

# Final Report of Foreign Trade Statistics - Vehicle and Trailer Tracking

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## Final Report of Foreign Trade Statistics

These data sources contains Export, Import and Empty Entry data of Turkish and Foreign Vehicles.

There are six data sources from the TCMB site. One of the links is given below.

Dataset Link

## Key Takeaways

1. Most imported countries are EU countries such as Germany, Italy, France etc. On the other hand countries close to our border like Iraq, Iran, Bulgaria etc.
2. Most exported countries are countries close to our borders. Top countries are usually in middle east or Asia, followed by EU countries.
3. There is parallel increase and decrease between Import and Export numbers on Quarterly basis. Moreover we found out drops on export and import numbers between fourth quarter and first quarter on every year. We strongly believe this is due to winter conditions also we found out a huge drop in between 2020-Q1 and 2020-Q2. We believe this is due to the Corona Virus.
4. Turkish vehicles mostly used for imports and exports.
5. Import levels in Europe are way greater than Asia and Africa regions. Africa has the lowest import numbers among all. When we analyze the line running by quarters, import lines are quite bumpy. This irregularity can be considered as a factor of seasonal and political changes. In Africa region the line runs steadily.

## Exploratory Data Analysis

In this section we will analyze and find some interesting insights from our dataset.

## Summary of Dataset

We have 14 columns. 4 of them is character data type, 1 of them is date data type and rest of all is numeric data type.

You can see detailed summary statistics from below.

```
summary(df_exportimport_final)
```

```
##      Level      PercentageChange      Difference
## Min.   : 0.0   Min.   : -100.000   Min.   : -32764.00
## 1st Qu.: 0.0   1st Qu.:  -9.253   1st Qu.:  -4.00
## Median : 19.0   Median :   0.000   Median :   0.00
## Mean   : 623.3   Mean   :   8.911   Mean   :   2.59
## 3rd Qu.: 285.0   3rd Qu.:   8.086   3rd Qu.:   6.00
## Max.   :62182.0   Max.   :27900.000   Max.   : 24903.00
## YearlyPercentageChange YearlyDifference DtePreviousYearPercentageChange
## Min.   : -100.00   Min.   : -32668.0   Min.   : -100.000
## 1st Qu.:  -4.53    1st Qu.:  -1.0     1st Qu.: -11.305
## Median :   0.00    Median :   0.0     Median :   0.000
## Mean   :  46.76    Mean   :  15.7     Mean   :  20.535
## 3rd Qu.:  11.48    3rd Qu.:   9.0     3rd Qu.:   5.634
## Max.   :293850.00   Max.   : 21013.0   Max.   :19850.000
## DtePreviousYearPercentageDifference MovingAverage      MovingSum
## Min.   : -31509.00           Min.   : 0.00   Min.   : 0
## 1st Qu.:  -3.00             1st Qu.: 0.17   1st Qu.: 2
## Median : 0.00              Median : 20.50   Median : 225
## Mean   : -17.89            Mean   : 613.53   Mean   : 7068
## 3rd Qu.: 4.00              3rd Qu.: 288.77   3rd Qu.: 3253
## Max.   : 26171.00           Max.   :53219.17   Max.   :638630
##      Date      ExportImportCountry VehicleType      ExportImport
## Min.   :2012   Length:50112   Length:50112   Length:50112
## 1st Qu.:2014   Class :character   Class :character   Class :character
## Median :2017   Mode  :character   Mode  :character   Mode  :character
## Mean   :2017
## 3rd Qu.:2019
## Max.   :2022
## ExportImportRegion
## Length:50112
## Class :character
## Mode  :character
##
##
##
```

## Most Import-Export Countries

The Word Cloud graphs in the below shows us most imported and exported countries based on country name size.

Most import countries as we can see below are EU countries such as Germany, Italy, France etc. On the other hand countries close to our border like Iraq, Iran, Bulgaria etc.

Import Plot

```

#Import
ImportFreq <- df_exportimport_final %>% filter(ExportImport == 'IMPORT') %>% group_by(ExportImportCount)
wordcloud2(data=ImportFreq, size=0.8)

```



Most export countries as we can see below are countries close to our borders. Top countries are usually in middle east or Asia, followed by EU countries.

Export Plot

```

#Export
ExportFreq <- df_exportimport_final %>% filter(ExportImport == 'EXPORT') %>% group_by(ExportImportCount)
wordcloud2(data=ExportFreq, size=0.8)

```

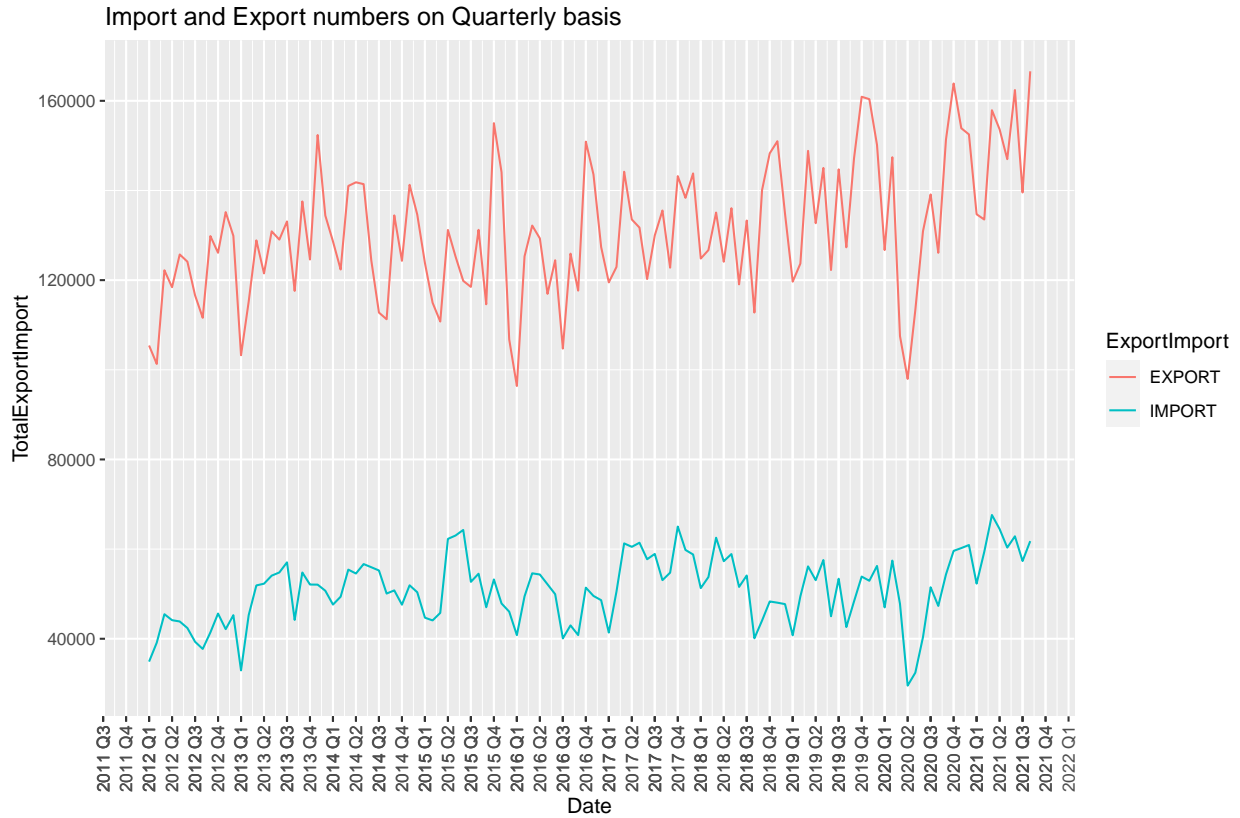


□

## Export-Import Trend

As seen in the graph below we can see parallel increase and decrease between Import and Export numbers on Quarterly basis. Moreover we can see drops on export and import numbers between fourth quarter and first quarter. We strongly believe this is due to winter conditions also we are seeing a huge drop in between 2020-Q1 and 2020-Q2 due to Corona Virus.

```
df_exportimport_final %>%
  filter(ExportImport == 'EXPORT' | ExportImport == 'IMPORT') %>%
  group_by(Date,ExportImport) %>% summarize(TotalExportImport = sum(Level)) %>%
  ggplot( aes(x=Date, y=TotalExportImport, group=ExportImport, color=ExportImport)) +
  zoo::scale_x_yearqtr(n = 100,format = '%Y Q%q') +
  geom_line() +
  theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  labs(title = "Import and Export numbers on Quarterly basis")
```

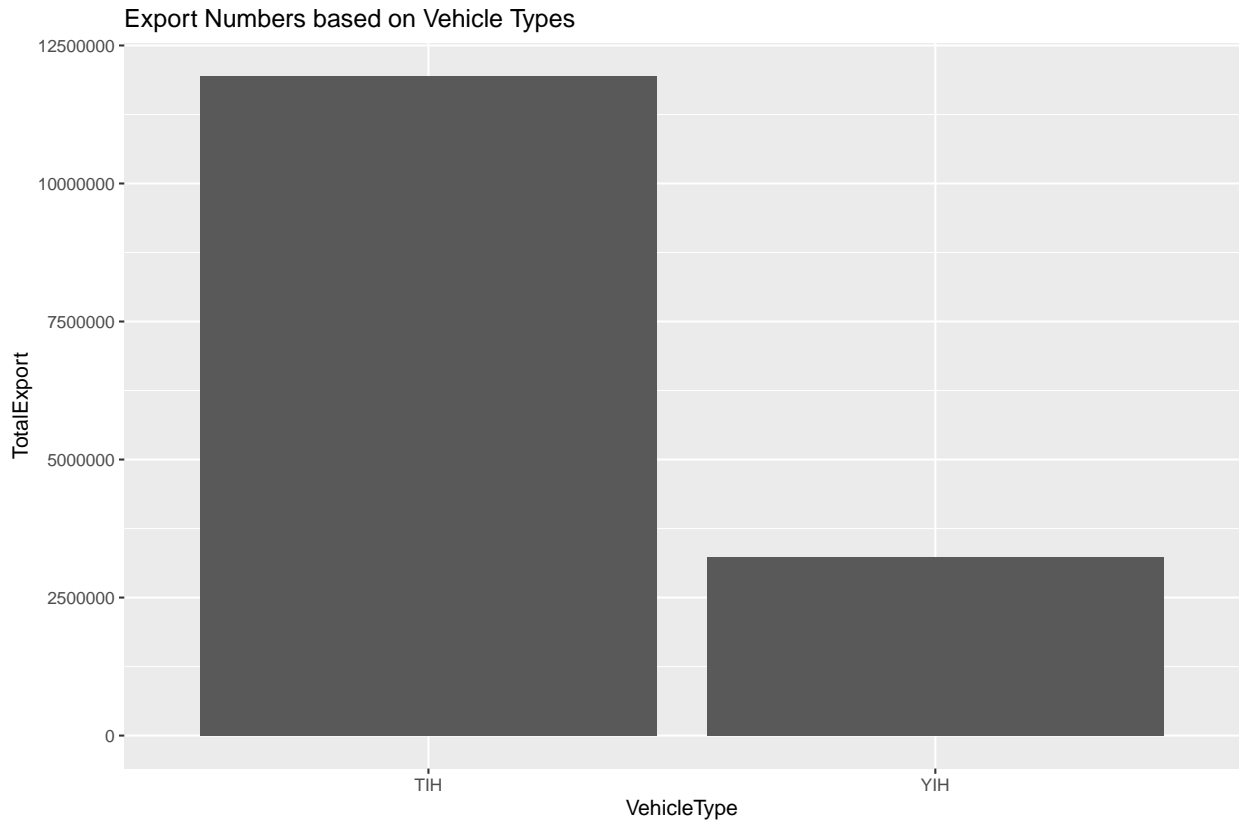


### Export-Import Numbers Based On Vehicle Type (Turkish or Foreign Vehicles)

We can see in bar charts below Turkish vehicles mostly used for imports and exports.

Imports and Exports Percentages based on Vehicle Type also shown in tables.

```
# Export
ExportVehicles <- df_exportimport_final %>% filter(ExportImport == 'EXPORT') %>% group_by(VehicleType)
ggplot(ExportVehicles , aes(y=TotalExport, x=VehicleType)) +
  geom_bar(position="dodge", stat="identity") + labs(title = "Export Numbers based on Vehicle Types")
```

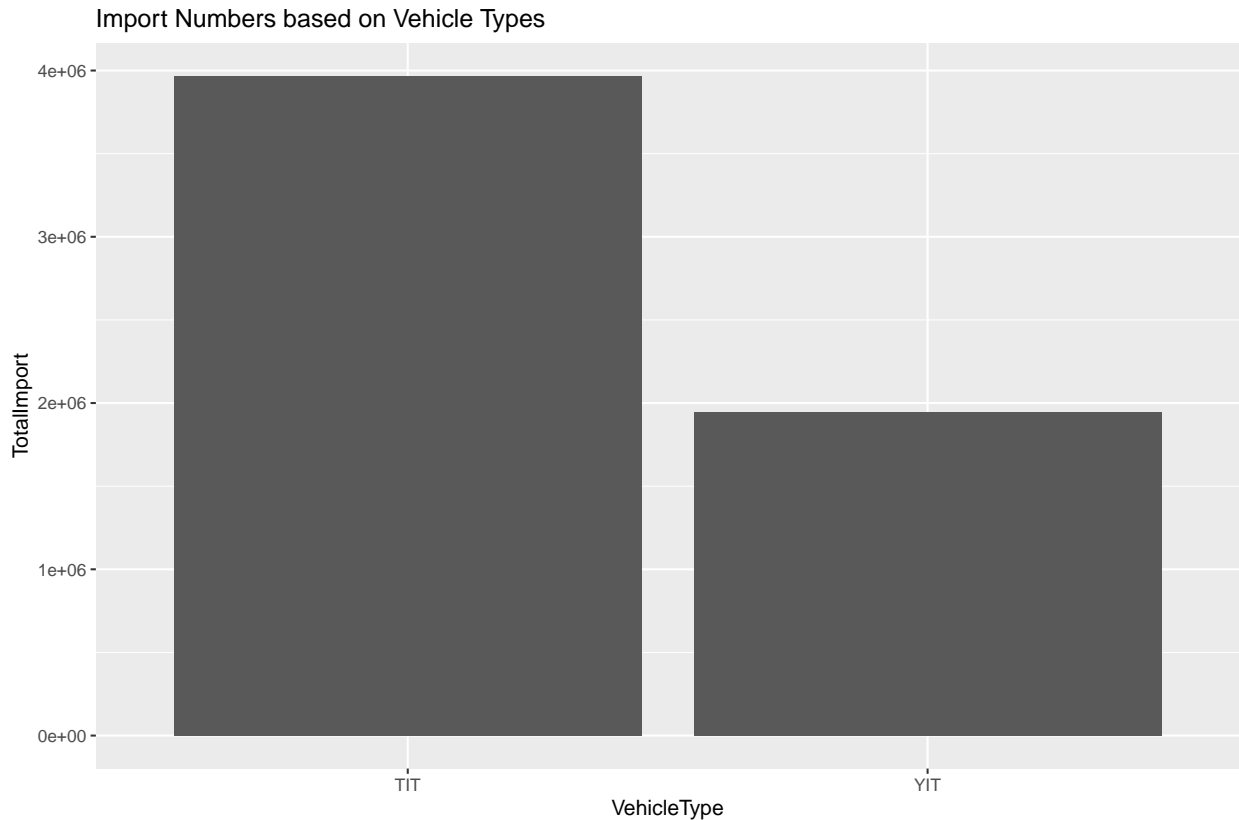


```
df_exportimport_final %>% filter(ExportImport == 'EXPORT') %>% group_by(VehicleType) %>% summarize(Tot
```

```
## # A tibble: 2 x 2
##   VehicleType Percentage
##   <chr>         <dbl>
## 1 TIH           78.7
## 2 YIH           21.3
```

```
#Import
```

```
ImportVehicles <- df_exportimport_final %>% filter(ExportImport == 'IMPORT') %>% group_by(VehicleType)
ggplot(ImportVehicles , aes(y=TotalImport, x=VehicleType)) +
  geom_bar(position="dodge", stat="identity") + labs(title = "Import Numbers based on Vehicle Types")
```



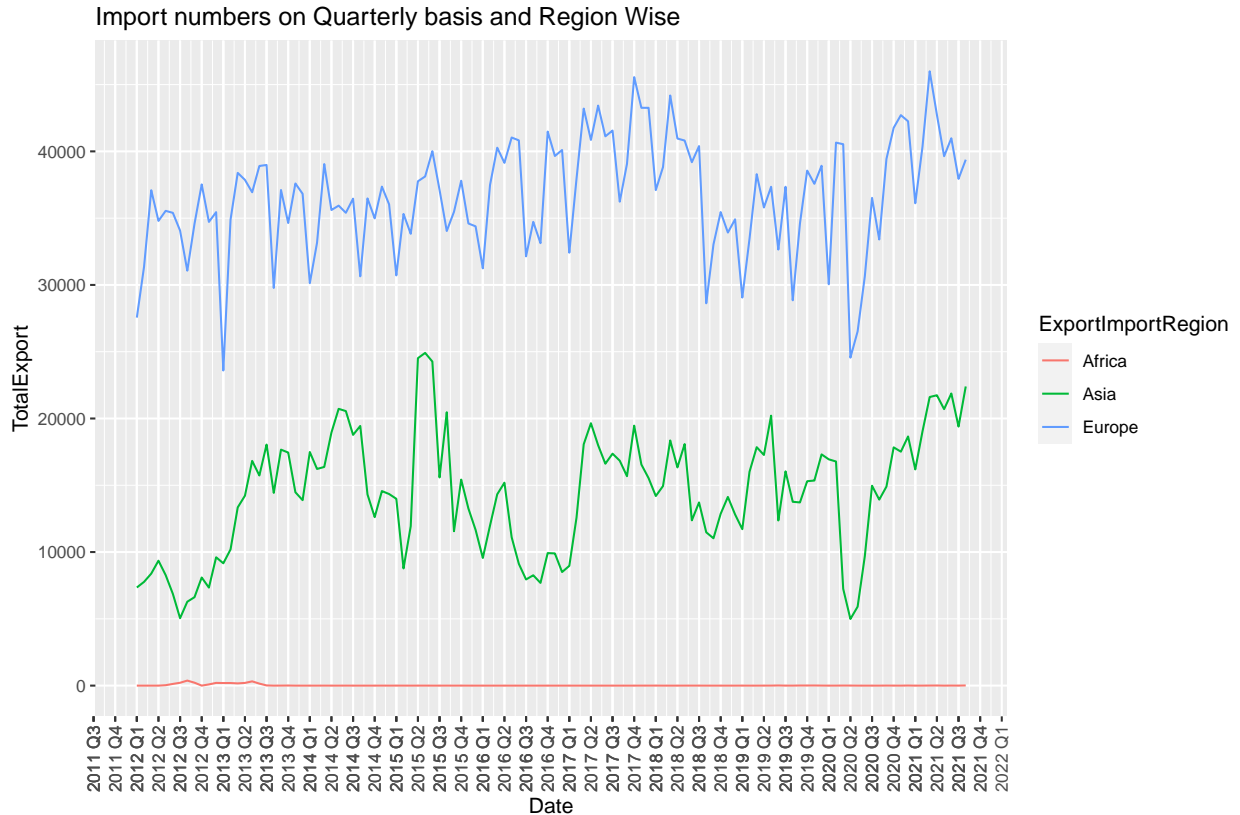
```
df_exportimport_final %>% filter(ExportImport == 'IMPORT') %>% group_by(VehicleType) %>% summarize(Tot
```

```
## # A tibble: 2 x 2
##   VehicleType Percentage
##   <chr>          <dbl>
## 1 TIT             67.1
## 2 YIT             32.9
```

### Export-Import Numbers Based On Region Wise

In this part we analyse our Import data based on Regions. As we can see in the plot below, import levels in Europe are way greater than Asia and Africa regions. Africa has the lowest import numbers among all. When we analyze the line running by quarters, import lines are quite bumpy. This irregularity can be considered as a factor of seasonal and political changes. In Africa region the line runs steadily.

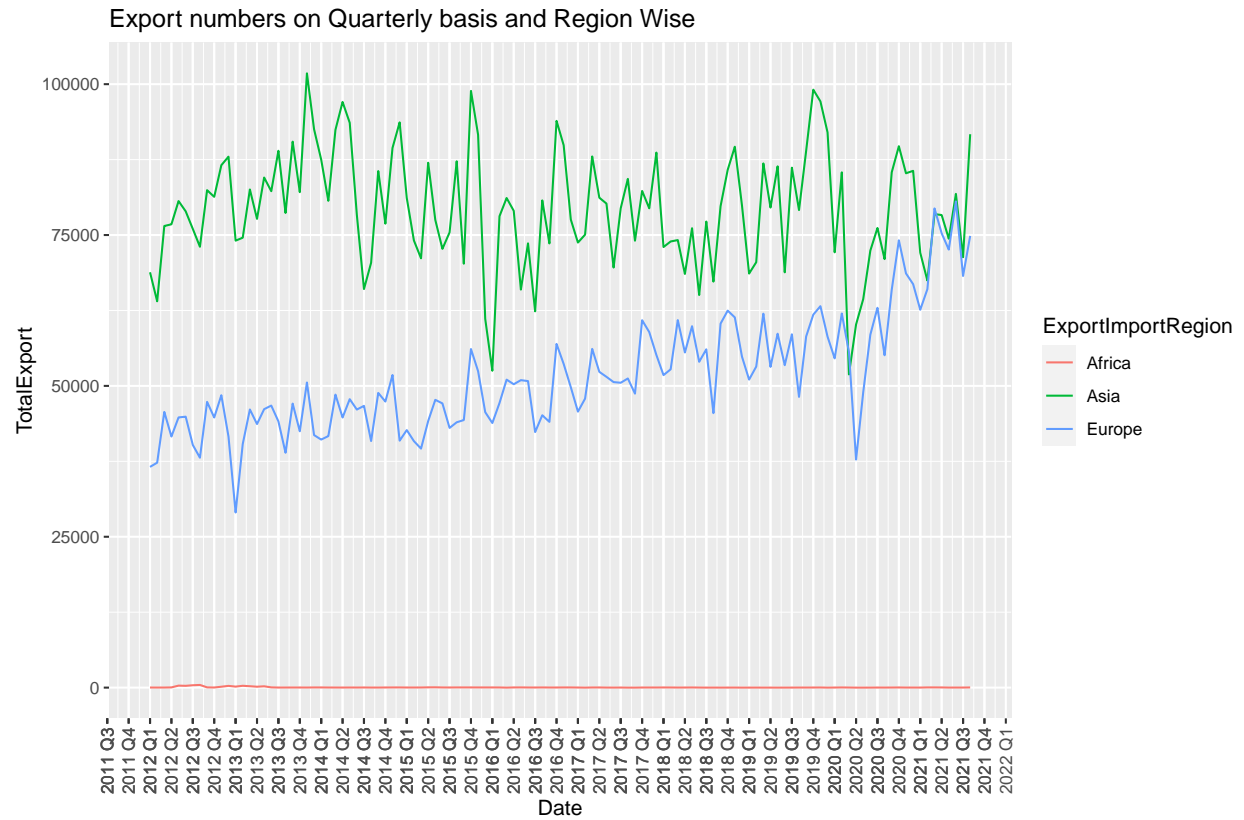
```
df_exportimport_final %>%
  filter(ExportImport == 'IMPORT') %>%
  group_by(Date,ExportImportRegion) %>% summarize(TotalExport = sum(Level)) %>%
  ggplot( aes(x=Date, y=TotalExport, group=ExportImportRegion, color=ExportImportRegion)) +
  zoo::scale_x_yearqtr(n = 100,format = '%Y Q%q') +
  geom_line() +
  theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  labs(title = "Import numbers on Quarterly basis and Region Wise")
```



In the second plot we analyse our Export data based on Regions. As we can see in the plot below, export levels in Asia are greater than Europe region in the beginnings of our line chart, but export numbers of Europe has caught Asia numbers lately. Africa's line runs steady and has the lowest export numbers among all.

```
df_exportimport_final %>%
  filter(ExportImport == 'EXPORT') %>%
  group_by(Date,ExportImportRegion) %>% summarize(TotalExport = sum(Level)) %>%
  ggplot( aes(x=Date, y=TotalExport, group=ExportImportRegion, color=ExportImportRegion)) +
  zoo::scale_x_yearqtr(n = 100,format = '%Y Q%q') +
  geom_line() +
  theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  labs(title = "Export numbers on Quarterly basis and Region Wise")
```





## References

1. CountryCode Documentation (<https://www.rdocumentation.org/packages/countrycode/versions/1.2.0/topics/countrycode>)
2. Stackoverflow (<https://stackoverflow.com/>)
3. WordCloud2 Documentation (<https://www.r-graph-gallery.com/196-the-wordcloud2-library.html>)
4. KableExtra Documentation (<https://www.rdocumentation.org/packages/kableExtra/versions/1.3.4>)