulting

dataon

About me.

- 12+ years of experience in data analytics and data management in different industries such as finance, technology, and wholesale across Asia and Europe

- Featured Articles on

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Agenda.

- **Motivation?**
  5 mins

- **Demo/ Technical know how**
  15 mins

- **Case Study**
  15 mins

- **Key Takeaways**
  5 mins

Power BI
Next Step

Motivation/ why care?

Motivation

- Notebook helps collaboration

- Power BI helps the interaction

4 months ago
@
I really don't understand the point of this.

Reply

Demo

Case Study

Case Study

We have data. Now what?

Goal: **Increase** the **revenue**

Metric Type	Metric Name	Expectation
Main	Avg Revenue/Station/Day	Increase
Supporting	Avg Charging Sessions/Station/Day	Increase
Monitoring	Customer Experience	Not Decrease
Discovering	Avg Utilization Rate/Station/Day	Increase

Data

accounts

['id',
 'creation_timestamp_utc',
 'status',
 'payment_country',
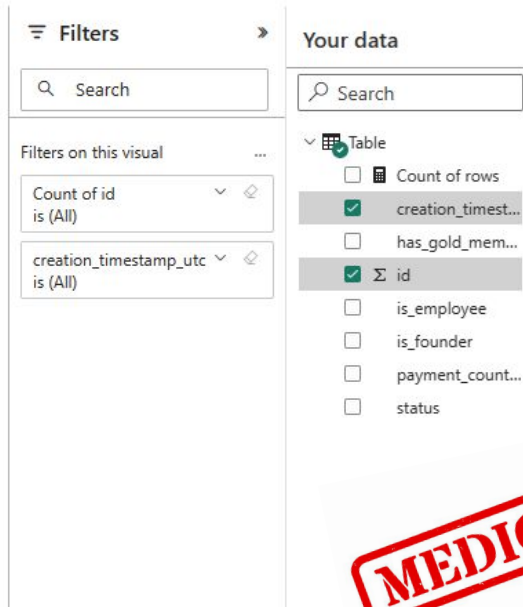 'has_gold_membership',
 'is_employee',
  'is_founder']

sessions

['id',
 'start_timestamp_local',
 'stop_timestamp_local',
 'country',
 'station_id',
 'kwh_delivered',
 'duration_sec',
 'start_authorisation_method',
 'account_id',
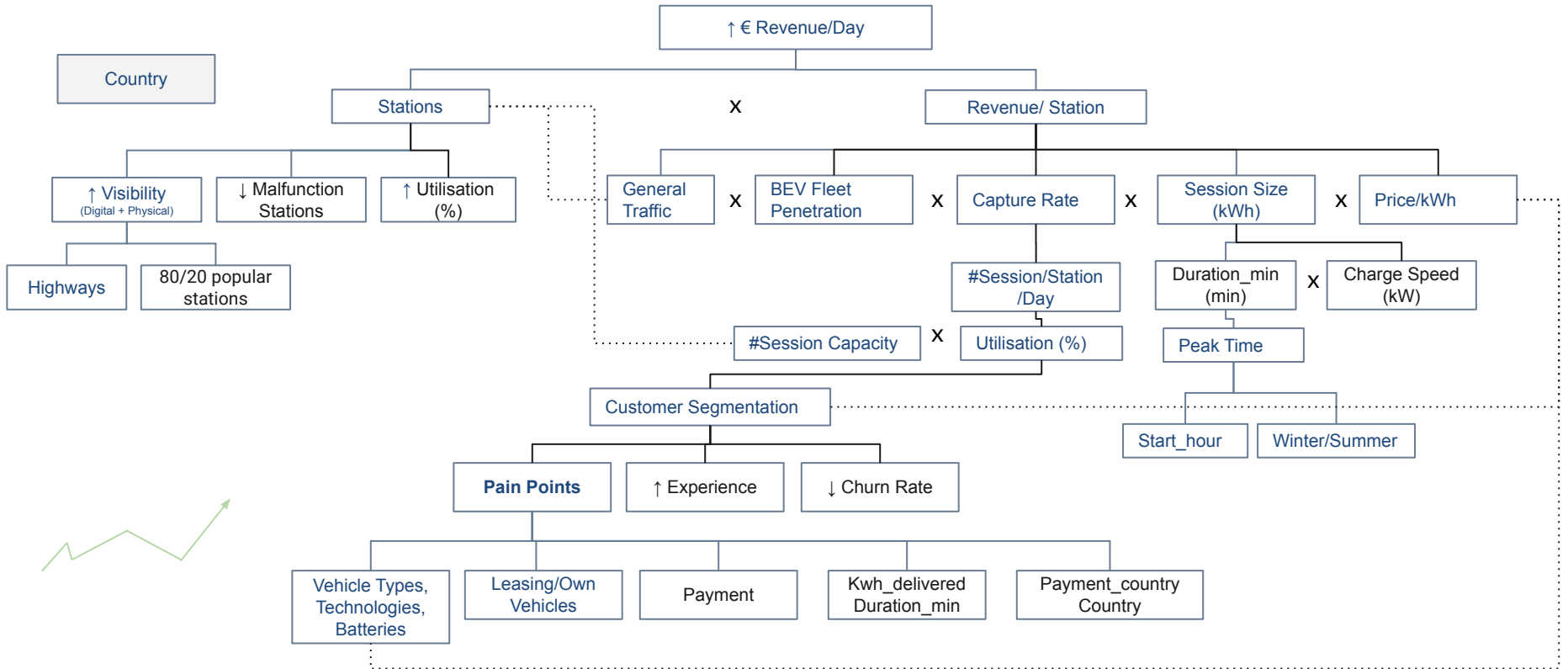 'proxy_customer_id',
 'membership_type',
  'customer_type']

Before Change

| | Motivation | Demo | Case Study | Summary |

Metrics Breakdown
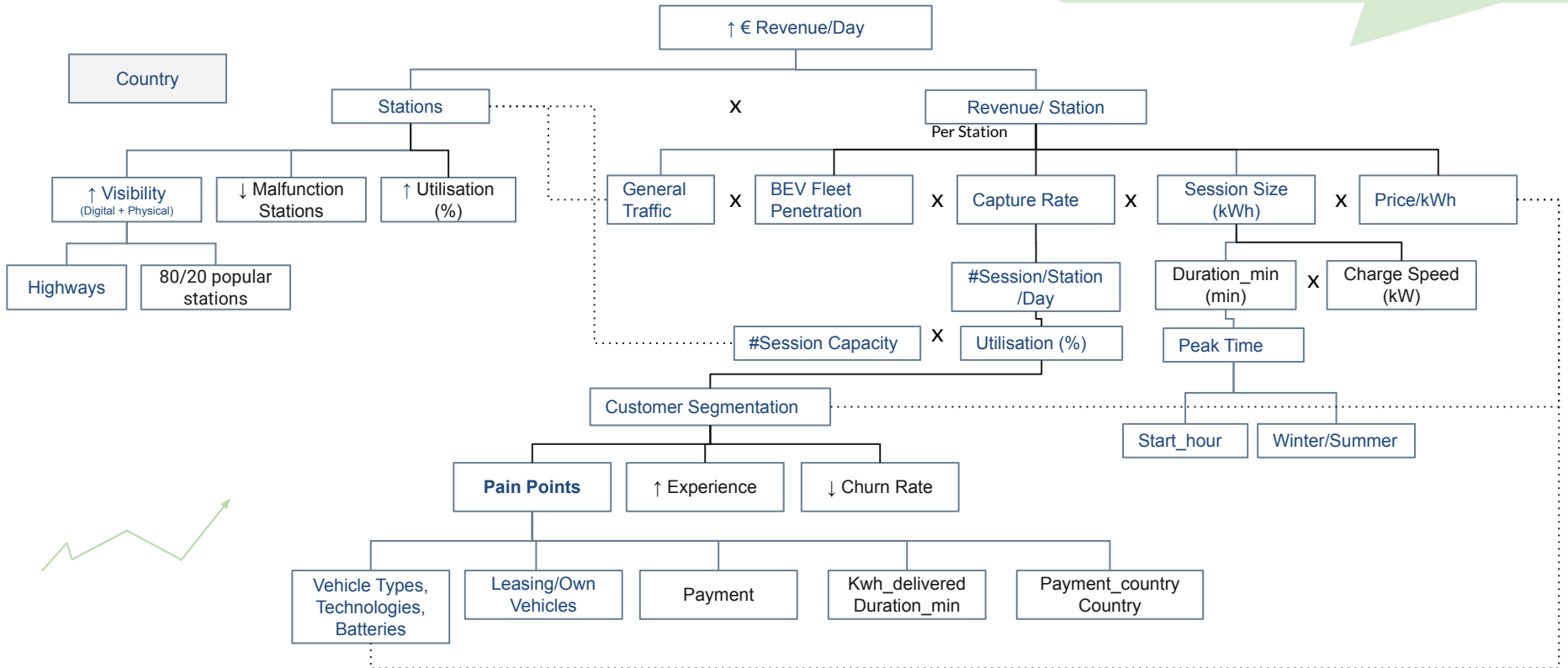
After Change

What Makes the Difference?

- Focus on Impact

- Data StoryTelling
  - Details: Title, visualise, data to pick

- Benefits of the combined power:
 - Faster to do EDA and collaborate
  - Scale up

Metrics Breakdown

Game changer is to segment customers into their **pain points**

```
↑ € Revenue/Day
├── Stations                              X        Revenue/ Station
│   │                                              Per Station
│   ├── ↑ Visibility              ↓ Malfunction    ↑ Utilisation
│   │   (Digital + Physical)      Stations         (%)
│   │   ├── Highways    80/20 popular stations
```

- ↑ € Revenue/Day
  - Stations
    - ↑ Visibility (Digital + Physical)
      - Highways
      - 80/20 popular stations
    - ↓ Malfunction Stations
    - ↑ Utilisation (%)
  - **X**
  - Revenue/ Station — Per Station
    - General Traffic **X** BEV Fleet Penetration **X** Capture Rate **X** Session Size (kWh) **X** Price/kWh
    - Capture Rate
      - #Session/Station/Day
        - #Session Capacity **X** Utilisation (%)
    - Session Size (kWh)
      - Duration_min (min) **X** Charge Speed (kW)
        - Peak Time
          - Start_hour
          - Winter/Summer

Customer Segmentation
- **Pain Points**
  - Vehicle Types, Technologies, Batteries
  - Leasing/Own Vehicles
  - Payment
  - Kwh_delivered Duration_min
  - Payment_country Country
- ↑ Experience
- ↓ Churn Rate

Country

Station Traffic

Average of number_of_daily_sessions_per_station by customer_frequent_users_category
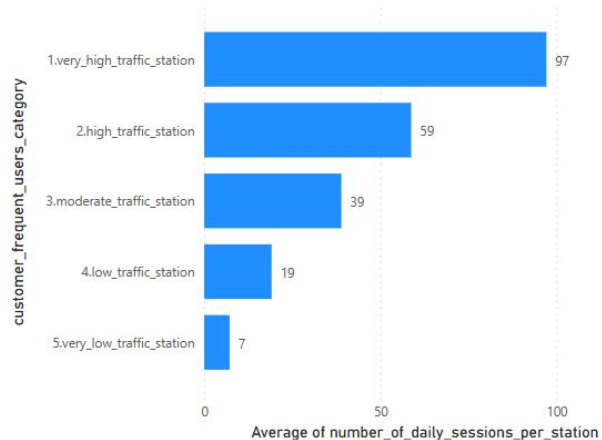
At 97.17, 1.very_high_traffic_station had the highest Average of number_of_daily_sessions_per_station and was 1,247.15% higher than 5.very_low_traffic_station, which had the lowest Average of number_of_daily_sessions_per_station at 7.21.

Across all 5 customer_frequent_users_category, Average of number_of_daily_sessions_per_station ranged from 7.21 to 97.17.

Although **Moderate to Very High Traffic Stations** account for **55%** of the number of stations, they're **responsible to nearly 80% of the sessions in operation**

Lesson: Utilising features table in powerbiclient and markdown in Notebooks to present a more compelling story
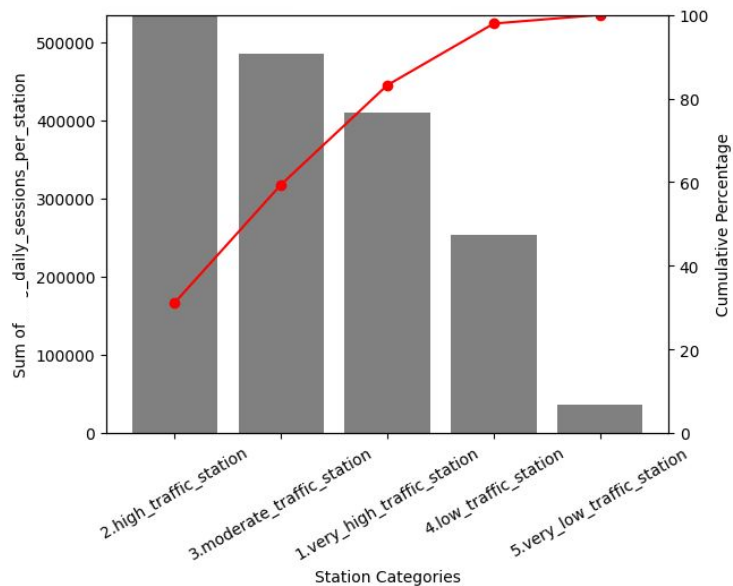
Station Traffic

> - Many customers have strong preference for convenience and familiarity
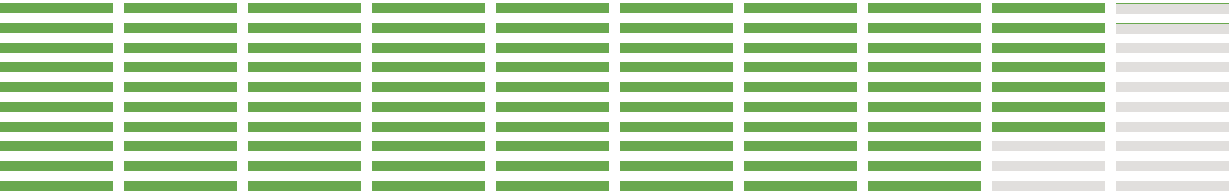> - High demand for cross-border mobility and convenience

Leveraging the power of crossed borders network
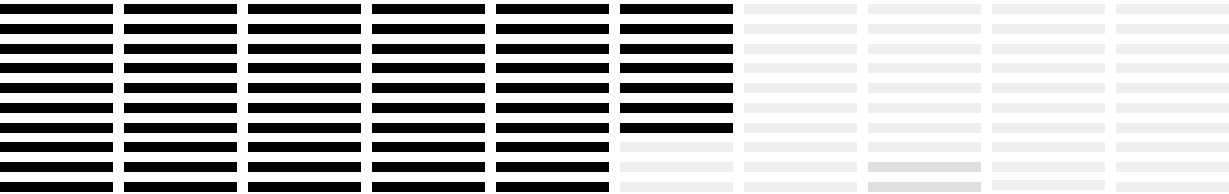
57%

Charging at Stations in at least 2 countries on a monthly basis
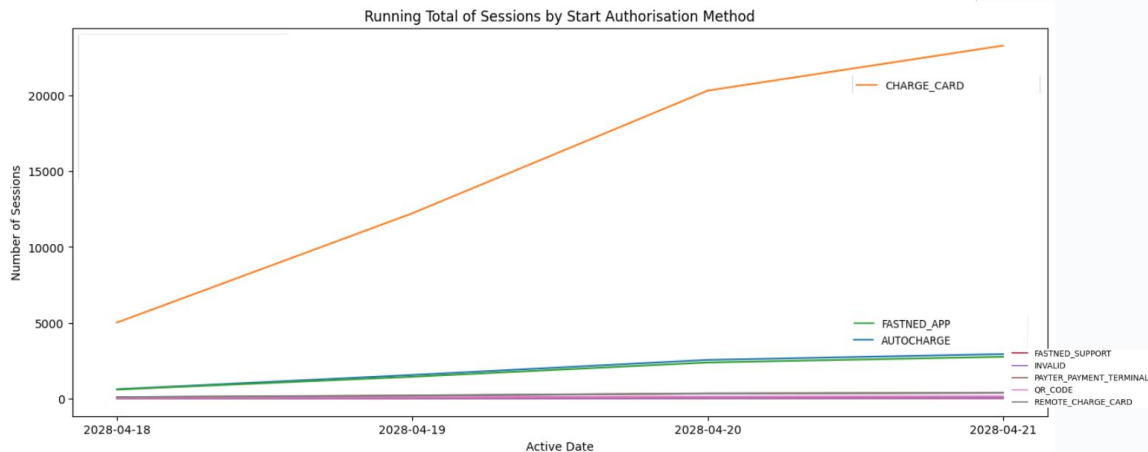
Charging as a habit

87%

Charging routinely at 1-2 stations.

Freedom

Charge_card is continued to be favorite authorisation method

Room to promote the app as authorisation method

one_auth_method (99.46%)

Running Total of Sessions by Start Authorisation Method

CHARGE_CARD

FASTNED_APP
AUTOCHARGE

FASTNED_SUPPORT
INVALID
PAYTER_PAYMENT_TERMINAL
QR_CODE
REMOTE_CHARGE_CARD

Number of Sessions

Active Date

multi_auth_methods (0.54%)

Membership

There is still room to increase numbers of customers who have Gold Membership

Encourage more people joining Gold Membership


```
percentage_by_membership ACTIVE BLOCKED CLOSED DELETED
has_gold_membership
False                      95%     85%   100%     99%
True                        4%     14%             0%

percentage_by_status ACTIVE BLOCKED CLOSED DELETED
has_gold_membership
False                98.7%    0.9%   0.0%    0.4%
True                 96.3%    3.6%           0.0%

status               ACTIVE BLOCKED CLOSED DELETED
has_gold_membership
False                 64461     585     19     261
True                   2696     102              1
```
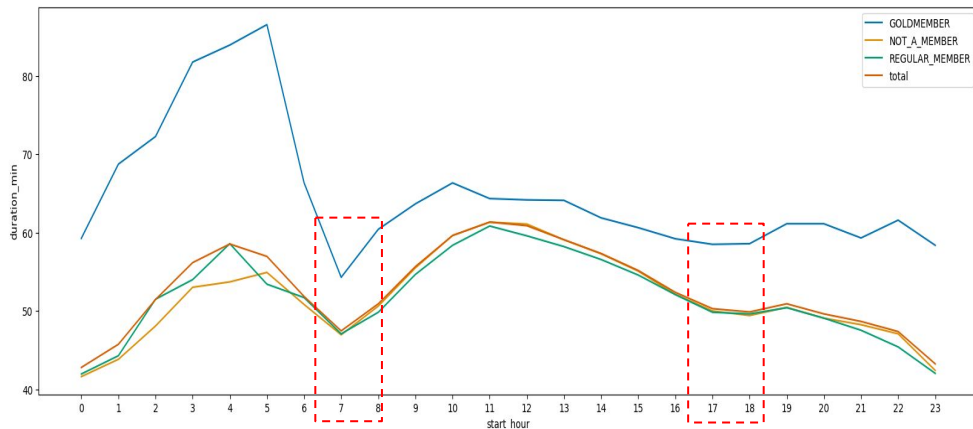
While Gold Members do share common pattern with other groups, they did spend **longer time** at Public Charging Points than the rest

Power BI Next Step	Motivation	Demo	Case Study	Summary

Up-sell Opportunities

```
customer_frequent_users_category
1.heavy_user >2 sessions/day          27    0.2%
2.frequent >=1 session/day            62    0.5%
3.routine 1 session every 2 days     846    7.3%
4.occasional 1 every 4 days         3444   29.7%
5.sporadic                          7199   62.2%
                                   11578
```

> Most of customers charged their vehicles less than 1 every 4 days

```
customer_frequent_users_category  membership_type
1.heavy_user >2 sessions/day      EMPLOYEE         1    0.0%
                                  FOUNDER          1    0.0%
                                  GOLDMEMBER      14    0.1%
                                  NOT_A_MEMBER     1    0.0%
                                  REGULAR_MEMBER  10    0.1%
2.frequent >=1 session/day        GOLDMEMBER      38    0.3%
                                  REGULAR_MEMBER  23    0.2%
3.routine 1 session every 2 days  FOUNDER          5    0.0%
                                  GOLDMEMBER     249    2.2%
                                  REGULAR_MEMBER 589    5.1%
4.occasional 1 every 4 days       FOUNDER          4    0.0%
                                  GOLDMEMBER     514    4.4%
                                  REGULAR_MEMBER 2931  25.3%
5.sporadic                        0                1    0.0%
                                  FOUNDER          7    0.1%
                                  GOLDMEMBER     550    4.8%
                                  REGULAR_MEMBER 6664  57.6%
```

> Potential to **upgrade** them to **Gold Membership**

Retention
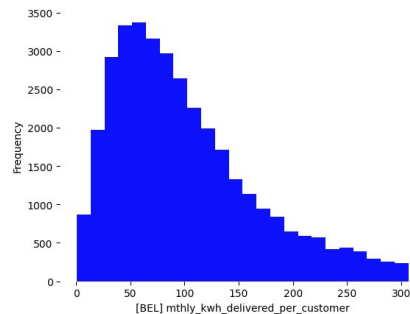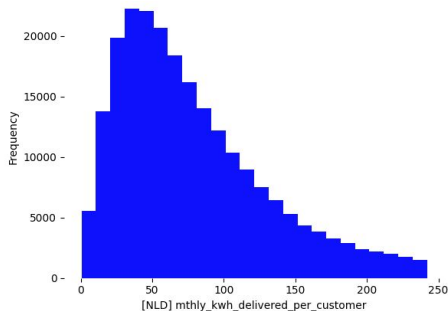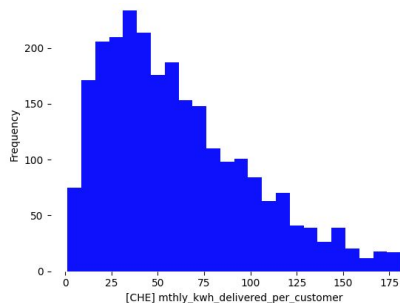
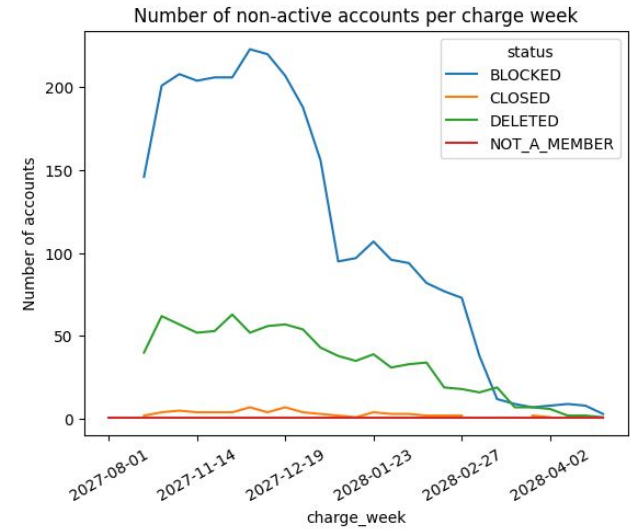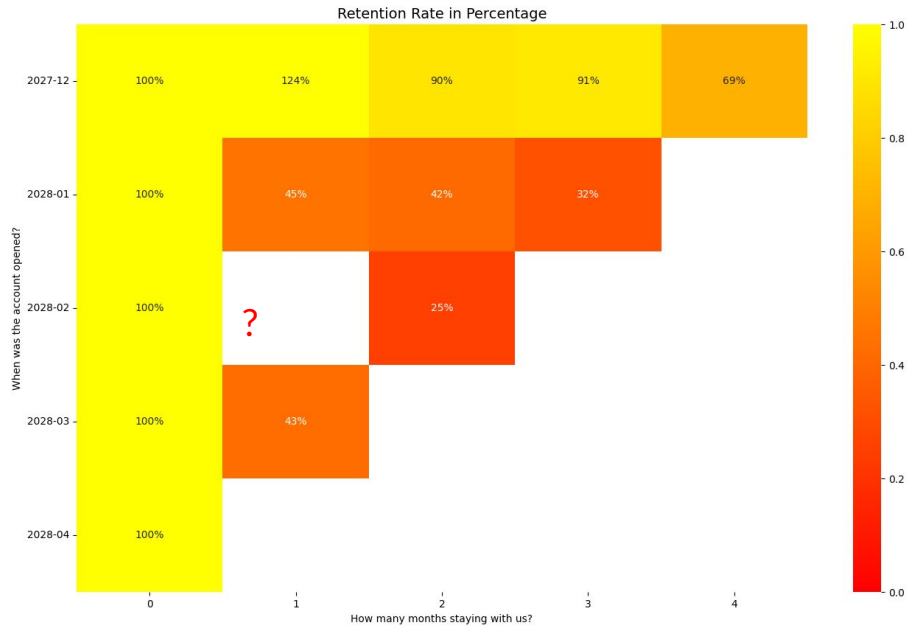Retention rate varies across different cohorts of customers
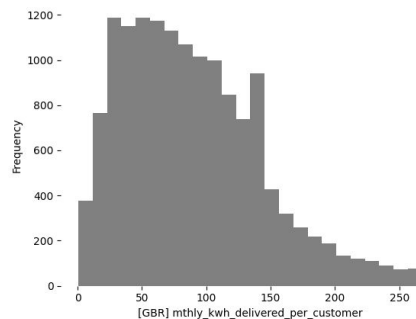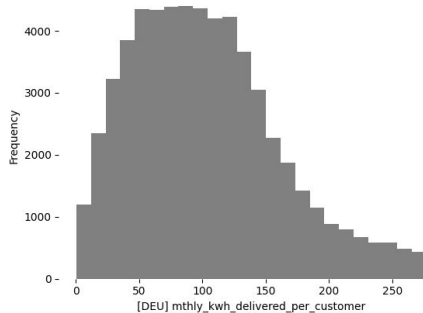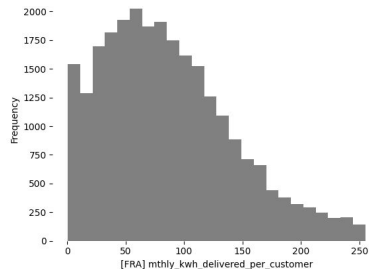
The combined power allows a quick overview of all distributions

When it comes to colour, less is more

Retention

Retention Rate in Percentage

Number of non-active accounts per charge week

A More Scientific Approach

Long-term game- Journey/ Roadmap

Customer Willingness to pay

Identity

Customised Experience
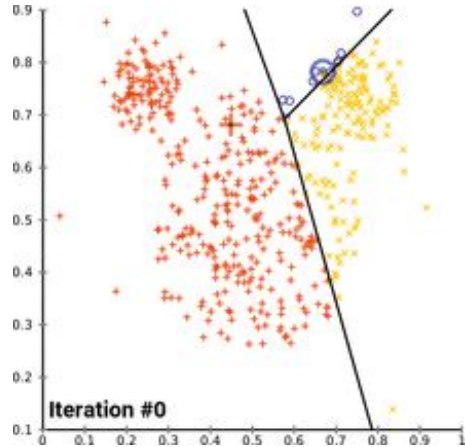
Love, belonging
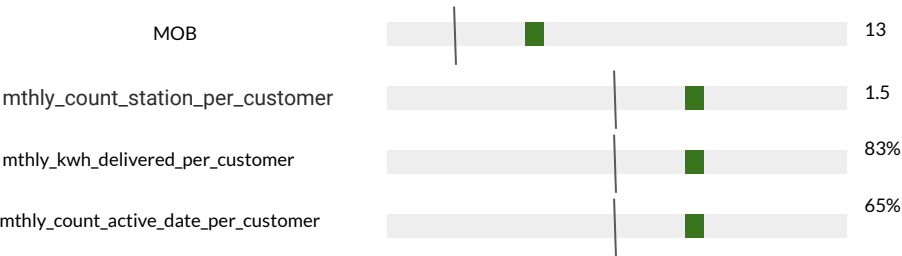
Reliability

Transparency

Freedom
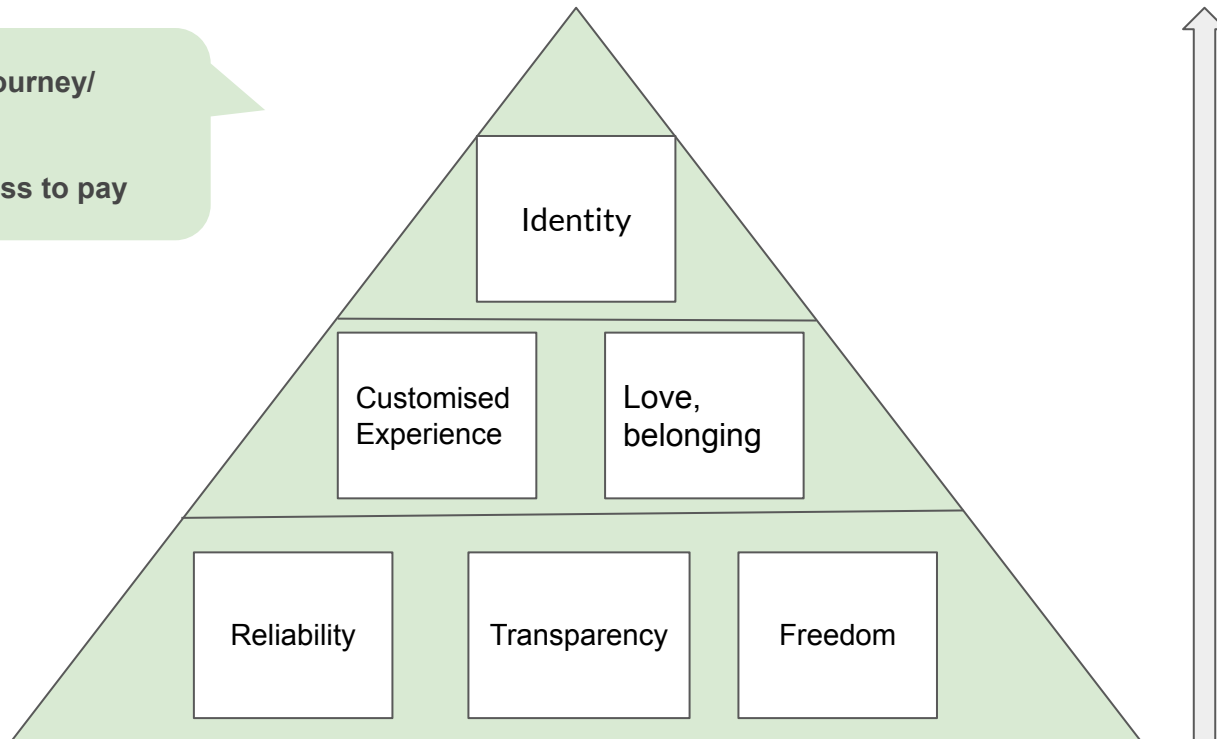
Customer Need Based Segmentation

Cluster Analysis

Customer Need Based Segmentation

I want Affordable Price

- I love the idea of reservation app
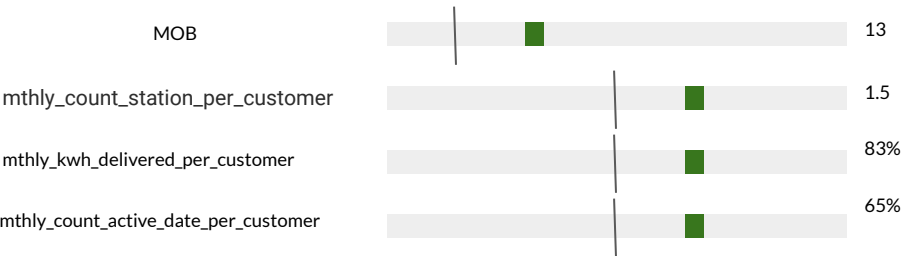
MOB		13
mthly_count_station_per_customer		1.5
mthly_kwh_delivered_per_customer		83%
mthly_count_active_date_per_customer		65%

Customer Need Based Segmentation

I value convenience

- For me, time is more important, therefore I rarely use reservations app

MOB		13
mthly_count_station_per_customer		1.5
mthly_kwh_delivered_per_customer		83%
mthly_count_active_date_per_customer		65%

Customer Need Based Segmentation

I value Loyalty

- I seek for particular Brands before charging
- I love redeeming points with the app's **partners**

MOB		13
mthly_count_station_per_customer		1.5
mthly_kwh_delivered_per_customer		83%
mthly_count_active_date_per_customer		65%
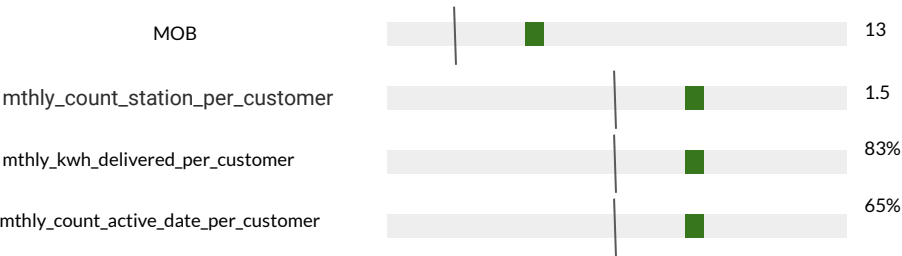
Key Takeaways

A Compelling Visualisation

An impactful message is a compelling narrative tailored for its audience.

- Who is the audience?

- How can the data help them make decision?

- What data points help and does not help with the goal?

Limitation

- Have not support all visualisation features as in Power BI Desktop

Thank you

Appreciate Your Feedback

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