



SMARTBRIDGE
Let's Bridge the Gap



Smart
Internz

**Visualization Tool for Electric Vehicle Charge and
Range Analysis**
Project Based Experiential Learning Program

Visualization tool for electric vehicle charge and range analysis

1. Introduction

1.1 Overview

India is a country with the third largest road network in the world. Electrification of passenger vehicles is ever more certain following the launch of many more EV offerings from vehicle manufacturers, legislation to curb Internal Combustion Engine (ICE) powered vehicles and municipal concerns over air quality. Policy makers, technologists, energy regulators, vehicle and EV infrastructure industries are increasingly concerning themselves with enhancing enablers and removing barriers to EV adoption. This recognition and call to action is playing out to differing degrees worldwide and, by being proactive, the UK has the potential to build on its position as the third largest vehicle producer in Europe and expand its vehicles offering and supporting arrangements.

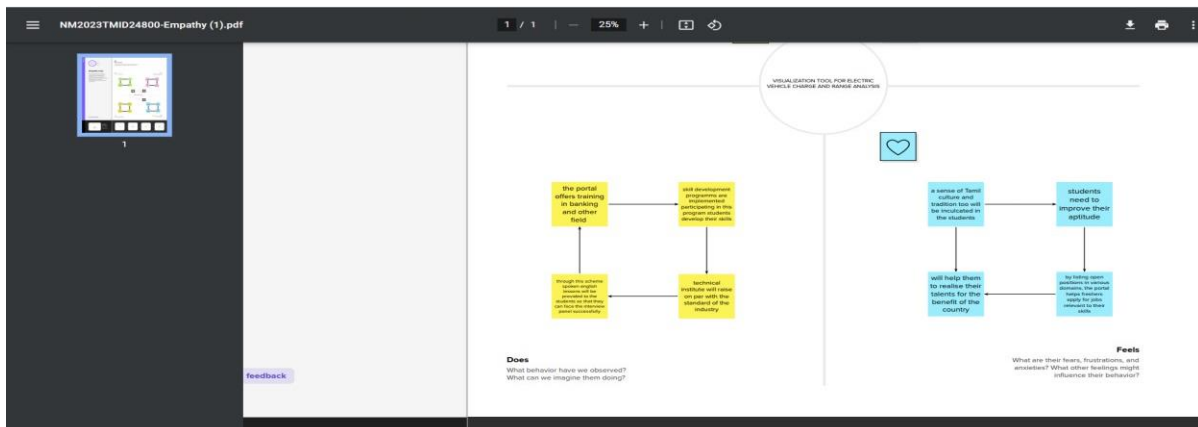
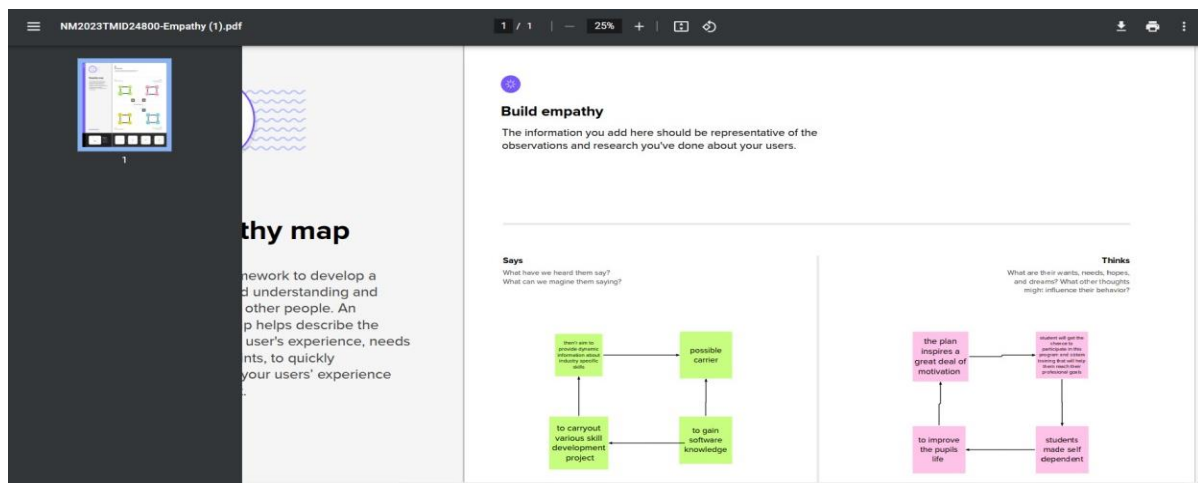
1.2 Purpose

Against this background, in January 2018, a cross Catapult working group drawn from Future Cities, Transport Systems, High Value Manufacturing and Energy Systems Catapult consulted with a broad range of stakeholders that were affected directly by, or could seize opportunities presented by, the mass adoption of EVs.

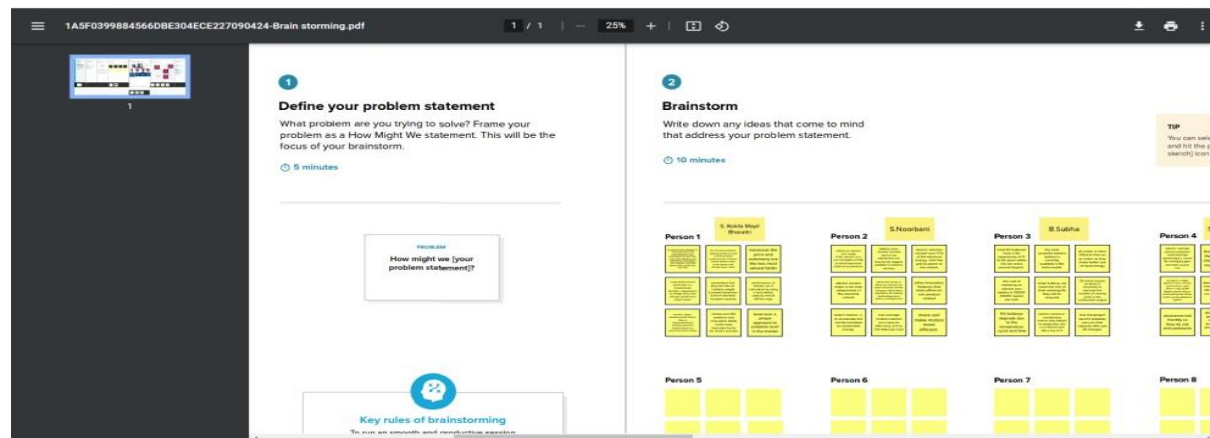
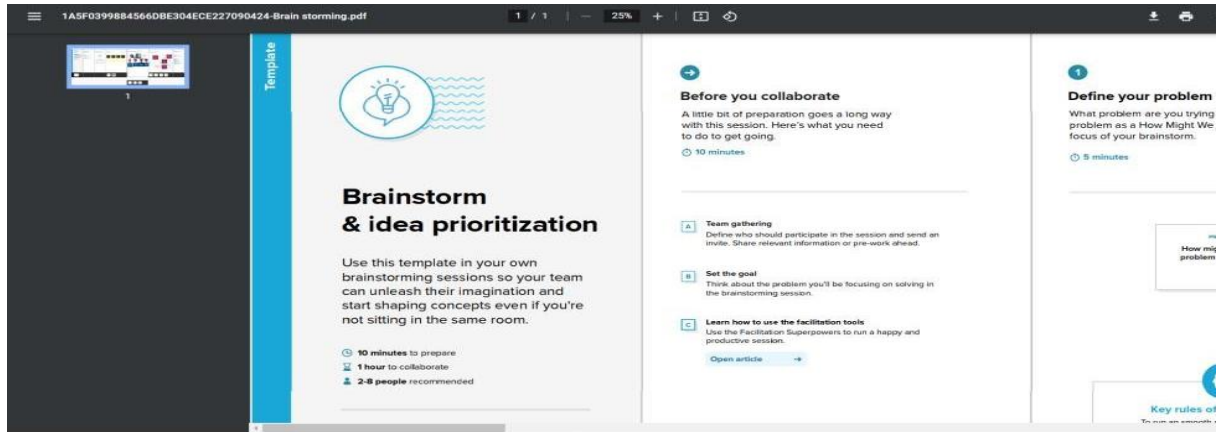
Several years ago, the number of highway-capable EV options was limited, but the variety of makes and models on the market is now quickly increasing. There are currently in excess of 40 highway-capable fully-EV models on the market and many more due for release in the coming year. In addition to passenger cars, Hackney Carriages², vans and buses are now on the market too and in operation in several cities. Electric heavy goods vehicles are towards the latter stages of development and are starting to be offered for commercial release. By 2025 it is expected that most types of ICE vehicle will have an EV equivalent available.

2. Problem definitions and design thinking

2.1 Empathy map



2.2 Brainstorming map



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1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

How might we [your problem statement]?

Key rules of brainstorming

To run an smooth and productive session

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP You can select and hit the pencil icon to start drawing!

Person 1: 5. Reduce speed, 5. Noorban, 5. Subha

Person 2: 5. Noorban, 5. Subha

Person 3: 5. Subha

Person 4: 5. Subha

Person 5: 5. Subha

Person 6: 5. Subha

Person 7: 5. Subha

Person 8: 5. Subha

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1

TIP You can select a sticky note and hit the pencil icon to start drawing!

Person 4: 5. Boundaries

Person 5: 5. Boundaries

4

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

20 minutes

TIP Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

electric vehicles

vehicle type

charging scenario

barriers of electrical vehicle

optimization technique

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TIP Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

optimization technique

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

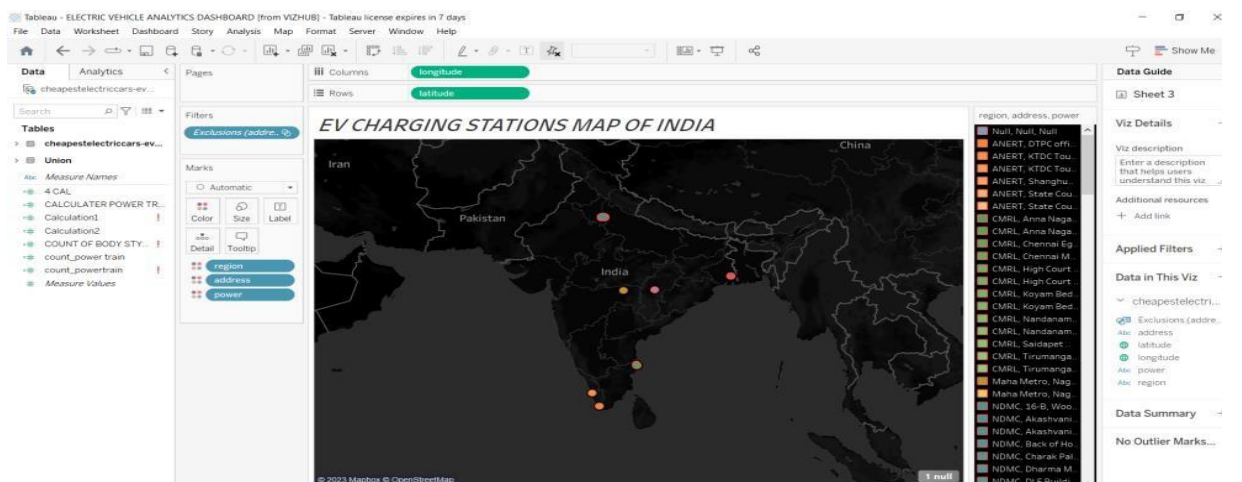
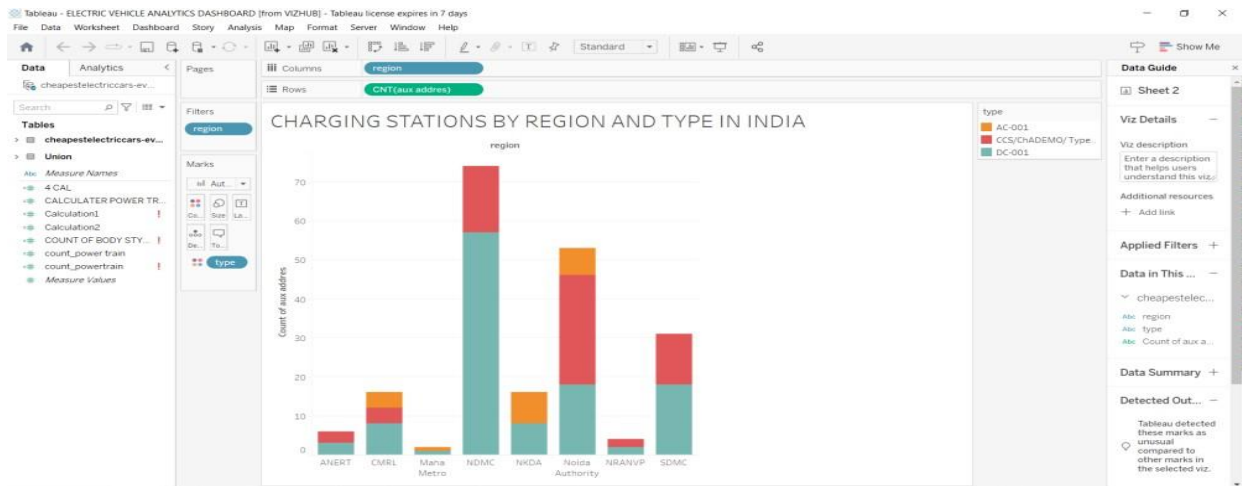
moving forward means not to accept the calamities of life to break you. it means that you are willing to continue even during times of great difficulties

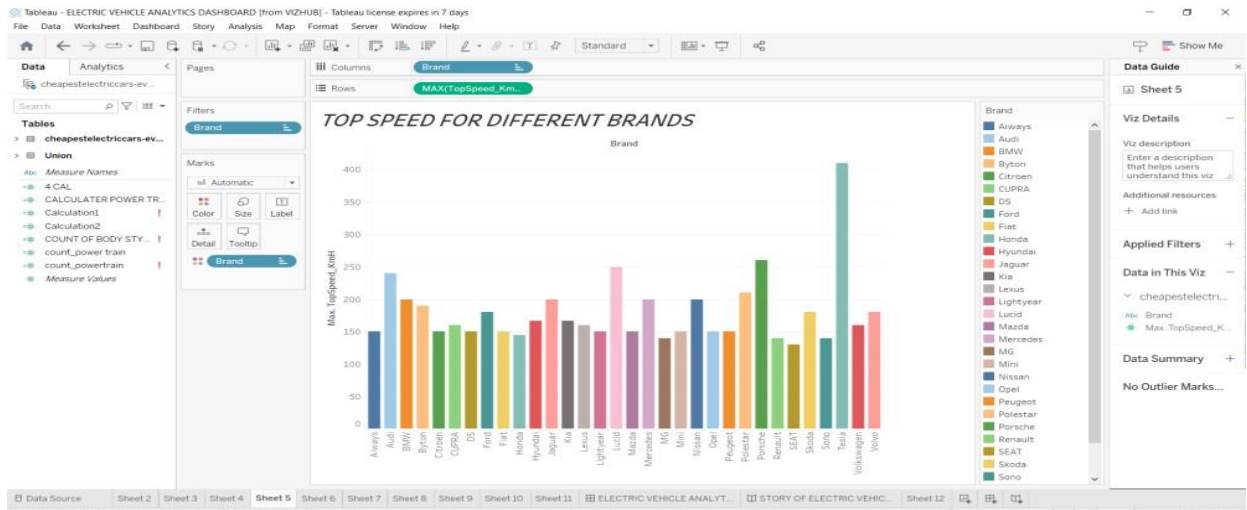
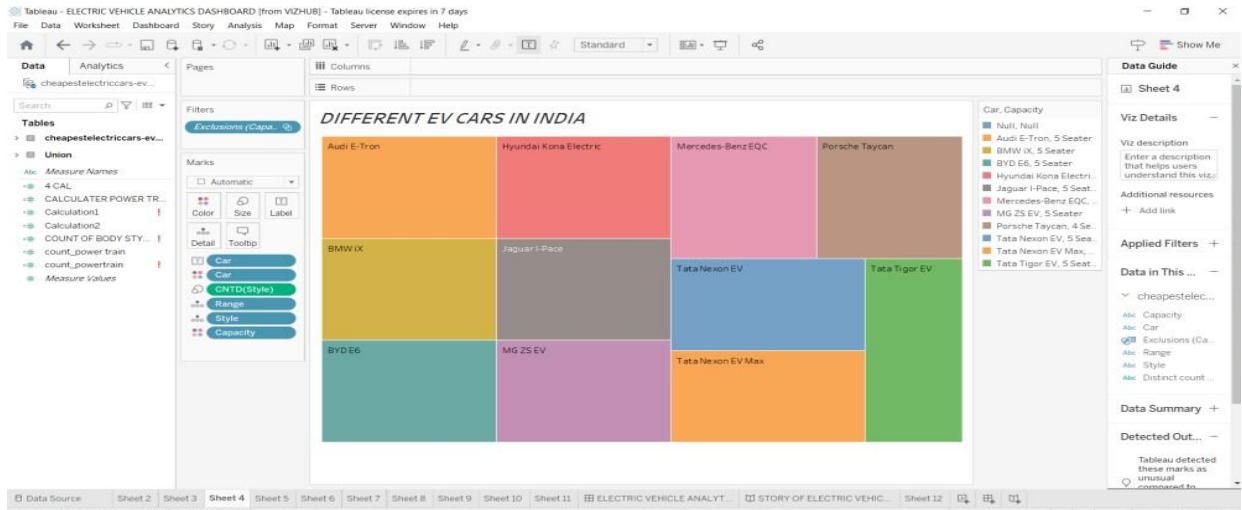
another integral aspect of moving forward is patience

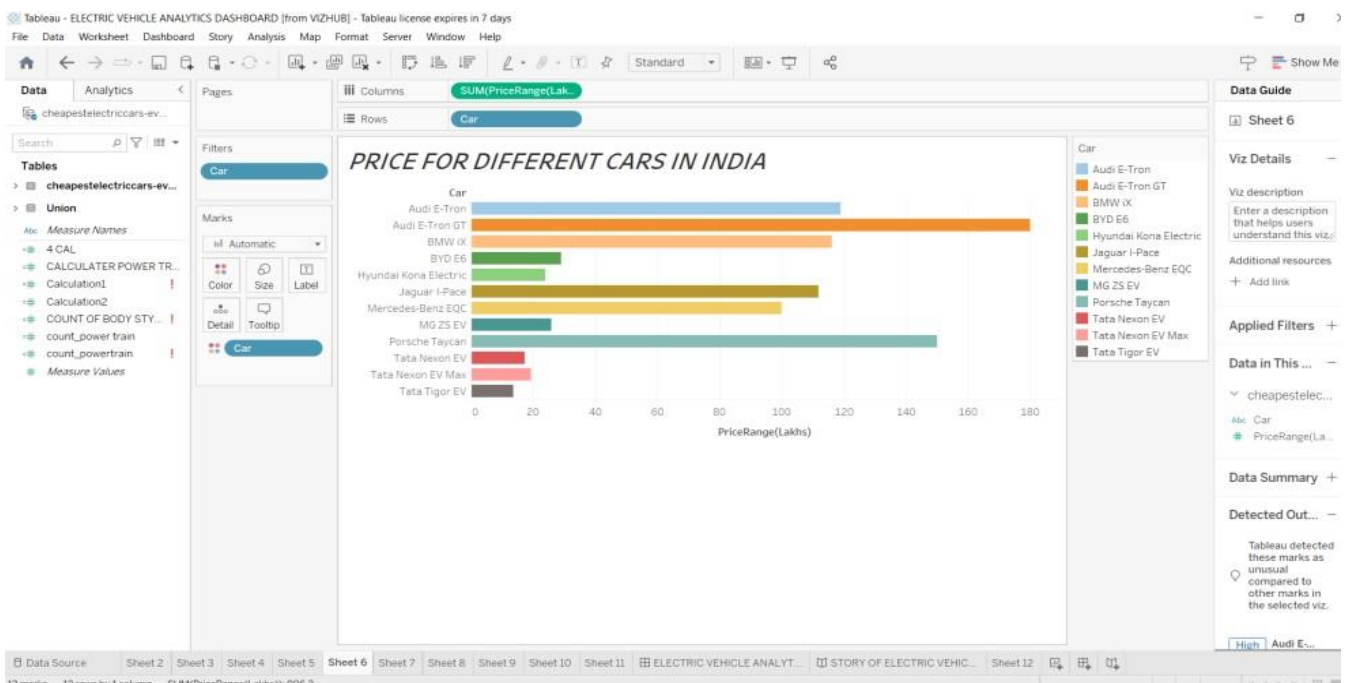
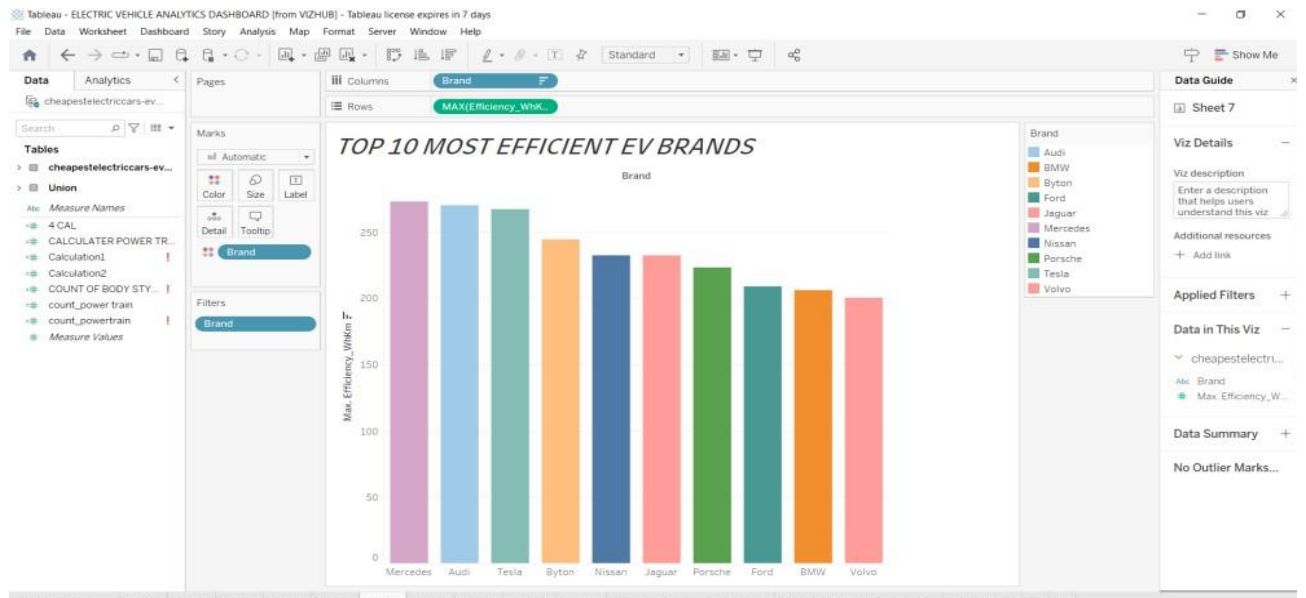
you do not allow external circumstance to stop you from

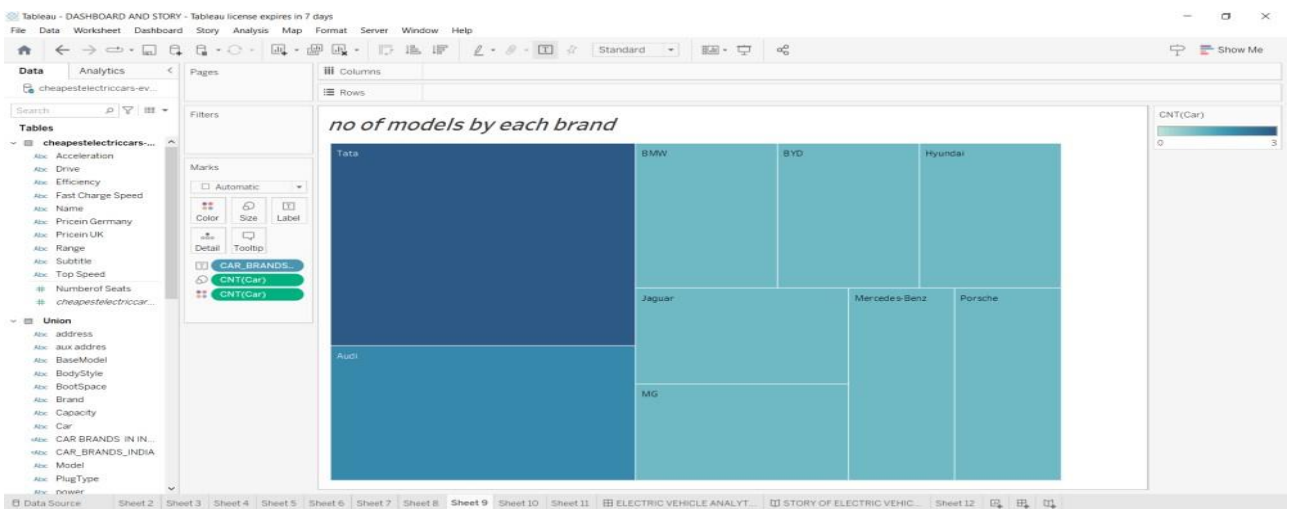
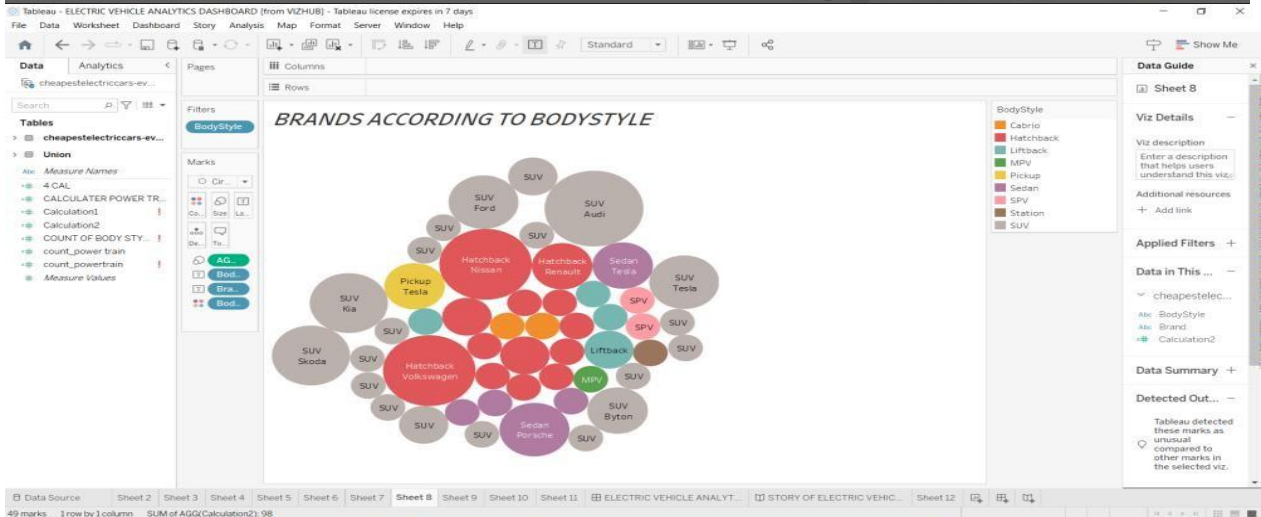
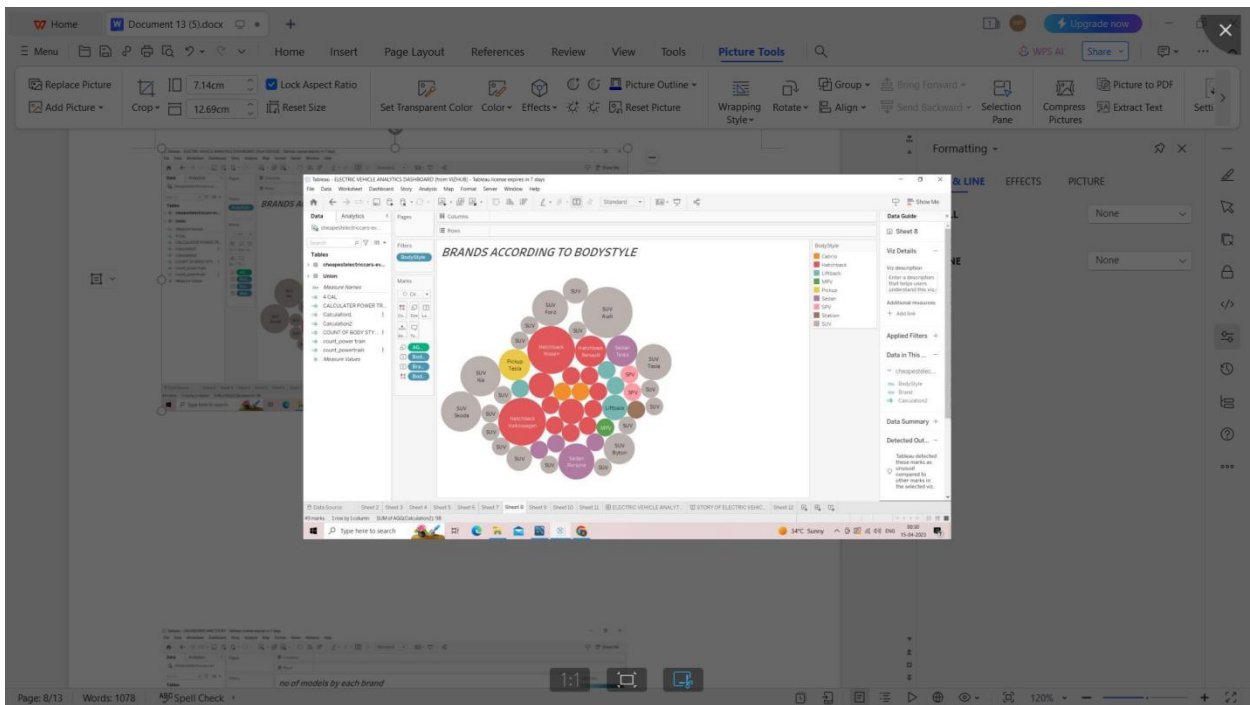
3. Results

3.1 Dashboard results

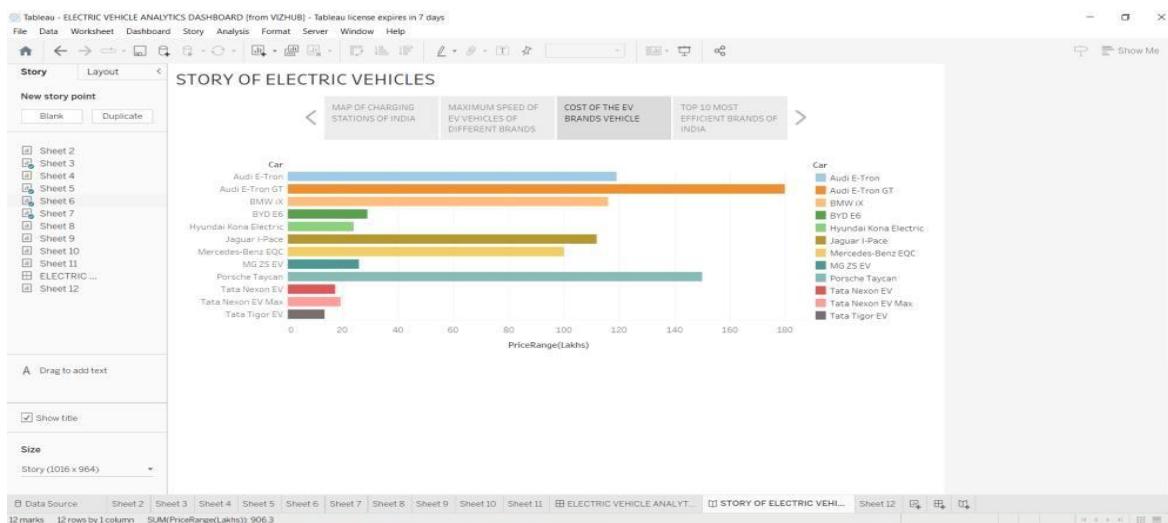
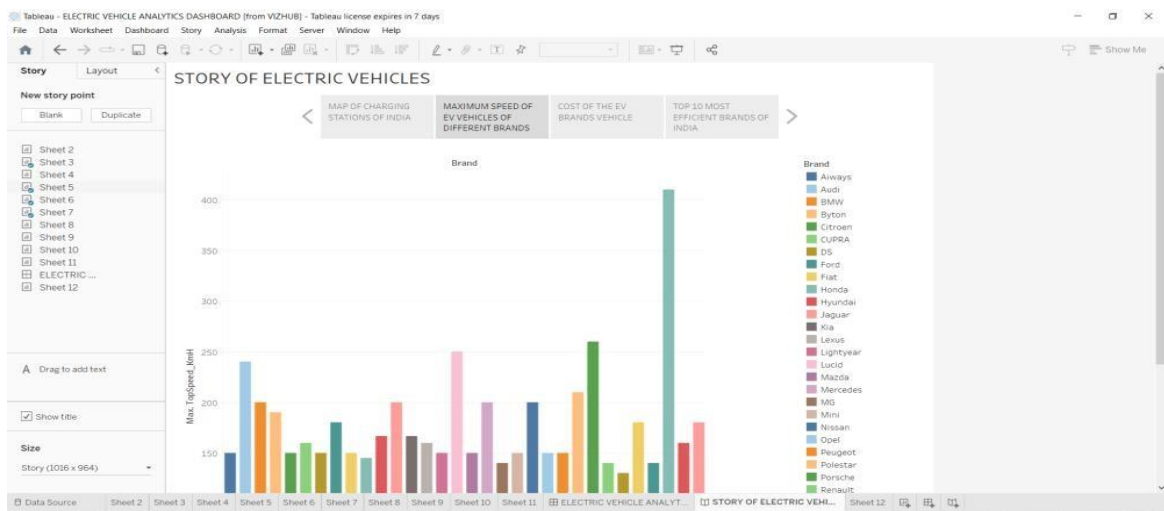
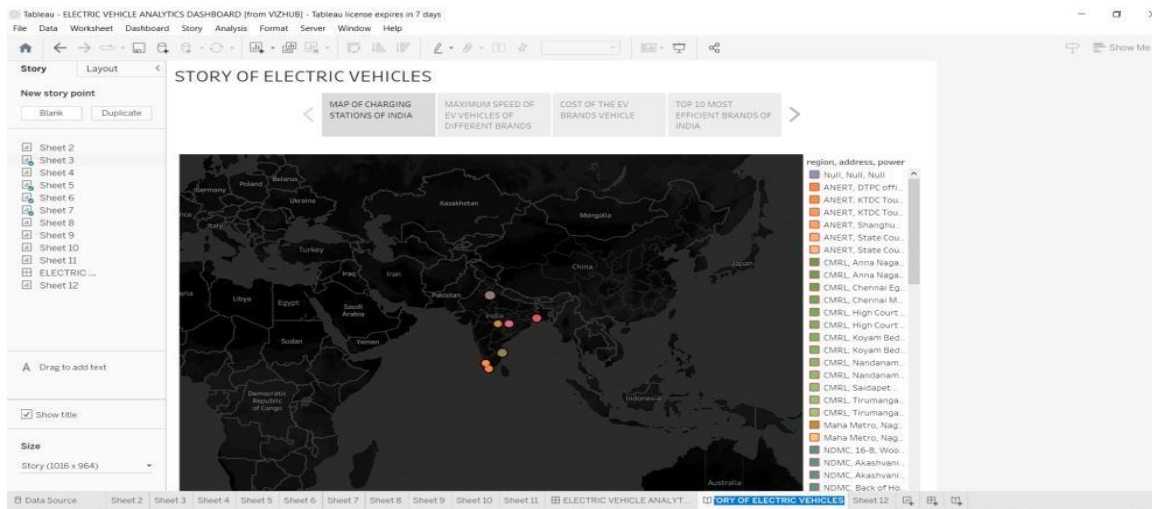


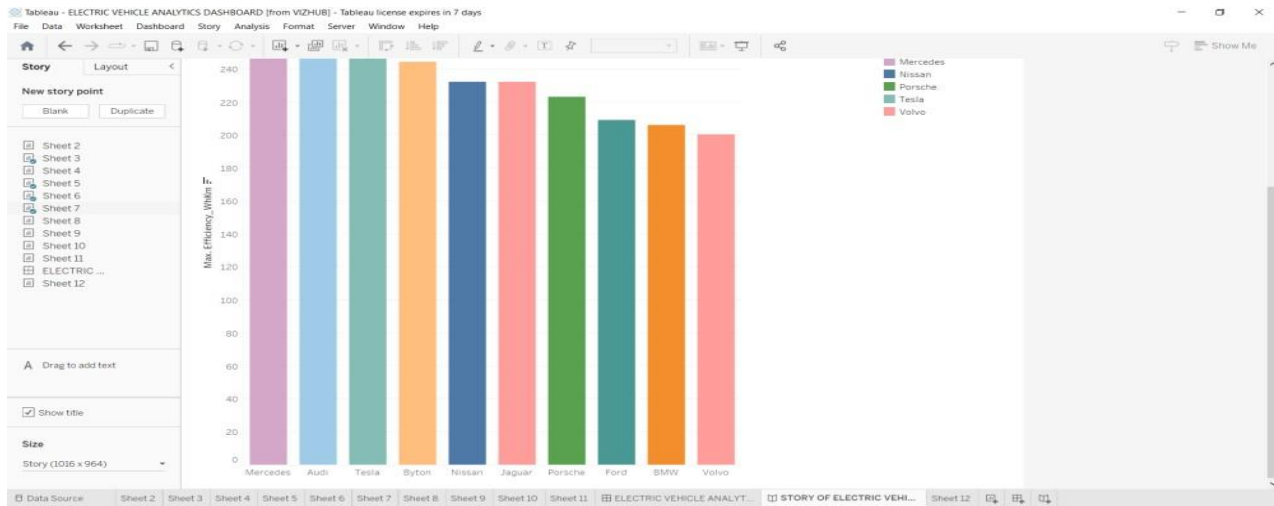






3.2 Story of electric vehicles





4. Advantages and disadvantages

4.1 Advantages of electric vehicle

- **Eco-friendly:** Because electric vehicles do not utilize fuel for combustion, there are no emissions or gas exhaust. Vehicles that run on fossil fuels contribute significantly to hazardous gas accumulation in the environment, thus driving an electric car can help contribute to a cleaner environment.
- **Renewable energy source:** Electric vehicles run on renewable power, whereas conventional automobiles function on the combustion of fossil fuels, which reduces the world's fossil-fuel stocks.
- **Less noise and smoother motion:** Driving an electric car is significantly smoother. Because they lack fast-moving elements, they are quieter and produce less noise.
- **Cost-effective:** Electricity is far less expensive than fuels such as gasoline and diesel, which are subject to regular price increases. When solar electricity is utilized at home, battery recharging is cost-effective.
- **Low maintenance:** Because electric cars have fewer moving components, wear and tear is reduced when compared to traditional auto parts. Repairs are also simpler and less expensive than combustion engines.
- **Government support:** Governments throughout the world have granted tax breaks to encourage people to drive electric vehicles as part of a green program.

4.2 Disadvantages of Electric Vehicles

- **High initial cost:** Electric vehicles continue to be quite expensive, and many buyers believe they are not as inexpensive as traditional automobiles.
- **Charging station limitations:** People who need to travel long distances are concerned about finding adequate charging stations in the middle of their journey, which are not always accessible.
- **Recharging takes time:** Unlike conventional automobiles, which require only a few minutes to replenish their gas tanks, charging an electric vehicle takes many hours.
- **Limited options:** Currently, there aren't many electric car models to pick from in terms of

appearance, style, or customized variations.

- **Less driving range:** When compared to conventional automobiles, electric vehicles have a shorter driving range. Electric cars can be convenient for short-distance travel but are inconvenient for long-distance travel.

5. Applications

- With so much data being acquired through data analysis in today's corporate environment, we need a means to visualise that data so we can understand it.
- By placing data in a visual context, such as maps or graphs, data visualisation helps us understand what it means. This makes the data more natural to understand for the human mind, making it simpler to see trends, patterns, and outliers in huge data sets.
- It provides insights on one or more pages or screens to assist you keep track of events or activities at a glance. Unlike an infographic, which displays a static graphical representation, a dashboard displays real-time data by extracting complicated data points from massive data sets.
- By visualization of electric vehicles, the people are come to know about the entire details of electric vehicles for example visualization of top speed for different brands gave a perfect result which gives top speed in different brands in this the customers or the people who want to buy a electric car will get a true information.

6. Future scope

A cutting-edge visualization tool for electric vehicle (EV) charge and range analysis offers a promising future scope in revolutionizing the EV industry. By integrating real-time data on charging station availability, energy consumption patterns, and driving habits, this tool provides comprehensive insights for both EV owners and infrastructure planners. Users can visualize optimal charging routes, predict range based on various factors like terrain and weather conditions, and even analyze long-term charging trends to optimize infrastructure deployment. With the growing adoption of EVs globally, such a tool becomes invaluable for enhancing user experience, maximizing efficiency, and accelerating the transition towards sustainable transportation. Moreover, continuous advancements in data analytics and visualization technologies ensure that this tool will evolve to meet the dynamic needs of the EV ecosystem, promising a bright future for electrified mobility.

7. Conclusion

Electric vehicles are made for the future and will be a big innovation. They are good for the environment, and they do not emit any greenhouse gases. There are, however, many challenges associated with electric vehicles. They have a limited range. Charging the vehicle takes time and can be a hassle sometimes. The availability of charging stations is also a big issue. Incompatibility of charging stations can also be a problem. Despite many challenges and issues, switching to electric vehicles is good for the environment and is more economically viable in the long term. Many have predicted that, by 2040, most of the vehicles will be electric. Rising fossil fuel costs and high maintenance costs of petrol and diesel vehicles coupled with environmental concerns are the main reasons. Many developed countries have given incentives for purchasing electric vehicles. Automobile manufacturers are already manufacturing some impressive electric vehicles.