Hello! My name is Yongshi Lin, you can call me Yuri. I am going to record a video about doing data visualization & analysis in Tableau.

Look for dataset(s) and think of what questions you may ask and answer from it. To do data visualization, large dataset with over 6 variables might be better.

1. Download the dataset(s). Clean the dataset(s). (pre-work)
2. Import datasets into Tableau. Link them. Pivot data if it’s needed.
3. Write down your research purpose, key obj., key factors, design process, storyline after exploring your dataset.
4. Look up some data viz chart types for inspiration.
5. Writ down your key findings/insights.

(I have written down what I think after exploring the datasets. So here we see 4 categories in parameter in the dataset, I didn’t understand what they mean, so I look up some background info. About Electric Vehicles. **EV sales means the yearly sales performance of the EV; EV stock means the accumulated EV currently in use on the road per year**.

Since the absolute value and the ratio are important for my study purpose, and these 2 different variables/aspects are also important for me for the key objs, I decide **to create calculate fields in Tableau**. Otherwise, in each worksheet I will need to keep filtering for the parameter, too much work.

If you not sure about the calculation, look up the formula, or double check with your dataset if you think you are correct. I am going to skip here.

Now I have extracted sales and stocks from parameter. Lets figure out the key factors before we explore the data viz. )

**Purpose:**

Analyze global EV sales & adoption data from 2010 to 2023 to understand regional trends & growth opportunities.

**Key objectives:**

1. Examine EV sales data & EV stock data
2. Recognize emerging markets & mature markets
3. Compare trends in emerging markets & mature markets

**Key factors:**

EV sales (EV sales rate & EV sales)

EV adoption (EV stock rate & EV stock)

Powertrain type

Vehicle mode

Others: GDP pc, Population

**Design Process**

Follow this principle:

“Overview first, zoom and filter, then details-on-demand.” – Shneiderman’s mantra.

**Storyline:**

Global overview – Geo map, Tree map, Comparison [change over time]

Exploration – Relationship (with Other factors) [change over time]

Domain market – Composition, Comparison [change over time]

1. **Global overview – Geo map, Tree map, Comparison [change over time]**

[since our dataset has lots of countries/locations, and a large timeline to study. I first want to create a geo map and tree map for global overview, this will be my worksheet 1 & 2]

Worksheet1-geo map:

When I try to create a geo map, go to “show me” see its suggestion. i found out my ‘region’ is not geo type(the globe symbol), so I couldn’t build one. Now I am going to change. Once I change it to “Country/Region”, “show me” will allow your to try the geo map. Double click it.

I want to use color to categorize the region, notice that the ‘region’ in the EV dataset from Kaggle is not actually region but means countries.

Then I drag ‘EV stock share’ to ‘Size’, so that on the geo map, I can easily tell what countries have higher EV stock share, this points to what countries might be mature EV markets.

Drag “Year” to “pages” for time series analysis.

Workseet2- tree map:

I want to quickly overview which countries bloom when it comes to EV sales through the years. Still use EV stock, I prefer the accumulated EV volume to recognize the steady market trend.

Note that make sure ‘year’ is discrete, not continuous, otherwise cannot get this tree map.

Worksheet3-line chart/bar chart for comparison:

This is one way to show the animation. We can see which country in which year grew vapidly. Or use gantt bar and edit “show history” to show “mark&trails” for “all”.

The other way is to just use line chart with time series.

Worksheet4-box plot to see average performance & outliers:

This is to see which countries outperform the average market performance.

Obviously, Norway & China had the highest EV stock share, meaning that they are mature market.

Worksheet5-heatmap with the percent difference to see the growing trend in all countries:

From this graph, we can see which country’s EV stock(accumulated EV on the road that year) is growing, and in which year grew strongly. Adjust the color gap in the %difference so that it reflect the growth difference better.

Adjust “Entire View” if you want to fit everything in this view.

Worksheet6-No. of EV sold %

I also want to see how EV grows as a whole in the car market.

First, we need to pivot these two columns, and rename them. So that each country in each year now has the unit value of both EV sold & non-EV sold.

In order to show the proportion as a label in the chart, we need to create a calculated field.

We also want to see percentage format. Right click, find the number format, change it.

Adding up the two sections of a bar is not 100%, something needs to be modified. Go to Label, right click, compute using select ‘total no. car sold’, it only calculates this bar/column. The default was table across, so the proportion shown was of the whole table.

Drag the countries to filter to see the proportion in a specific country. This is a very nice function about Tableau, you can see the overview/whole, as well as the specific unit. Now you can see the proportion of EV sold and non-EV sold in a specific country that you want to study.

Note, there are three “year” variables from 3 tables that I joined. I normally select the “year” from the table that I use its variables to calculate or show data viz on the worksheet.

1. **Domain market – Composition, Comparison [change over time]**

Now let’s look into which powertrain and EV type are the most popular.

Most popular powertrain: BEV & PHEV (Battery Electric Vehicles & Plug-in Hybrid EV)

Most popular EV mode: Cars

So we can focus more on BEV & PHEV Cars market.

We can also see the most popular combined powertrain & EV type:

Cars-BEV & Cars-PHEV are the domain EV choice in the recent years.

We can do more exploration here, such as focus on East Asia Market, or focus on sales in Cars-BV & Cars-PHEV. Just need to use filter function.

From the quick exploration, we find that Cars-BEV is the only domain type in Southeast Asia market, unlike many other regions. We can do further research if we want to invest in this regional market.

1. **Exploration – Relationship (with Other factors) [change over time]**

Now I want to explore the correlation between factors, object is to figure out the potential growing markets/ opportunities.

Worksheet10-Mature Markets VS Potential Markets

EV Stock Share indicates long-term EV in use rate of a country. EV Sales Share indicates sales performance. Put EV stock share as x-axis, EV sales share as y-axis as we want to see clearly the sales potentials. I also drag EV sales (absolute value) to “Size”, so the bigger the circle, the larger sales happened in that country. Use time-series animation, we can see the history trail as well. From the animation, we can see European countries started the EV trend, and when it comes to EV adoption behavior and EV sales, it is a stable market to invest. China has the largest sales volume for many years. Then is the US. However, US market is on the left bottom corner, means that US market is still not mature and might has lots of room to grow. But why US is not a leading country in EV market? We can look up more background info. Like US’s consumer preferences, etc. Building power charging stations in the US might also be more difficult?

Worksheet11-Why? Population & EV Sales

Move on to explore if population base support the volume of EV sales. We can also see that population base can be a growing factor, such as India. If India government encourage EV investment and consider other factors(consumer preference, city foundation, etc.), it could be a great market to invest.

Worksheet12- Why? GDPpc & EV Adoption

No strong relationship between these gdppc & EV sales value. There are strong relationships between GDPpc and EV sales share as well as EV stock share. I choose to leave GDPpc & EV stock share, to reflect that higher GDPpc is positively related to more EV in use/on the road.

I noticed that North European countries especially Norway, Iceland are above the trend line. While China with lower GPDpc performance than many other European countries ranked No.3 when it comes to avg EV in use.

**Key Findings/Insights:**

Mature Markets:

Emerging Markets:

Domain EV type in market:

Other factors:

**References:**

1. Kaggle Dataset: Ford, P. "Global EV Sales (2010–2024)." Retrieved from https://www.kaggle.com/datasets/patricklford/global-ev-sales-2010-2024 .

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3. Maddison Project Database: "Historical GDP Data (2023 Release)." Retrieved from https://www.rug.nl/ggdc/historicaldevelopment/maddison/releases/maddison-proj ect-database-2023?lang=en.