Contents

1. Setup of Web Application

1.1 Pre-Requisites

The following things need to be installed in order to run the project:

1. Web Browser (Recommended: Google Chrome)
2. Local Server (Recommended: EasyPHP DevServer 14.1 VC9)

1.2 Setup

1. Copy and paste the "va" folder into the "local web" folder where EasyPHP is installed. The "localweb" folder can be found in the following directory by default: "C:\Program Files (x86)\EasyPHP-DevServer-14.1VC9\data\localweb"
2. Run EasyPHP
3. Open the web browser and enter the following URL: "http://127.0.0.1/va/index.html"

1.3 Best Experience

1. Adjust screen resolution to 1440 x 900, zoom: 75%.
2. Use the recommended browser (Google Chrome)

2 Homepage

The following page will be shown when the user enters "http://127.0.0.1/va/index.html" in the web browser. The homepage will show the events that might affect COE price and consumer car preferences in Singapore. The user can swipe to the right to see more events that happened over the years.
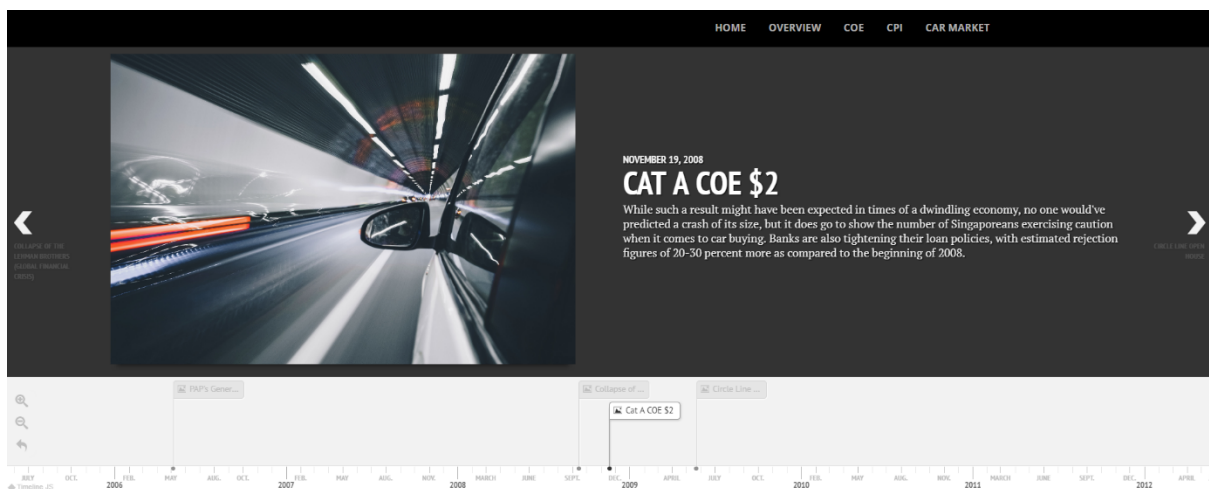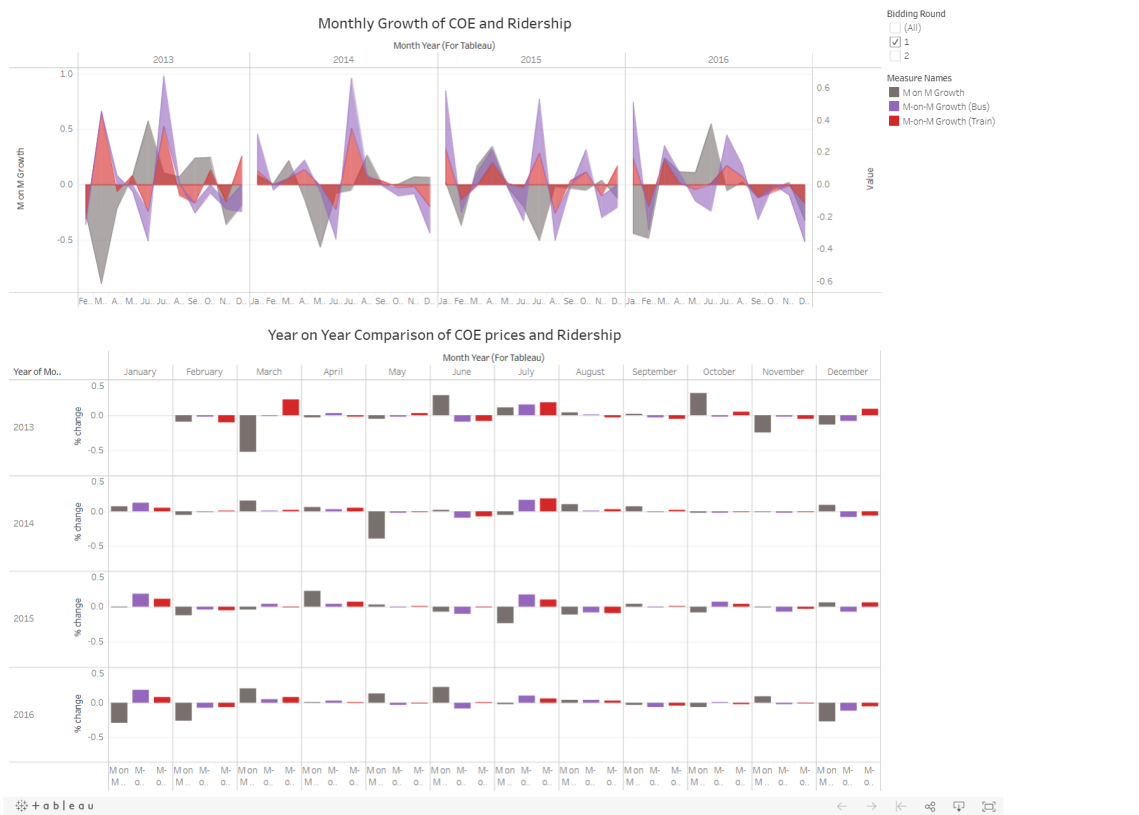

2.1 Navigations

There are five buttons (or links) in the navigation bar which are HOME, OVERVIEW, COE, CPI and CAR MARKET.

3   Visualization 1: Overview

The relationship between private and public transport and its effect on policies.

These two visualizations show the relationship between private and public transport and its effect on policies. For the first graph, it uses area graph to show the relationship between private and public transport in a month on month growth. For the second graph, it uses bar chart to display the relationship between private and public transport in a year on year growth.

The user can filter the result based on the bidding rounds (display all, bidding round 1 and/or bidding round 2). Besides that, the legend display at the right shows the measure names:

- grey → month on month growth of COE price
- purple → month on month growth on bus
- red → month of month growth on train

The user can hover on the data points to see the corresponding label data and information.
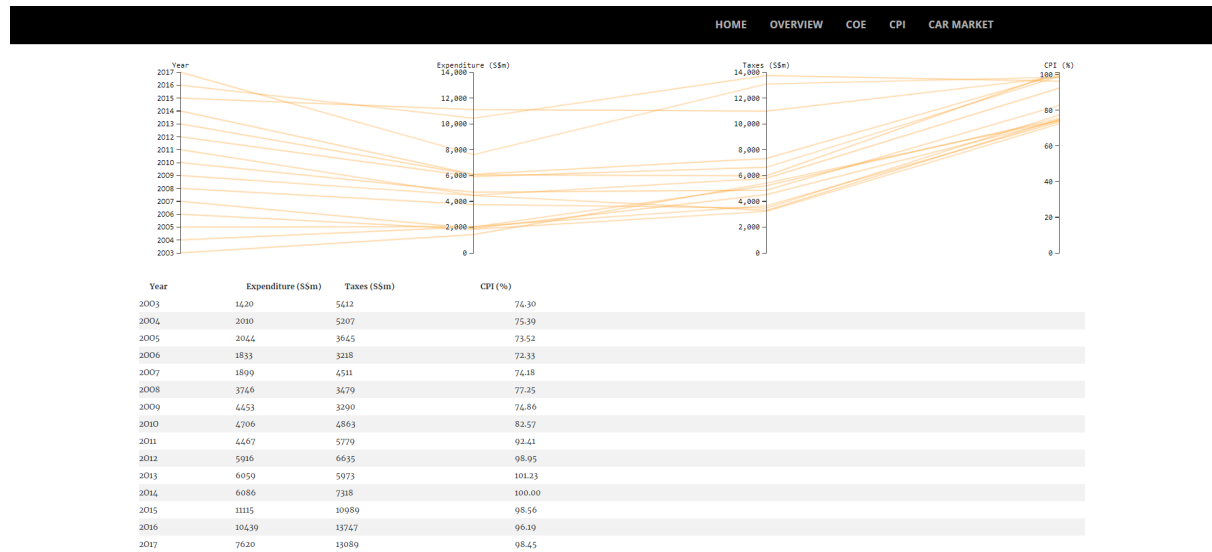
4 Visualization 2: COE

These two visualizations show the relationship between car brands and COE price. For the first graph, the user can simply select FIND from the toolbar the car brands they wish to compare and hit the play button to watch it run. Besides that, the user can adjust the size and colour of the bubbles in the first graph by clicking the option button OPTIONS. The user can hover on the data points to see the corresponding label data and information.

For the second graph, the user can click and drag the timeline to see the COE prices based on the specific timing selected by them. Besides, the user can see the COE price trends changes over the time based on different car categories:

- ● Cat A - Cars 1600cc & below, and the engine power should not exceed 97 kilowatts (kW)
- ● Cat B - Cars 1600cc & above, or the engine power output exceeds 97 kilowatts (kW)
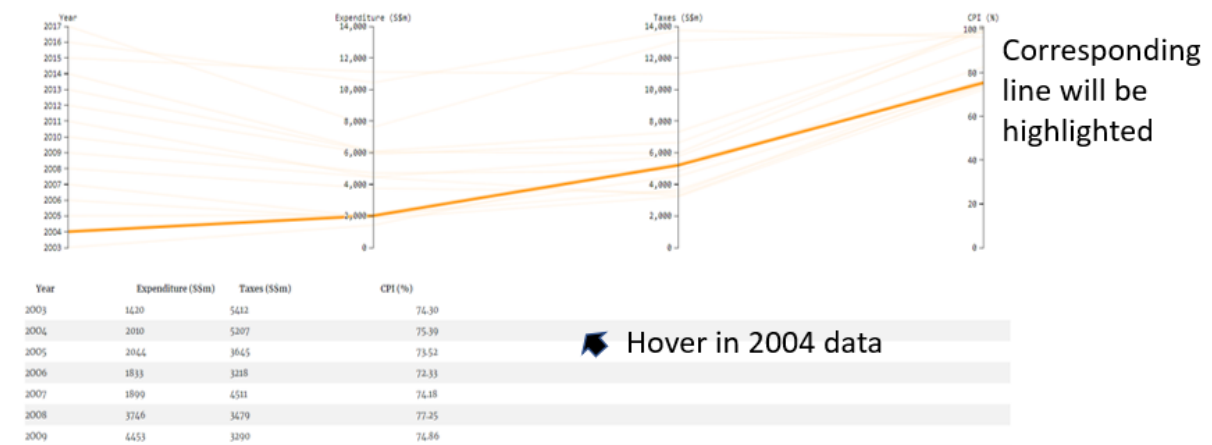- ● Cat E - "Open" (for any kind of vehicles)

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5 Visualization 3: CPI

Year	Expenditure (S$m)	Taxes (S$m)	CPI (%)
2003	1420	5412	74.30
2004	2010	5207	75.39
2005	2044	3645	73.52
2006	1833	3218	72.33
2007	1899	4511	74.18
2008	3746	3479	77.25
2009	4453	3290	74.86
2010	4706	4863	82.57
2011	4467	5779	92.41
2012	5916	6635	98.95
2013	6059	5973	101.23
2014	6086	7318	100.00
2015	11115	10989	98.56
2016	10439	13747	96.19
2017	7620	13089	98.45

This visualization provides an overview of the government's expenditure on transport system as a proportion of transport tax in the form of COE. The user can do the brushing at the specific range in the Year axis, Expenditure (S$m) axis, Taxes (S$m) axis or CPI (%) axis as show in the picture below and the corresponds data will be shown in the table:

Brushing

Year	Expenditure (S$m)	Taxes (S$m)	CPI (%)
2012	5916	6635	98.95
2013	6059	5973	101.23
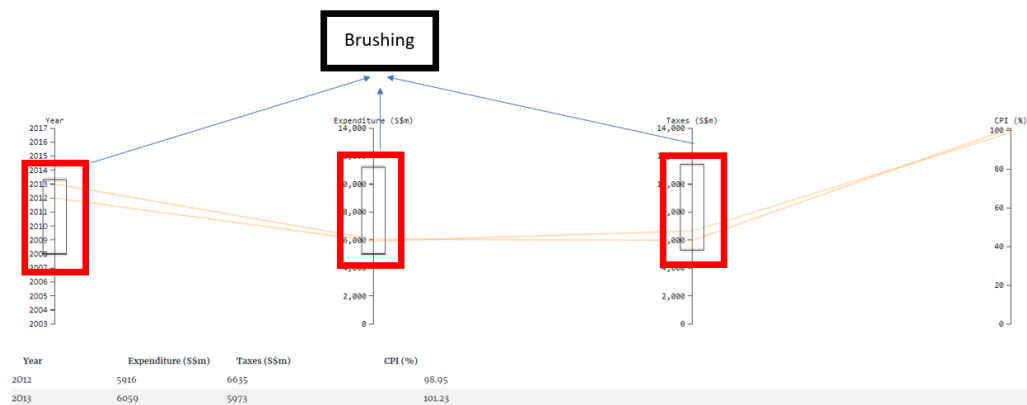
Besides that, the user can hover on the table below to see the corresponding line (highlighted) in parallel coordinates:

Corresponding line will be highlighted

Year	Expenditure (S$m)	Taxes (S$m)	CPI (%)
2003	1420	5412	74.30
2004	2010	5207	75.39
2005	2044	3645	73.52
2006	1833	3218	72.33
2007	1899	4511	74.18
2008	3746	3479	77.25
2009	4453	3290	74.86

Hover in 2004 data

6   Visualization 4: Car Market

There are 3 visualizations in this page. The user can click on the buttons: ⏮ ◀ ▶ ⏭ to flip the page.

6.1   The treemap
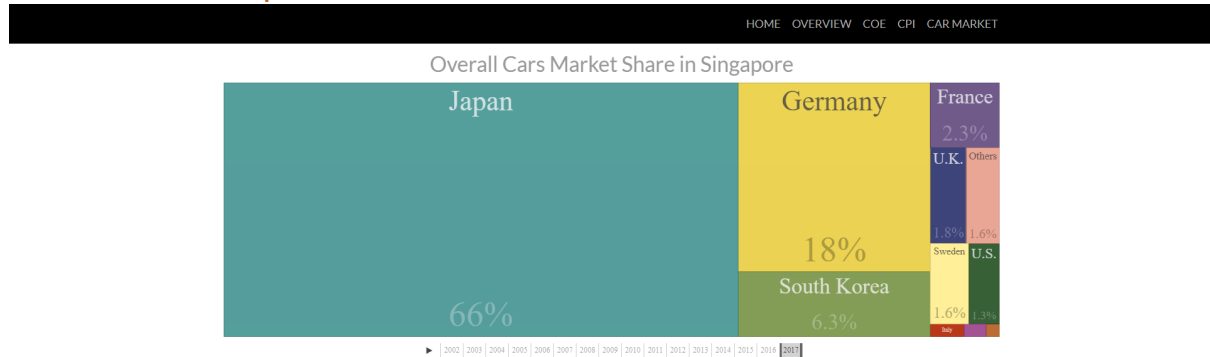
This visualization allows a user to see the overall car market shares in Singapore from 2012 to 2017. The user can

- click on the play button ▶ below to see the changes over the time
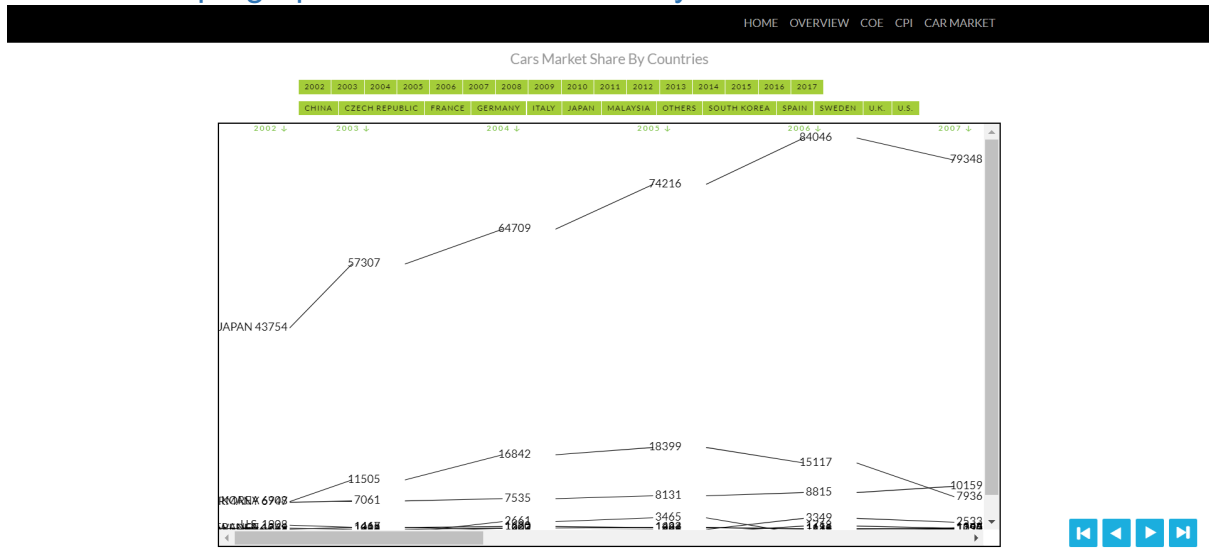- they can select a specific year and see the market share distribution for year

- Or they can select a range of years

Besides that, the user can click on the country (e.g Japan) to see the car brands under the country as below:
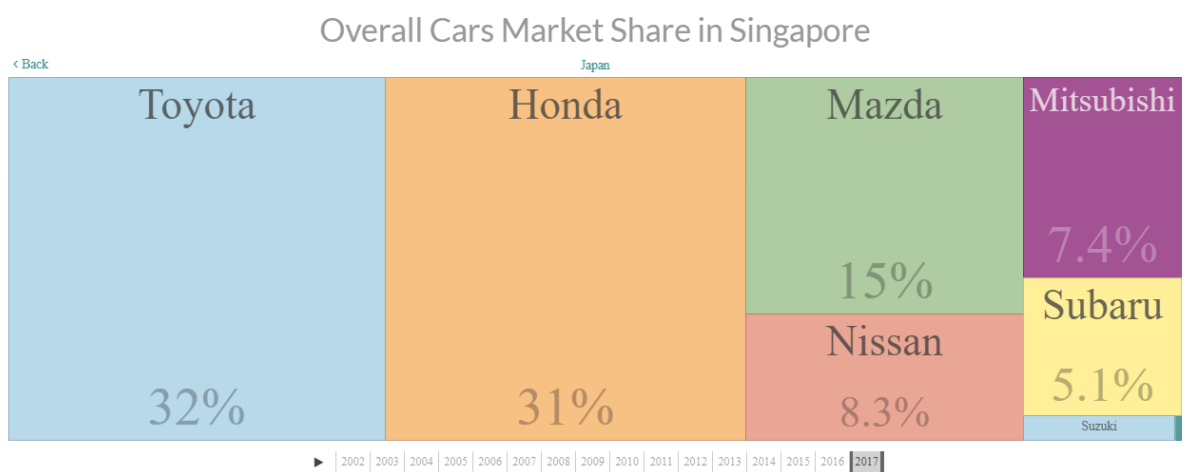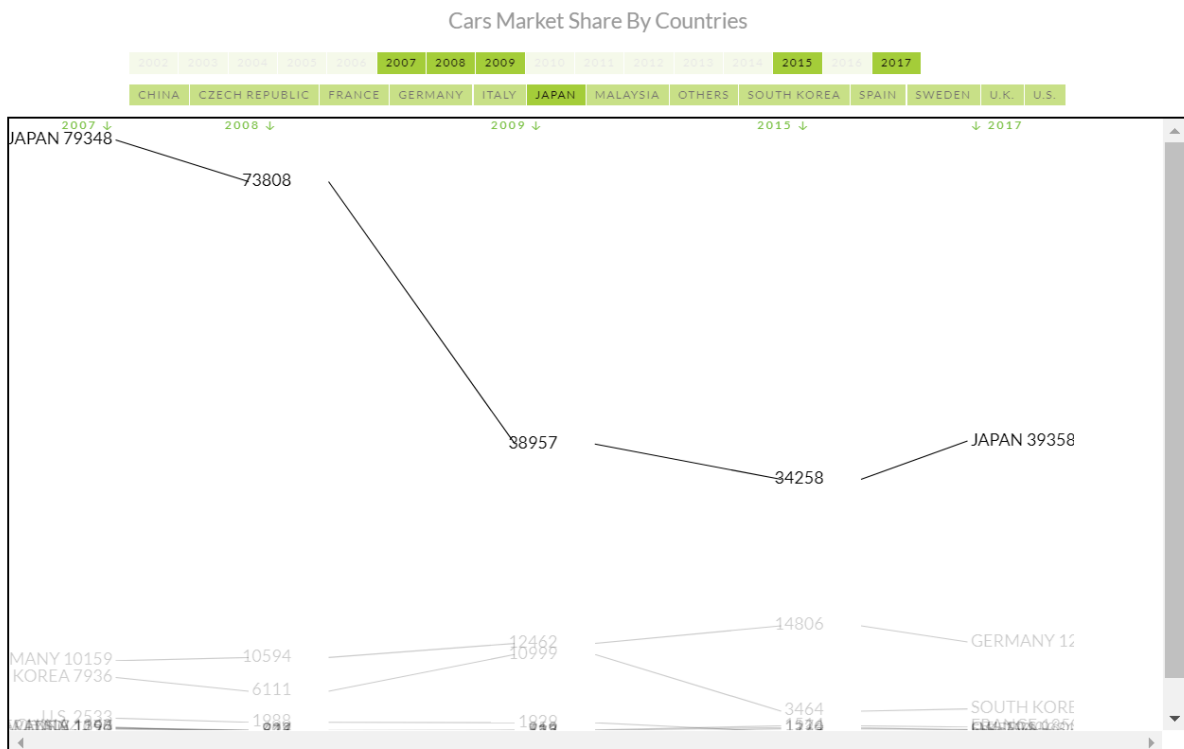
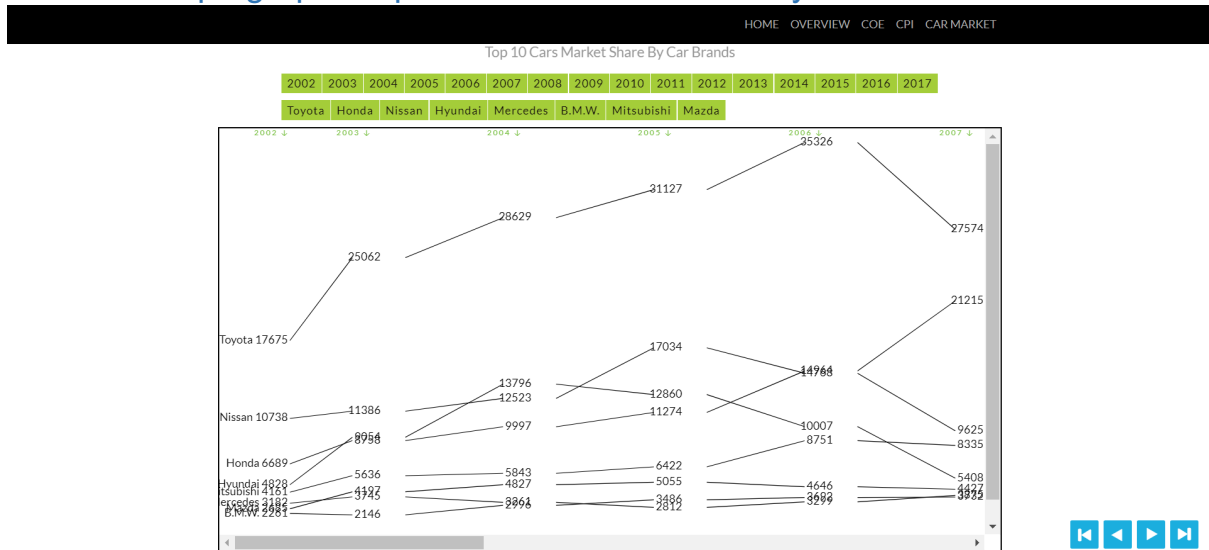## 6.2   The slope graph: Cars Market Share by Countries

This visualization shows the cars market shares by countries. The user can scroll to the right to see the results displayed from year 2002 to 2017.

The user can filter the data by selecting the multiple years and one country they want at the green buttons above the graph. Besides that, the user can also hover the line and the respective line will be highlighted. Example: years such as 2007, 2008, 2009, 2015 and 2017 and country such as Japan have been selected.

6.3   The slope graph: Top 10 Cars Market Share by Car Brands

This visualization shows the top 10 cars market shares by car brands. The user can scroll to the right to see the results displayed from year 2002 to 2017.

The user can filter the data by selecting the multiple years and one car brand they want at the green buttons above the graph. Besides that, the user can also hover the line and the respective line will be highlighted.

Example: years such as 2013 to 2017 and car brand such as Toyota have been selected.