



**TRADE INSIGHTS  
FOR THE  
DEPARTMENT FOR  
INTERNATIONAL TRADE  
IN A BRITISH ORGANISATION**

-

**ANALYTICS PRACTICUM INTERIM PRESENTATION  
24 Feb 2017**

**Group 13  
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# AGENDA

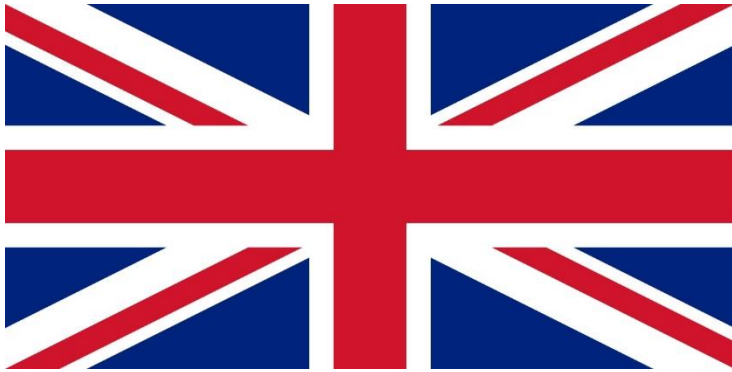
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- **Project Overview**
- **Data**
  - Extraction
  - Metadata
  - Pre-processing
  - Cleaned Data
- **Exploratory Data Analysis**
  - Visualisation Flow
  - Dashboard Overview
  - Dashboard Analysis
  - Case Study
- **Project Management**
  - Revised Scope of Work
  - Revised Work Plan

# PROJECT OVERVIEW

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## Background



Department for  
International Trade

- British organisation
- Department for International Trade (DIT)
- Plans and reviews marketing campaigns that the UK should take to encourage British businesses to expand into Singapore

# PROJECT OVERVIEW

## Background

- 18 sectors – Currently focusing on 5

s/n	High Value Campaign	High Priority Volume	Low Priority Volume	Unclassified
1	<b>Aerospace</b>	Retail/Consumer	Advanced Manufacturing (Excluding aerospace and automotive)	Others - Raw Materials
2	<b>Food and Beverage</b>	Education	Automotive	Others - Manufacturing
3	<b>Infrastructure (Water and Environment)</b>	Energy	Bio-economy (Agri-tech)	Financial and Professional Business Services - Others
4	<b>Infrastructure (Rail)</b>	Financial and Professional Business Services	Bio-economy (Chemicals)	
5	<b>Technology</b>	Healthcare	Sports	
6	Food and Beverage	Life Sciences		
7		Infrastructure (Airports)		

# PROJECT OVERVIEW

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## Problem



- Decisions made for marketing campaigns
  - **Do not refer to existing historical trade data**
  - Are based on **staff sentiment** or **past successful campaigns**
- Patterns in import/export data are not analysed
- Loss in untapped trade opportunities for the UK
- Decreases UK's export revenue + overall GDP

# PROJECT OVERVIEW

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## Objective



To **aid in decision-making** through an analytical dashboard that **provides insights into UK's current trade patterns** with Singapore

This **dashboard** will help the end-user determine the following:

1. Trade sectors to focus on
2. High - / low-performing goods and services that should or should not be imported into Singapore
3. High-/low-risk competitors importing into Singapore

# DATA EXTRACTION

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## Data Source: comtrade.un

- Trade value of imports from all countries in the world into Singapore
- Full names of commodities and respective 2D, 4D and 6D HS codes
- Full names of services and respective EBOPS codes
- All months from 2011 – 2015

## Limitation

- 50,000 rows per .csv file
- Extraction required specific queries



# DATA EXTRACTION

## Download Query

Welcome to the trade data extraction interface!  
Keep an eye out for other **new features** being added based on your feedback!

### 1. Type of product & Frequency

1

#### Type of product

Goods  Services

1

#### Frequency

Annual  Monthly

### 2. Classification

Monthly datasets may mix codes from multiple HS revisions and are provided as is except for standardization of trade flow and partner information, as well as conversion to U.S. dollars.

### 3. Select desired data

2

#### Periods (year, month)

January 2016  February 2016  
 March 2016  April 2016  
 May 2016

3

#### HS (as reported) commodity codes

AG2 - All 2-digit HS commodities

1

#### Reporters

Singapore

All or a valid reporter. Up to 5 may be selected. All may only be used if a partner is selected.

4

#### Partners

All

World. All or a valid reporter. Up to 5 may be selected. All may only be used if a reporter is selected.

1

#### Trade flows

Import

All or select multiple trade flows.

### 4. See the results

Preview »

Download CSV 

Issues opening CSV in Excel? See this Microsoft how-to.



# DATA PRE-PROCESSING

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1. Combination of data
2. Removal of unnecessary columns
3. Assigning dimension tables
4. Calculated fields



# DATA PRE-PROCESSING

## 1. Combination of data

```
C:\Users\Christian Chua\Desktop\Data>copy *.csv combine.csv
Goods_2011_2d.csv
Goods_2012_2d.csv
        1 file(s) copied.

C:\Users\Christian Chua\Desktop\Data>
```

“copy \*.csv”  
function

```
R version 3.3.2 (2016-10-31) -- "Sincere Pumpkin Patch"
Copyright (C) 2016 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin13.4.0 (64-bit)
```

```
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.
```

```
  Natural language support but running in an English locale
```

```
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
```

```
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
```

```
[R.app GUI 1.68 (7288) x86_64-apple-darwin13.4.0]
```

```
[Workspace restored from /Users/Christian/.RData]
[History restored from /Users/Christian/.Rapp.history]
```

```
2017-02-18 10:09:49.574 R[48675:406918] plugin com.getdropbox.dropbox.garcon invalidated
> data1 <- read.csv("Goods_2011_2d.csv")
> data2 <- read.csv("Goods_2012_2d.csv")
> datafull <- rbind(data1, data2)
>
```

“rbind”  
function

# DATA PRE-PROCESSING

## 2. Removal of unnecessary columns

- Columns without values were removed

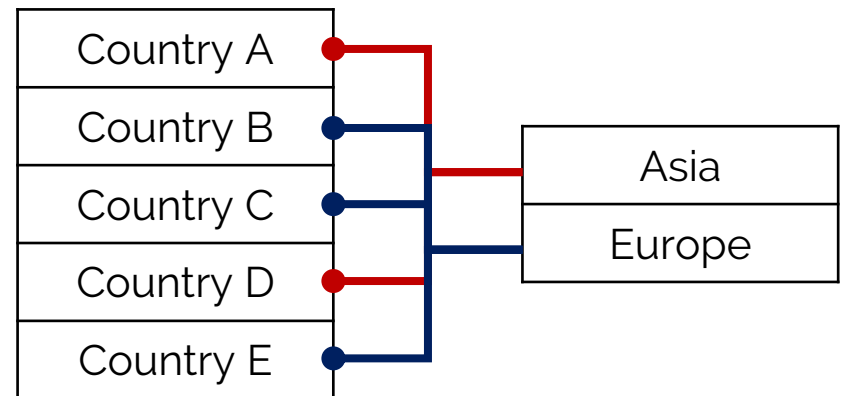
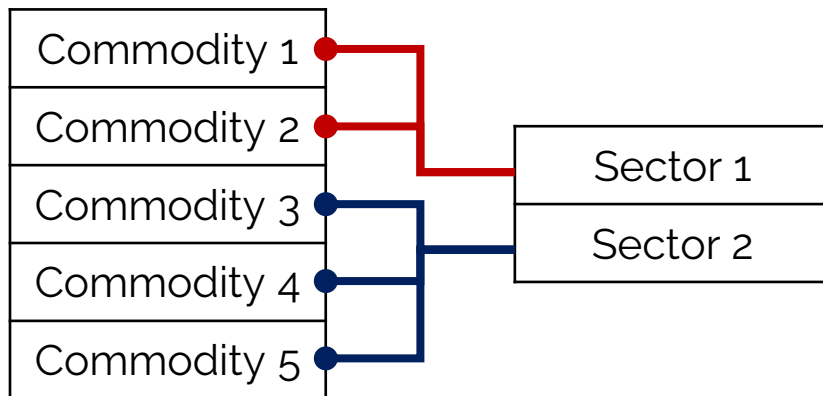
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Classification	Year	Period	Period Desc.	Aggregate Le	Is Leaf Code	Trade Flow C	Trade Flow	Reporter Coc	Reporter	Reporter ISO	Partner Code	Partner	Partner ISO	2nd Partner	2nd Partner	2nd Partner	Customs Pro
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		0	World					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		76	Brazil					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		124	Canada					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		152	Chile					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		156	China					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		208	Denmark					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		246	Finland					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		251	France					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		276	Germany					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		348	Hungary					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		372	Ireland					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		381	Italy					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		392	Japan					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		458	Malaysia					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		528	Netherlands					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		554	New Zealand					
HS	2011	201101	Jan-11	2	0	1	Imports	702	Singapore		699	India					

S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
Customs	Mode of Trai	Mode of Trai	Commodity C	Commodity	Qty Unit Cod	Qty Unit	Qty	Alt Qty Unit	Alt Qty Unit	Alt Qty	Netweight (k	Gross weight	Trade Value	CIF Trade Va	FOB Trade V	Flag
				2	Meat and ed	0							84316539			0
				2	Meat and ed	0							33865289			0
				2	Meat and ed	0							1563108			0
				2	Meat and ed	0							599655			0
				2	Meat and ed	0							968818			0
				2	Meat and ed	0							1068528			0
				2	Meat and ed	0							84172			0
				2	Meat and ed	0							1407887			0
				2	Meat and ed	0							895034			0
				2	Meat and ed	0							7242			0
				2	Meat and ed	0							353515			0
				2	Meat and ed	0							159948			0
				2	Meat and ed	0							397430			0
				2	Meat and ed	0							707359			0
				2	Meat and ed	0							4206283			0
				2	Meat and ed	0							5401367			0
				2	Meat and ed	0							534474			0
				2	Meat and ed	0							333700			0

# DATA PRE-PROCESSING

## 3. Assigning dimension tables

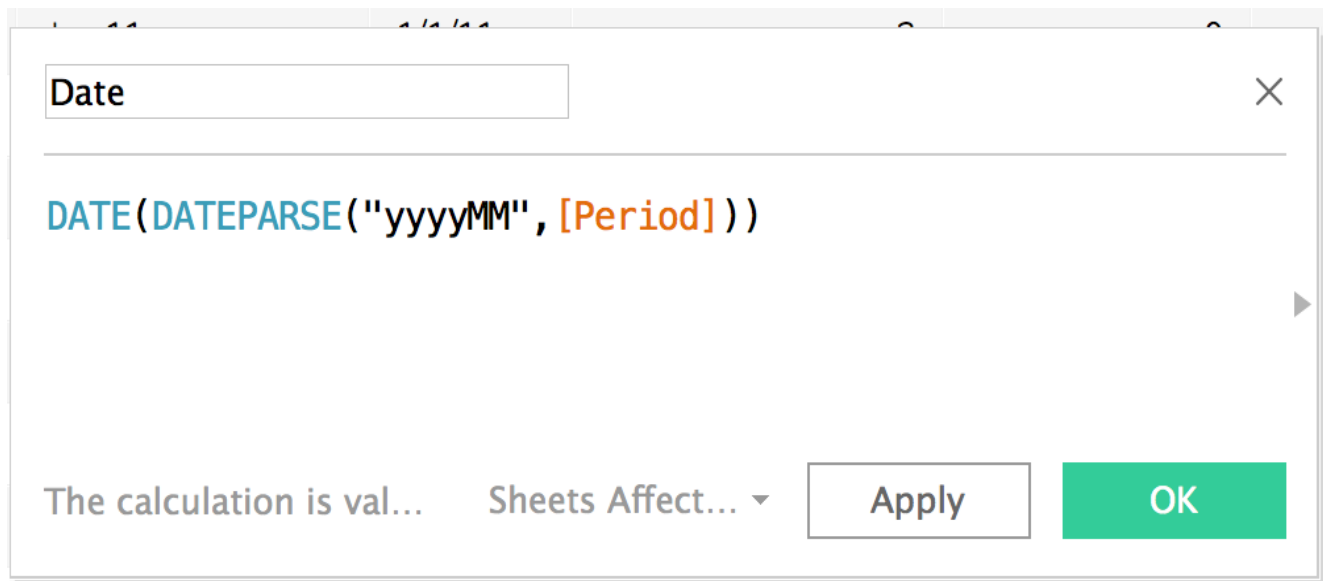
- Separate dimension tables created to assign:
  - Sectors → HS Codes + Commodity Name
  - Continent, Region, Political Organisation → Country
- Used “vlookup” function



# DATA PRE-PROCESSING

## 4. Calculated fields

- Conversion of "Period" to date variable through "DateParse" function in Tableau



# DATA PRE-PROCESSING

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## 4. Calculated fields

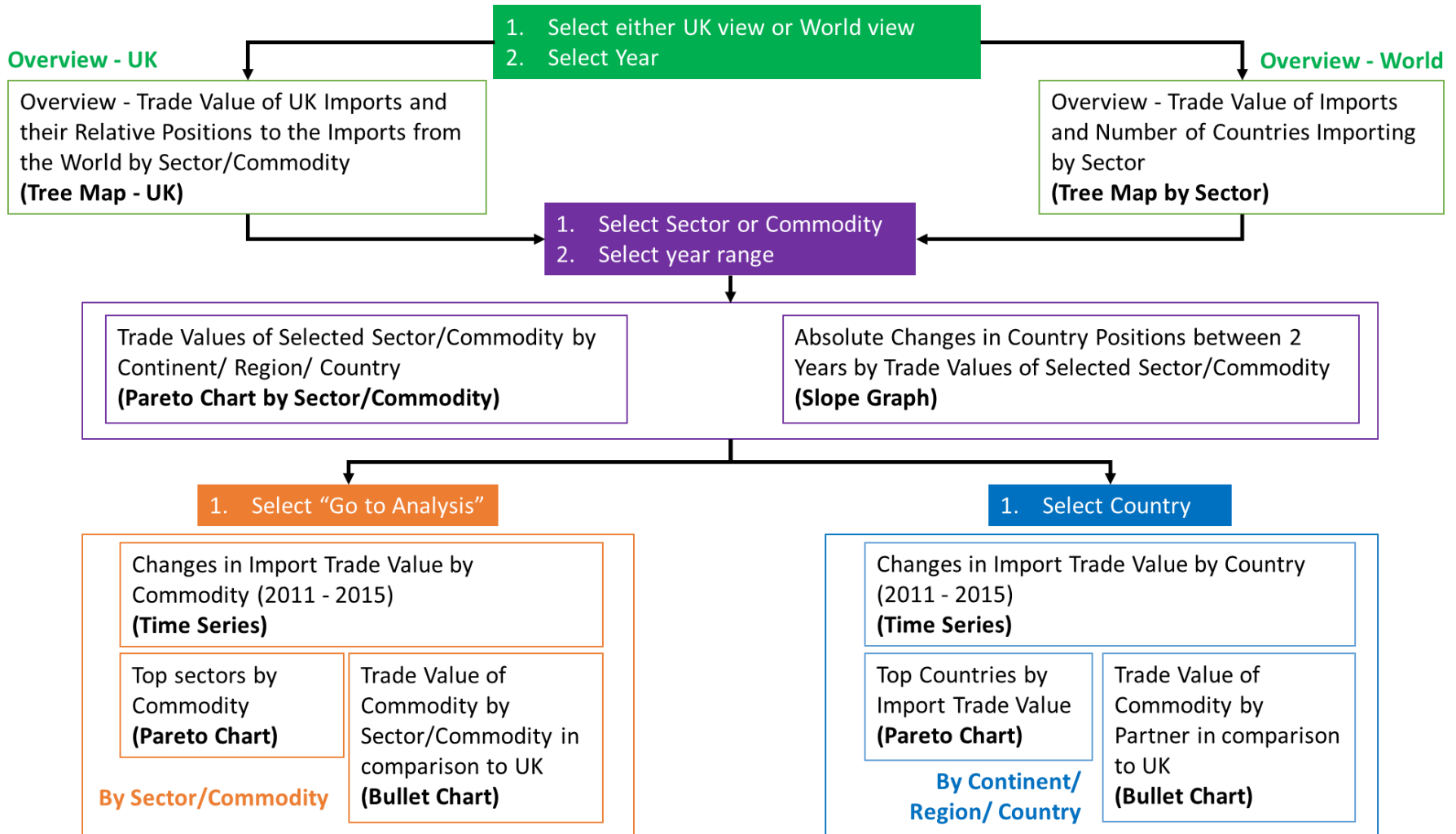
- Calculation of “Market share of SG imports from UK relative to the world”

$$\frac{\text{commodity 1 (UK)} + \text{commodity 2 (UK)} + \dots}{\text{commodity 1(World)} + \text{commodity 2 (World)} + \dots}$$

Example: 
$$\frac{\text{Fish (UK)} + \text{Meat(UK)} + \dots}{\text{Fish(World)} + \text{Meat(World)} + \dots}$$

# Exploratory Data Analysis

## Flow of Visualisation



# Exploratory Data Analysis

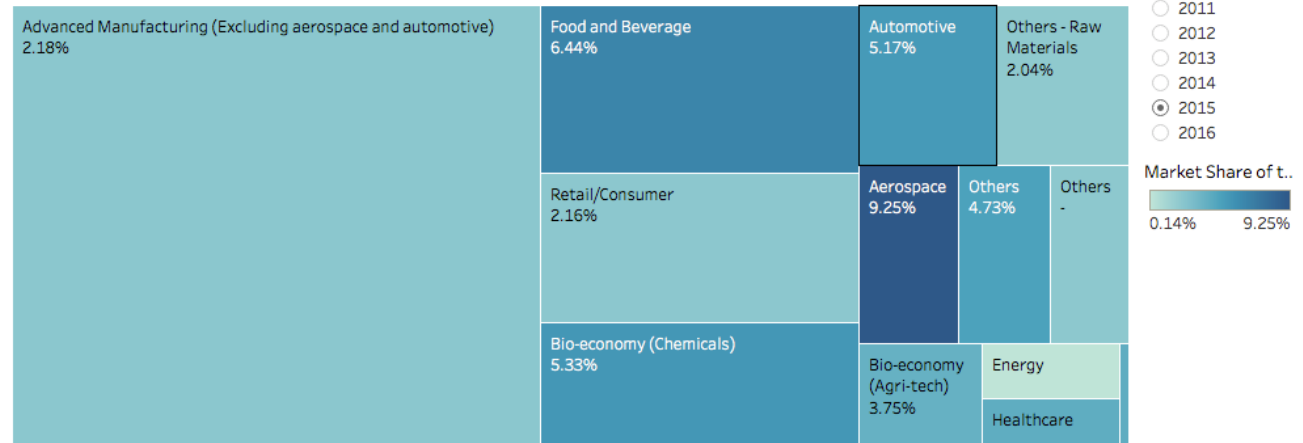
## Overview

Each quadrilateral → sector/ commodity

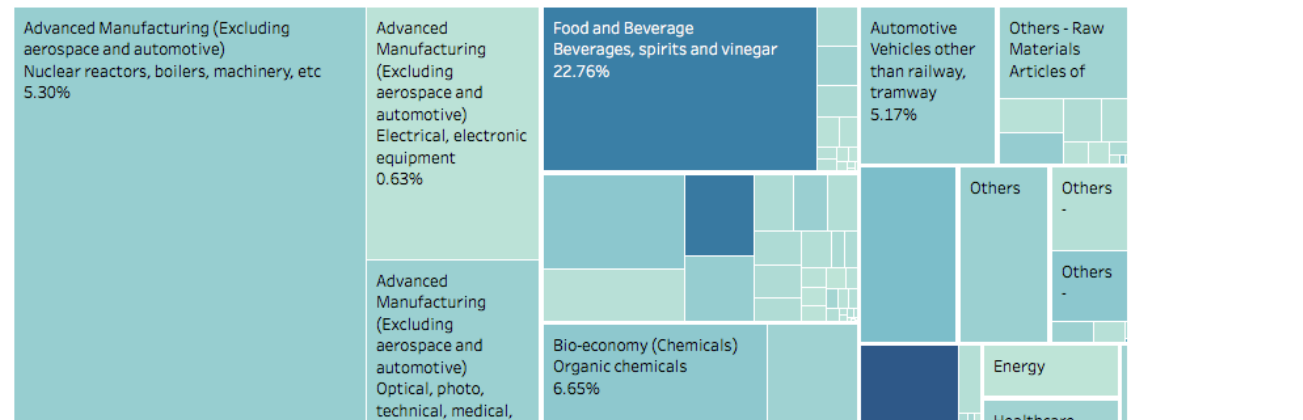
Colour intensity → UK sector/ commodity as a proportion of total World imports

Size → Size of UK sector/ commodity as a proportion of total UK imports

UK Overview - Sector Level



UK Overview - Commodity Level





# Exploratory Data Analysis

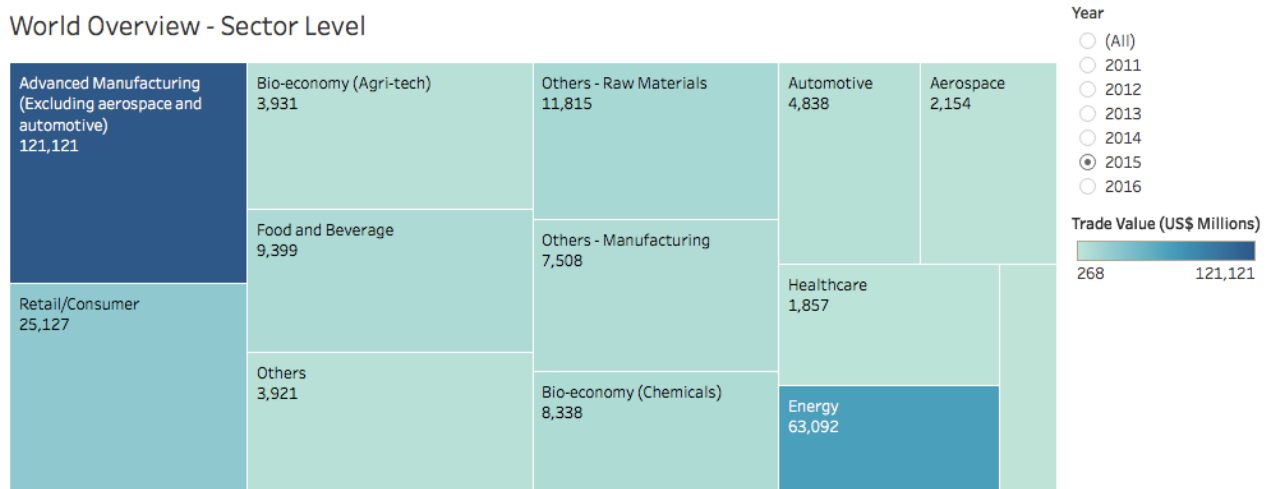
## Overview

Each quadrilateral → sector/ commodity

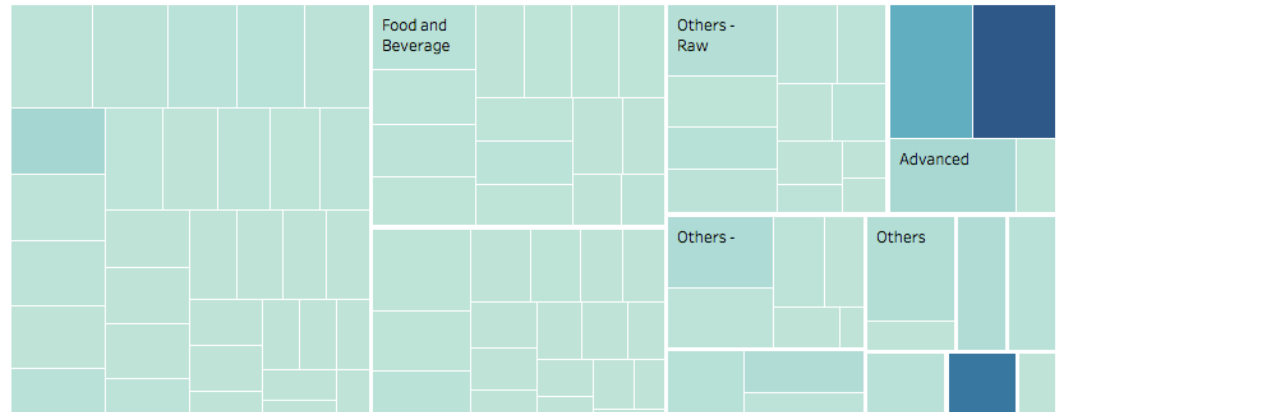
Colour intensity → trade value (US\$ millions)

Size → Number of countries importing that particular sector/ commodity

World Overview - Sector Level



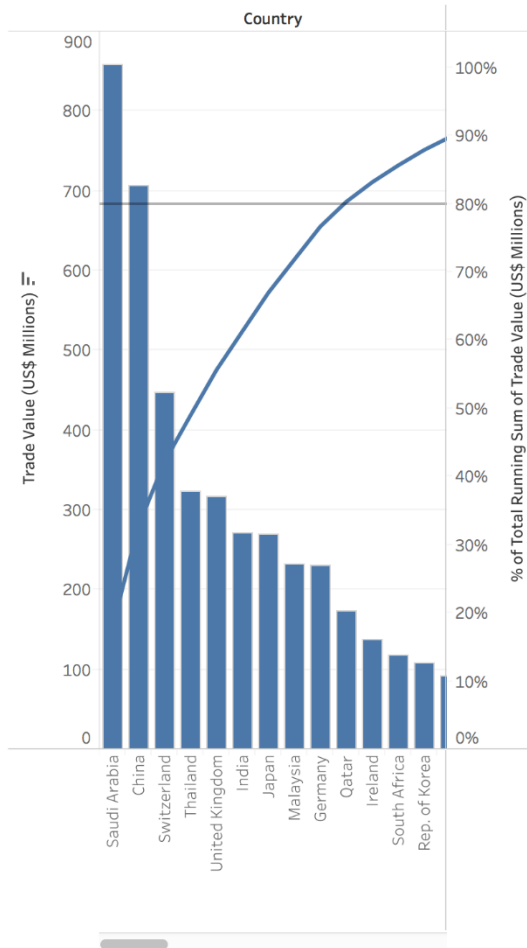
World Overview - Commodity Level



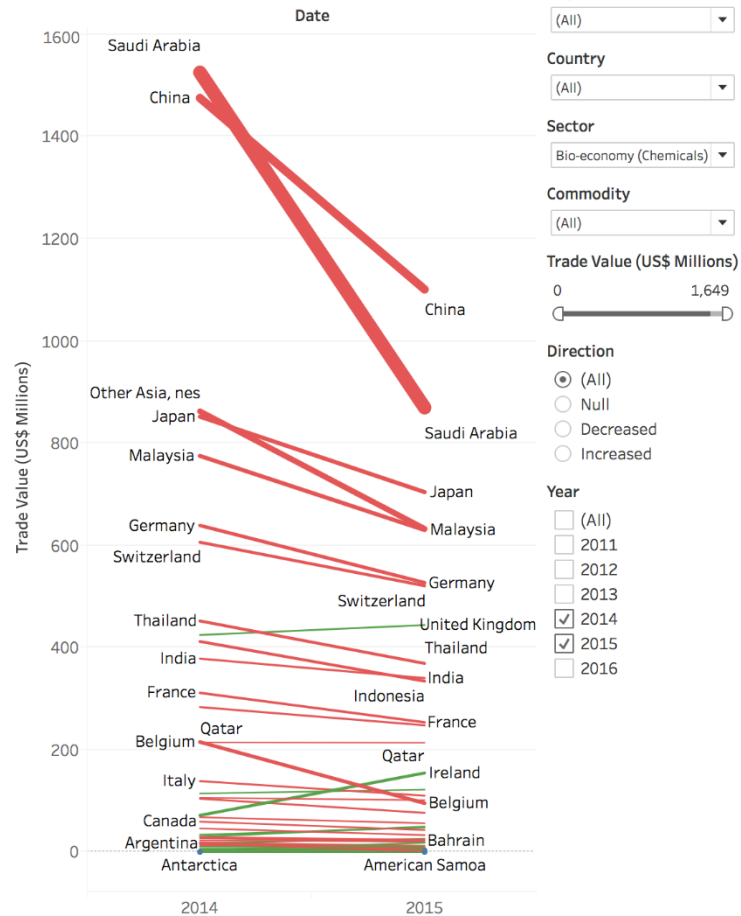
# Exploratory Data Analysis

## Primary Analysis of Sector/Commodity

Pareto Chart (Country)



Absolute Changes in Country Position between 2 Years by Import Trade Value



Continent: (All) [v]

Region: (All) [v]

Country: (All) [v]

Sector: Bio-economy (Chemicals) [v]

Commodity: (All) [v]

Trade Value (US\$ Millions): 0 to 1,649 [slider]

Direction:
 

- (All)
- Null
- Decreased
- Increased

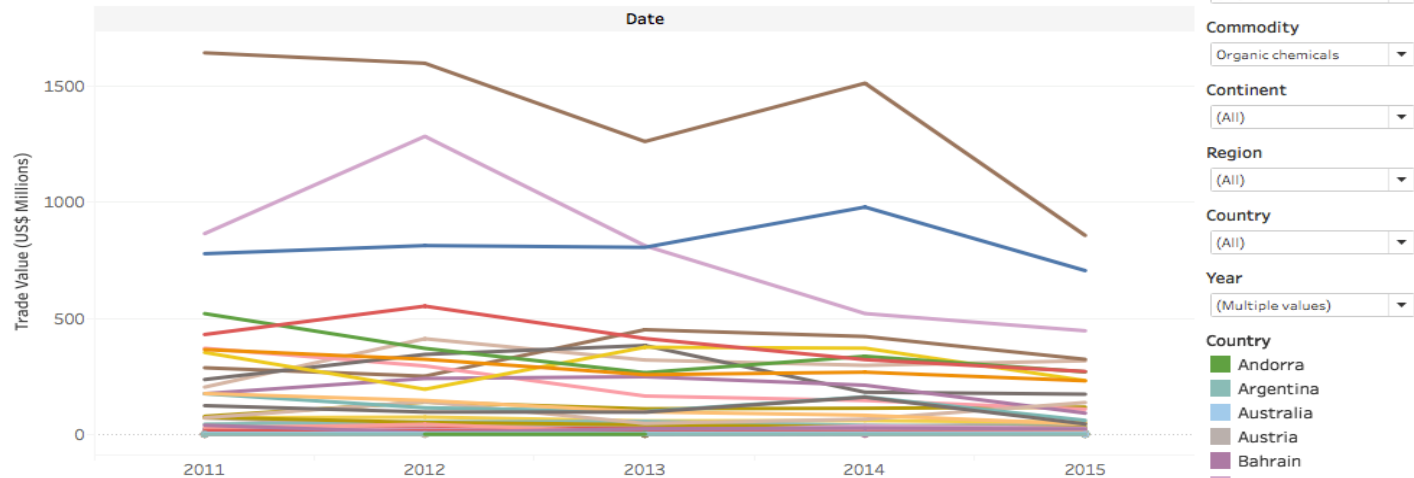
Year:
 

- 2011
- 2012
- 2013
- 2014
- 2015
- 2016

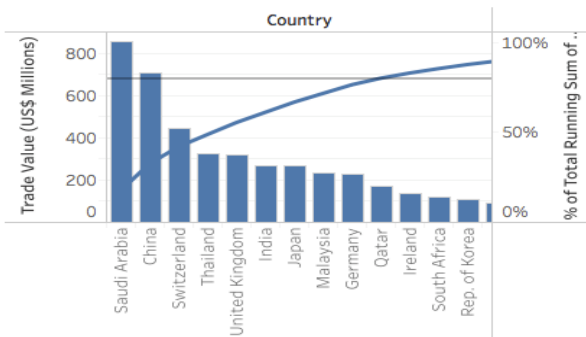
# Exploratory Data Analysis

## Analysis of Country

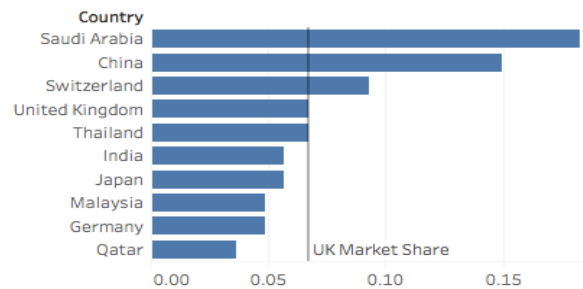
Changes in Import Trade Value by Country (2011 - 2015)



Pareto Chart (Country)



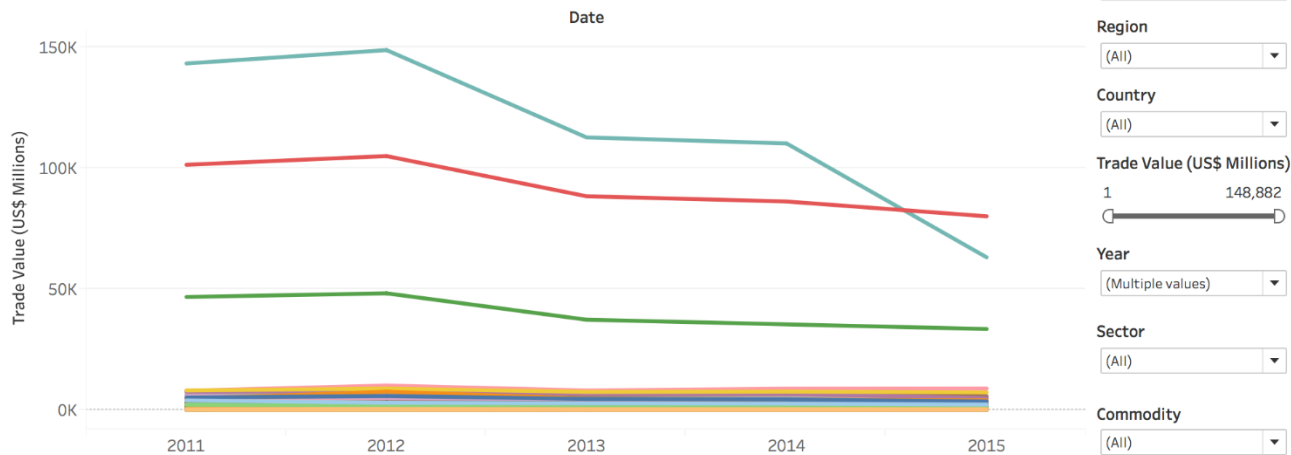
Trade Value of Commodity by Country in comparison to UK



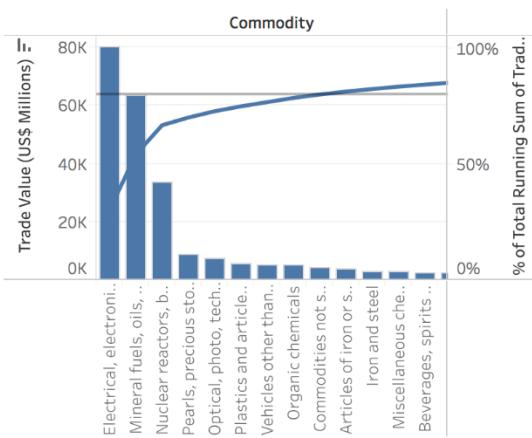
# Exploratory Data Analysis

## Analysis of Sector/Commodity

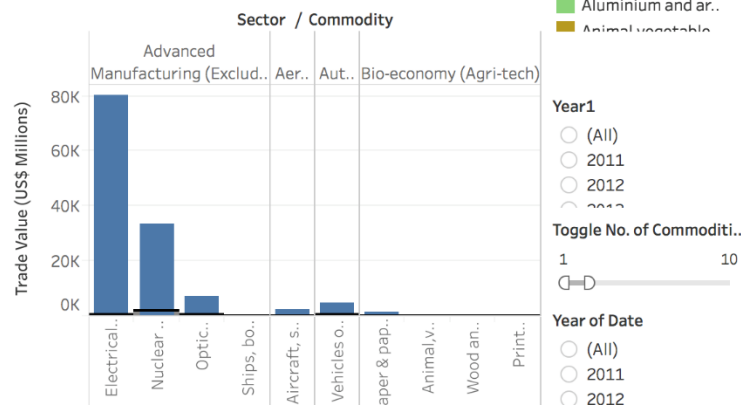
Changes in Import Trade Value by Commodity (2011 - 2015)



Pareto Chart (Commodity)



Trade Value of Commodity by Sector/  
Commodity in comparison to UK



# Exploratory Data Analysis

## Case Study



Overview

Dataset

EDA

Project Management

# Project Management

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## Moving Forward

- Analyse changes in individual countries' imports in relation to the world
- Further statistical analysis
- Adding 4D and 6D HS Codes into Tableau
- Fine-tuning of Tableau dashboard
- In-depth analysis of top 5 sectors currently chosen by DIT
- In-depth analysis of prominent sectors/commodities from overview



# **THANK YOU!**

## **Q&A**

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