Visualising the 2020 election results of Ireland and Galway west

1.0 Introduction

In this report, we are going to discuss and visualise the Irish election of the year 2016 and 2020. Visualised data in this report is about the number of first preference votes per party, the change in first preference votes per party and change in first preference votes for the most significant candidates in Galway west constituency of both year 2016 and 2020. This report also discusses a comparison between national party average and Galway west's party average.

2.0 The vote per party

In this section, the total number of first preference votes per party in Galway west constituency of the year 2016 and 2020 is visualised.
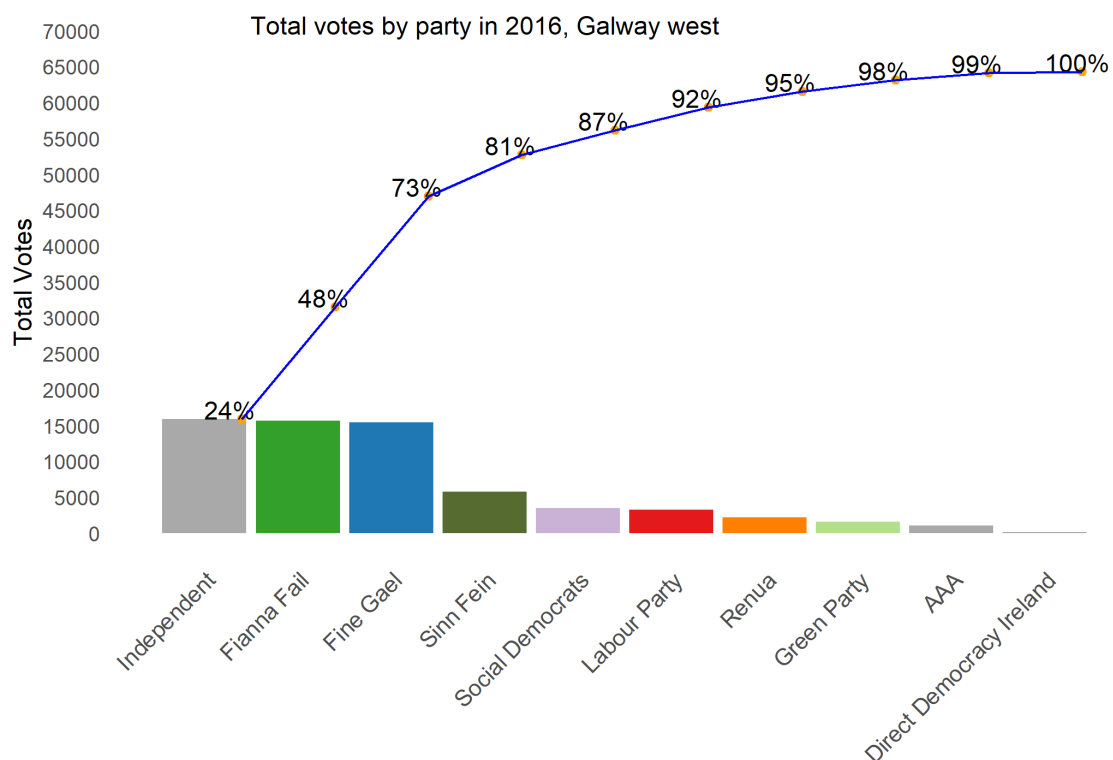
2.1 The vote per party in the year 2016

Figure 1: Number of votes per party in 2016

Figure 1 which is Pareto chart represents, the total number of first preference votes per party in Galway west constituency in the year 2016. Y-axis represents the vote count and X-axis represents a political party. Colours choice is based on political party colours. The vertical bar gives the metrics of the number of votes per party. Percentages connected with a blue line is a cumulative share of votes by each party. X-axis labels are tilted with 45 degrees so that readers can read the party name with less effort.
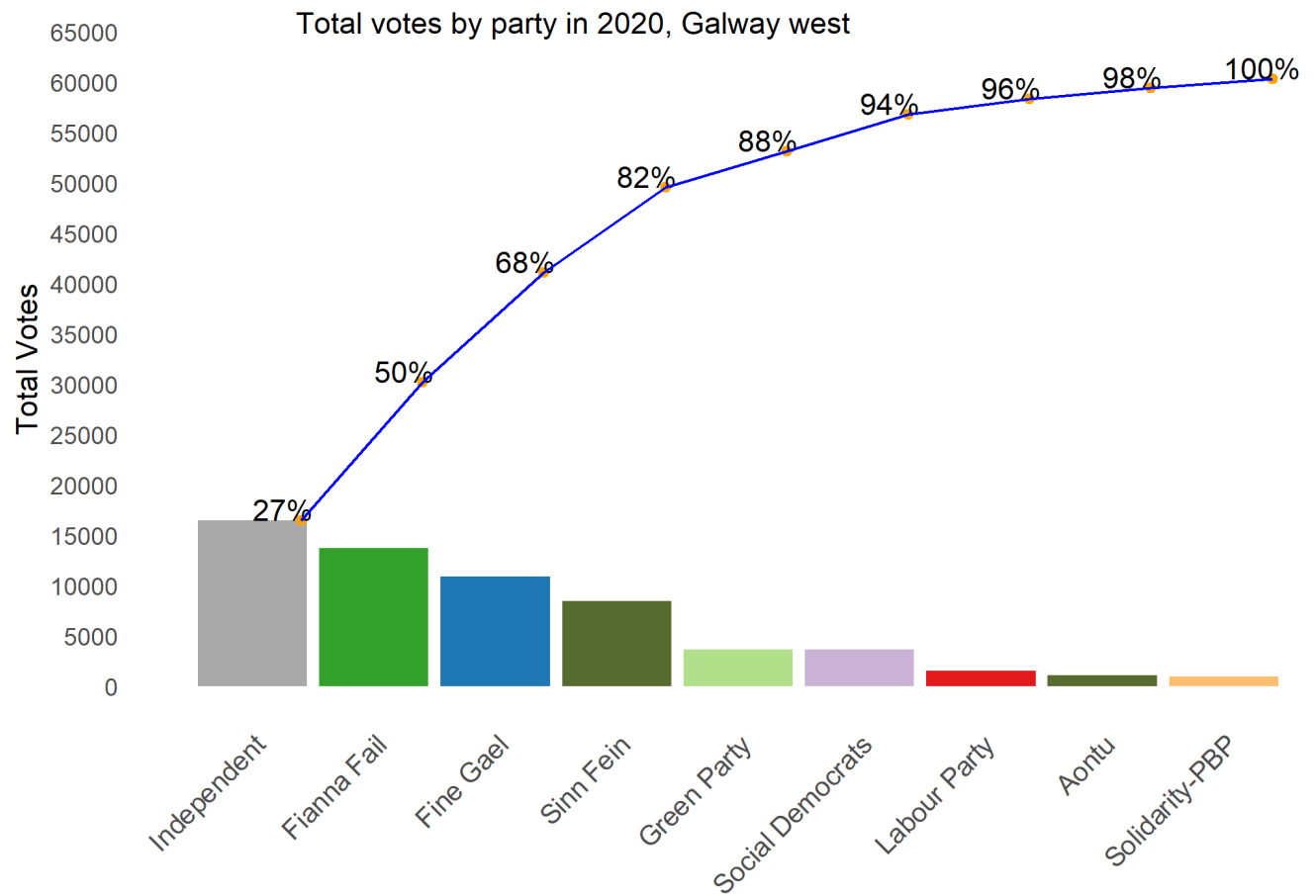
2.2 The vote per party in the year 2020

Figure 2: Number of votes per party in 2020

Figure 2 which is the Pareto chart represents, the total number of first preference votes per party in Galway west constituency in the year 2020. Y-axis represents the votes count and X-axis represents the political party. Colours choice is based on political party colours. The vertical bar gives the metrics of the number of votes per party. Percentages connected with a blue line is a cumulative share of votes by each party. X-axis labels are tilted with 45 degrees so that readers can read the party name with less effort.

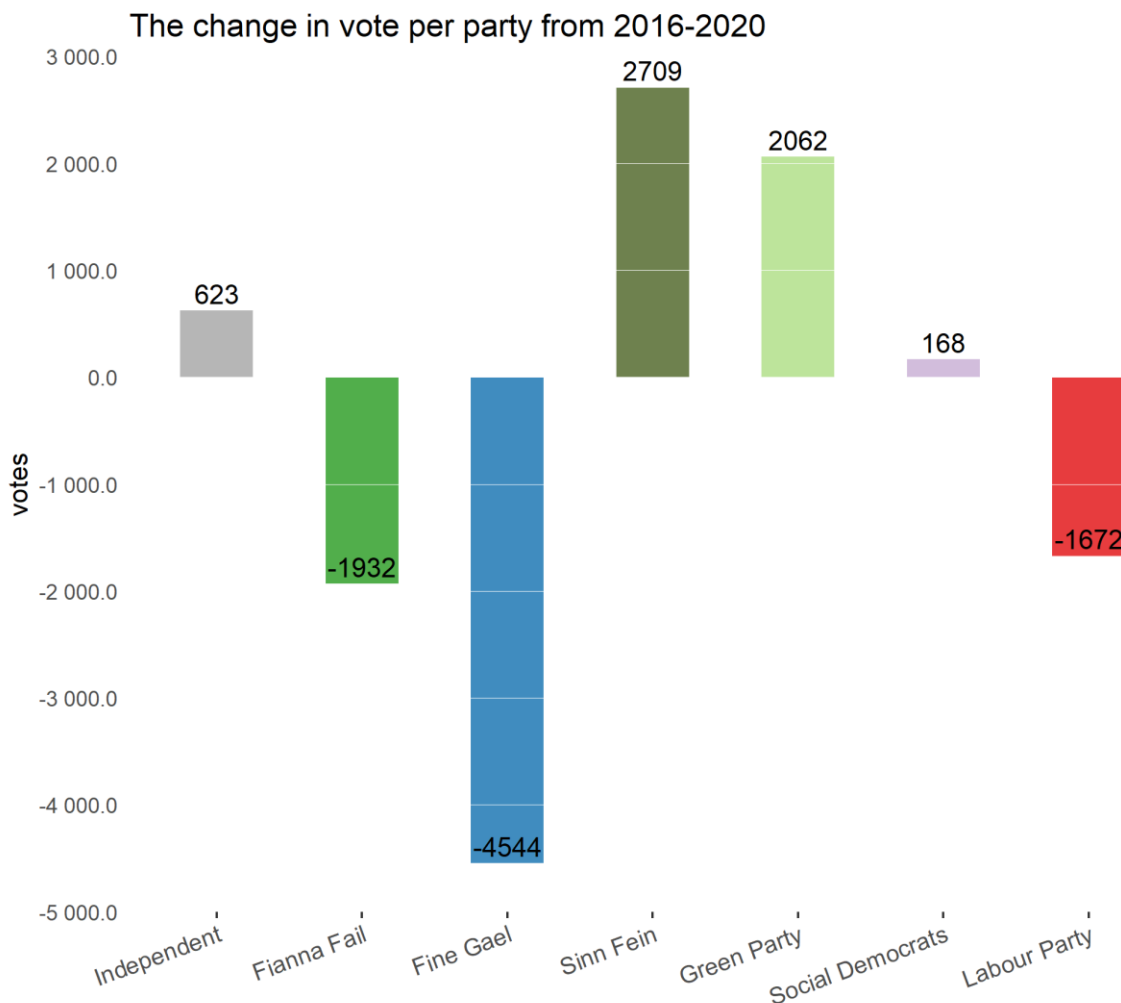**3.0 The change in vote per party from 2016 to 2020**

Figure 3: The change in vote per party from 2016 to 2020

Figure 3 which is Diverging Bar Charts represents the change in first preference vote per party in Galway west constituency from the year 2016 to the year 2020. This graph shows the divergence of the number of votes per party from reference y-axis value zero. In this graph, the reference value is first preference votes in the year 2016. Positive y-axis value represents the increase in votes per party in the year 2020 as compared with the year 2016. Negative y-axis value represents the decrease in votes per party in the year 2020 as compared with the year 2016. The X-axis represents a political party. Colours choice is based on political party colours. The number associated with each bar represents the qualitative value of that particular bar. The bar represents the first preference votes per party.

This graph visualises only parties participated in Galway west constituency in the year 2020.

Fine Gael party performs very badly in Galway west constituency election in the year 2020 as compared with the party's performance in the year 2016. Fine Gael party's first preference votes decreased by 4544 votes. Fianna Fail and Labour Party lose their party votes by 1932 and 1672 respectively in Galway west constituency election in the year 2020 as compared to the year 2016.

Sinn Fein party performs very well in Galway west constituency election in the year 2020 as compared with the party's performance in the year 2016. Sinn Fein first preference votes increased by 2709

votes. The green party also performs exceptionally in Galway west constituency election in the year 2020 as compared with the party's performance in the year 2016 with 2062 increase in first preference votes. Independent candidates first performance votes also increase by 623 votes. Lastly, the Social Democrats party first preference votes increase by 168 votes. Overall Fine Gael performs worst and Sinn Fein performs best in Galway west constituency election in the year 2020 as compared to the year 2016.

4.0 Comparison to the national average for party share of the vote

Figure 4.0 is a grouped bar chart which is used to compare the party's performance at the national level and in Galway west constituency in the year 2020. The national average dataset is taken from RTE Broadcast [1].

Colour used here from okabi and ito's colour palette which is colour blind friendly. Y-axis represents the percentage share of the first preference votes per party in the national level and in Galway west constituency. The X-axis represents a party.
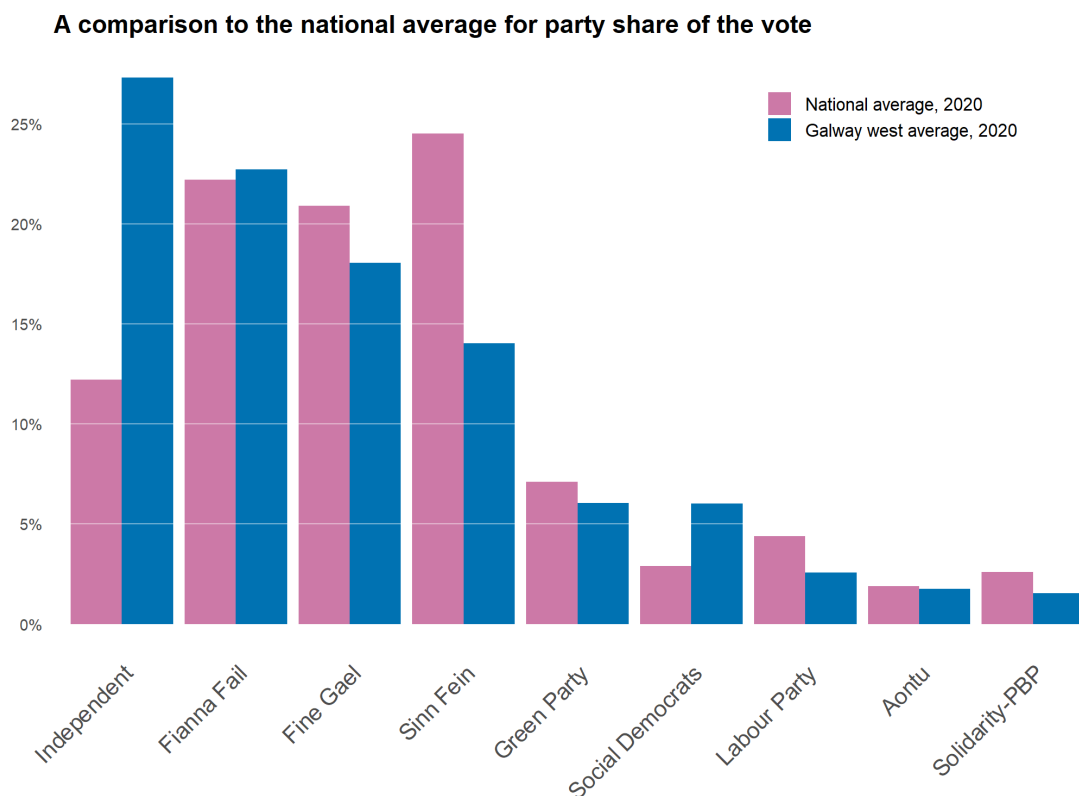

Figure 4: Comparison between the national average and Galway west constituency average per party

First preference vote percentage of Sinn Fein party and Independent candidates has a significant difference in their value. Independent candidates perform better in the Galway west than at the national level but Sinn Fein party perform better at the national level than the Galway west. Fianna Fail party and Aontu party voting share at the national level and Galway west are almost similar. Fine Gael, Green party, Labour party, and Solidarity-PBP perform slightly better at the national level than the Galway west.

5.0 The change in the vote for the most significant candidates

Figure 5.0 is a grouped bar chart which is used to compare the significant candidate's performance in Galway west constituency in the year 2016 and year 2020. This chart visualises the performance of candidate who participated in both the elections.

Colour used here from okabi and ito's colour palette which is colour blind friendly. Y-axis represents first preference votes per candidates in Galway west constituency in the year 2016 and year 2020. The X-axis represents candidates.
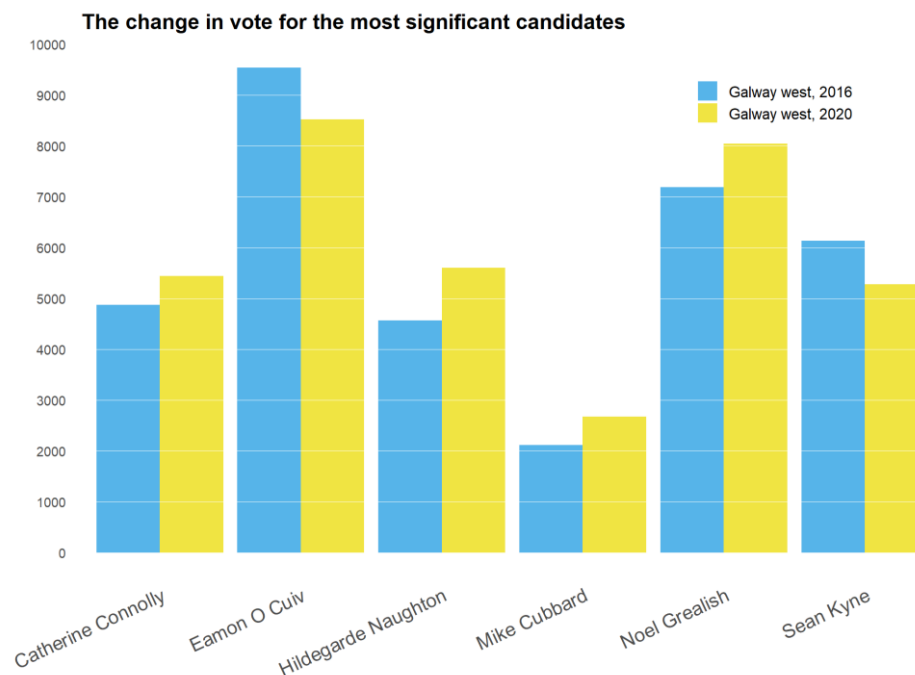

Figure 5:The change in the vote for the most significant candidates

Candidates Catherine Connolly, Eamon O Cuiv, Hilde Garde Naughton, Mike Cubbard, Noel Grealish and Sean Kyne are the significant candidates in the Galway West constituency. Each candidate performed in the same range in the year 2020 as they performed in the year 2016 where candidate Eamon O Cuiv and Sean Kyne lose around 1000 votes in the year 2020. Catherine Connolly, Hilde Garde Naughton, Mike Cubbard and Noel Grealish increased their votes in the year 2020. Hilde Garde Naughton and Noel Grealish's first preference votes have increased significantly in the year 2020 as compared with the year 2016.

6.0 Conclusion:

The Pareto chart is used to visualise the quantitative data such as the number of first preference votes in the year 2016 and 2020. From Pareto chart, it's easy to identify the number of votes and cumulative percentage of vote share per party. The diverging graph is the better option to show the change between two categories. The diverging graph helps to easily identify the change in values by plotting from zero to the positive and negative side of the vertical axis. To compare two categories, the grouped bar chart is used which plots bars side by side of a single entity. By plotting bars together readers can easily compare the bar length to know the difference in value. okabi and ito's colours are used so that the reader with CVD can easily differentiate the colours visualised.

References:

[1]"General Election 2020 Live Results | RTÉ News", *RTE.ie*, 2020. [Online]. Available: https://www.rte.ie/news/election-2020/results/#/national. [Accessed: 02- Mar- 2020].

7.0 Appendix

```r
require(dplyr)

require(tidyr)

require(readxl)

require(ggplot2)

require(forcats)

require(viridis)

require(ggridges)

#2.0 votes per party in each election ------------

# read 2016 data

ele_data_16 <- read.csv("2016-04-28_general-election-count-details-galway-w
est-csv_en.csv")

#cleaning data ++++

# taking relevant columns

ele_data_16 <- ele_data_16[ele_data_16$Count.Number == 1, c(-1, -6, -7, -9)
]

# convert party names to single format

levels(ele_data_16$Party) <- c(levels(ele_data_16$Party), "Independent", "S
ocial Democrats", "Fine Gael", "Direct Democracy Ireland")

ele_data_16$Party[ele_data_16$Party == "Ind"] <- "Independent"

ele_data_16$Party[ele_data_16$Party == "Social Democratic Party"] <- "Socia
l Democrats"

ele_data_16$Party[ele_data_16$Party == "Fine  Gael"] <- "Fine Gael"

ele_data_16$Party[2] <- "Direct Democracy Ireland"

# group on party and get total votes

ele_data_16_grp <- ele_data_16 %>% group_by(Party) %>% summarise("Total_vot
es" = sum(Total.Votes))


# 2.1 get pareto chart +++

# sort value based on votes

ele_data_16_grp <- ele_data_16_grp[order(ele_data_16_grp$Total_votes, decre
asing = TRUE),]
```

```r
ele_data_16_grp$Party <- factor(ele_data_16_grp$Party, levels = ele_data_16
_grp$Party)

# get cumulative sum

ele_data_16_grp["cumulative"] <- cumsum(ele_data_16_grp$Total_votes)

ele_data_16_grp["cumulative_perc"] <- floor(100 * cumsum(ele_data_16_grp$To
tal_votes) / sum(ele_data_16_grp$Total_votes))


# 2.2 read 2020 data

ele_data_20 <- read_excel("GalwayWest-2020.xlsx", col_names=TRUE)

#cleaning data

ele_data_20 <- ele_data_20[-1, c(2,3,5)]

ele_data_20 <- ele_data_20 %>% drop_na()

colnames(ele_data_20) <- c("Party", "candidate", "votes")

ele_data_20[3] <- sapply(sapply(ele_data_20[3],as.factor),as.integer)

# group on party and get total votes

ele_data_20_grp <- ele_data_20 %>% group_by(Party) %>% summarise("votes" =
sum(votes))


# convert into single char format

ele_data_20_grp$Party <- iconv(ele_data_20_grp$Party, 'utf-8', 'ASCII//TRAN
SLIT')

#2.2 get pareto chart

# sort value based on votes

ele_data_20_grp <- ele_data_20_grp[order(ele_data_20_grp$votes, decreasing
= TRUE),]

ele_data_20_grp$Party <- factor(ele_data_20_grp$Party, levels = ele_data_20
_grp$Party)

# get cumulative sum

ele_data_20_grp["cumulative"]  <- cumsum(ele_data_20_grp$votes)

ele_data_20_grp["cumulative_perc"]  <- floor(100 * cumsum(ele_data_20_grp$v
otes) / sum(ele_data_20_grp$votes))


# possible colours

mycols <- c('#a6cee3','#1f78b4','#fb9a99','#b2df8a','#e31a1c','#ff7f00','#f
dbf6f','#33a02c','#cab2d6')

# assign colours to party

party.colours <- c('Fine  Gael' = '#1f78b4', 'Fine Gael' = '#1f78b4', 'Fian
na Fail' = '#33a02c', 'Sinn Fein' = 'darkolivegreen', 'Labour Party' = '#e3
1a1c',  'Green Party' = '#b2df8a', 'Social Democrats' ='#cab2d6','#fb9a99',
'Independent' = 'darkgrey', 'Renua' = '#ff7f00', 'Direct Democracy Ireland'
='darkgrey', 'Direct Democracy Ireland' = 'darkgrey',      'AAA' ='darkgrey'
, "OTH"='#fb9a99',"Solidarity-PBP"= '#fdbf6f', 'Aontu'='darkolivegreen')
```

```r
# 2.1 The vote per party in year 2016        -----
theme_set(theme_classic())

ggplot(ele_data_16_grp, aes(x = Party, fill=Party)) +

  geom_col(aes(y = Total_votes)) +

  geom_point(aes(y = cumulative), position=position_nudge(x = 0.4, y = 0),
color="#FFA500")   +

  geom_text(aes(y = cumulative , label = sprintf("%1.2i%%", cumulative_perc
)),hjust = 0,vjust = 0) +

  geom_line(aes(y = cumulative, group = 1), position=position_nudge(x = 0.4
, y = 0), color = "blue") +

  scale_y_continuous(

    limits = c(0, 70000),

    breaks = seq(0, 70000, by = 5000),

    name = "Total Votes"

  ) +

  scale_x_discrete( expand = c(0,1)) +

  scale_fill_manual(values = party.colours ) +

  labs(title = "Total votes by party in 2016, Galway west") +

  theme(

      legend.position = "none",

      #axis.title.y = element_blank(),

      axis.line.y = element_blank(),

      axis.ticks.y = element_blank(),

      axis.line.x = element_blank(),

      axis.ticks.x = element_blank(),

      axis.text.x = element_text(size = 10, vjust = 1, angle = 45, hjust =
1.0),

      axis.title.x = element_blank(),

      plot.title = element_text(vjust = -8, hjust = 0.25, size = 11),

      plot.margin = margin(6, 6, 3, 3),

      panel.background = element_blank(),

      #panel.grid.major.y = element_line(size = 0.05, linetype = 'solid',co
lour = "white"),

      panel.grid.major.y= element_blank(),

      panel.ontop = TRUE) +

  expand_limits(x = c(3, 10))


# 2.1 The vote per party in year 2020
theme_set(theme_classic())
```

```r
ggplot(ele_data_20_grp, aes(x = Party, fill=Party)) +

  geom_col(aes(y = votes)) +

  geom_point(aes(y = cumulative), position=position_nudge(x = 0.4, y = 0),
color="#FFA500")   +

  geom_text(aes(y = cumulative , label = sprintf("%1.2i%%", cumulative_perc
)), hjust = 0, vjust = 0) +

  geom_line(aes(y = cumulative, group = 1), position=position_nudge(x = 0.4
, y = 0), color = "blue") +

  scale_y_continuous(

    limits = c(0, 65000),

    breaks = seq(0, 65000, by = 5000),

    name = "Total Votes") +

  scale_x_discrete( expand = c(0,1)) +

  scale_fill_manual(values = party.colours ) +

  scale_colour_viridis_d() +

  ggtitle("Total votes by party in 2020, Galway west") +

  theme(

      legend.position = "none",

      axis.line.y = element_blank(),

      axis.ticks.y = element_blank(),

      axis.line.x = element_blank(),

      axis.ticks.x = element_blank(),

      axis.text.x = element_text(size = 10, vjust = 1, angle = 45, hjust =
1.0),

      axis.title.x = element_blank(),

      plot.title = element_text(vjust = -8, hjust = 0.25, size = 11),

      plot.margin = margin(6, 6, 3, 3),

      panel.background = element_blank(),

      panel.grid.major.y= element_blank(),

      panel.ontop = TRUE

    ) + expand_limits(x = c(3, 10))
# 3.0 The change in vote per party from 2016 to 2020

# find difference
ele_both <- merge(x = ele_data_20_grp, y = ele_data_16_grp, by = "Party", a
ll.x = TRUE)

ele_both$votes_diff <- ele_both$votes - ele_both$Total_votes

ele_both <- ele_both %>% mutate(pos = votes_diff >=0)

ele_both <- ele_both[complete.cases(ele_both$votes_diff),]

# 3.0 ggolot
```

```r
library(scales)
ggplot(ele_both, aes(x = Party, y = votes_diff, fill = Party)) +
  geom_col(position = "identity", alpha = 0.85, width=0.5) +
  geom_text(aes(y = votes_diff , label = votes_diff), size = 4,
            hjust = 0.5, vjust = -0.35) +
  scale_y_continuous(limits = c(-5000, 3000),
                     breaks = seq(-5000, 3000, by= 1000) ,
                     name = "votes",
                     expand=c(0,0),
                     labels = scales::number_format(accuracy = 0.1)) +
  labs(title="The change in vote per party from 2016-2020")+
 scale_fill_manual(values=party.colours) +
    theme(
      axis.line.y = element_blank(),
      axis.ticks.y = element_blank(),
      axis.line.x = element_blank(),
      axis.text.x = element_text(size = 10, vjust = 1, angle = 20, hjust =
1.0),
      axis.title.x = element_blank(),
      plot.margin = margin(10, 10, 5, 5),
     panel.background=element_blank(),
      panel.grid.major.y = element_line(size = 0.2, linetype = 'solid',colo
ur = "white"),
      panel.ontop = TRUE,
      legend.position = "none")


# 4.0 national average
# read national average 2020 data
ire_ele_data_20 <- read_excel("Irish_election_2020.xlsx", col_names=TRUE)
# galway_west_average per party share
ele_data_20_grp$vote_share <- 100 * ele_data_20_grp$votes / sum(ele_data_20
_grp$votes)


# Join galway west table and whole Ireland table
ele_data_20_grp <- merge(ele_data_20_grp, ire_ele_data_20, by = "Party", al
l = TRUE)
ele_data_20_grp<-gather(ele_data_20_grp, key = "level", value = "share", 5:
6)
# 4.0 ggplot
```

```r
ggplot(ele_data_20_grp, aes(x=Party, y = share, fill=level) ) +

  geom_bar(position = "dodge" ,stat = "identity") +

  scale_y_continuous(name = "", breaks = seq(0,30,5), labels =  function(x)
paste0(x, "%")) +

   scale_fill_manual(values = c("#CC79A7", "#0072B2"),

                     name = NULL, labels=c("National average, 2020", "Galwa
y west average, 2020")) +

  labs(title = "A comparison to the national average for party share of the
vote") +

  theme_classic() +

  theme(axis.line.x = element_blank(),

        axis.ticks.x = element_blank(),

        axis.ticks.y = element_blank(),

        axis.line.y= element_blank(),

        axis.title.x=element_blank(),

        axis.text.x = element_text(size = 10, vjust = 1, angle = 45, hjust
= 1.0),

        axis.text.y = element_text( size=7),

        axis.title.y = element_text(size=9, face="bold"),

        legend.text = element_text(size=8),

        legend.title = element_blank(),

        legend.position = c(0.8,0.9),

        legend.key.size = unit(0.8,"line"),

        plot.title=element_text( hjust=0.00, face='bold', size=11),

        panel.background = element_blank(),

        panel.grid.major.y = element_line(size = 0.1, linetype = 'solid', c
olour = "white"),

     panel.ontop = TRUE )


# 5.0 most significant candidates

# join candidate's first name and last name

ele_data_16$candidate <- paste(ele_data_16$Candidate.First.Name, ele_data_1
6$Candidate.surname, sep = " ")

ele_data_16 <- ele_data_16[c(5,6,7)]

ele_data_16$candidate <- iconv(ele_data_16$candidate, 'utf-8', 'ASCII//TRAN
SLIT')

#ele_data_16$Party <- iconv(ele_data_16$Party, 'utf-8', 'ASCII//TRANSLIT')

ele_data_20$candidate <- iconv(ele_data_20$candidate, 'utf-8', 'ASCII//TRAN
SLIT')

#ele_data_20$Party <- iconv(ele_data_20$Party, 'utf-8', 'ASCII//TRANSLIT')
```

```r
# replace ' with " "

ele_data_16$candidate <- gsub("'", " ", ele_data_16$candidate)

ele_data_16$candidate <- gsub("Catherine Martina Ann Connolly", "Catherine
Connolly", ele_data_16$candidate)


ele_data_20<-ele_data_20[order(ele_data_20$votes, decreasing = TRUE),]

ele_data_16 <- ele_data_16[order(ele_data_16$Total.Votes, decreasing = TRUE
),]
# join election 2020 table and election 2016 table
ele_cadidate_info_both <- merge(x = ele_data_20, y = ele_data_16, by = "can
didate", all = TRUE)

ele_cadidate_info_both <- ele_cadidate_info_both %>% drop_na()

ele_cadidate_info_both<-gather(ele_cadidate_info_both, key = "year", value
= "votes", 3:4)

ele_cadidate_info_both <- ele_cadidate_info_both[order(ele_cadidate_info_bo
th$votes, decreasing = TRUE),]

# 5.0 ggplot

ggplot(ele_cadidate_info_both, aes(x=candidate, y = votes , fill=year) ) +

  geom_bar(position = "dodge" ,stat = "identity") +

  scale_y_continuous(name = "", breaks = seq(0,10000, by=1000)) +

   scale_fill_manual(values = c("#56B4E9", "#F0E442"),

                    name = NULL, labels=c("Galway west, 2016", "Galway wes
t, 2020")) +

  labs(title = " The change in vote for the most significant candidates") +

  theme_classic() +

  theme(axis.line.x = element_blank(),

        axis.ticks.x = element_blank(),

        axis.ticks.y = element_blank(),

        axis.line.y= element_blank(),

        axis.title.x=element_blank(),

        axis.text.x = element_text(size = 10, vjust = 1, angle = 25, hjust
= 1.0),

        axis.text.y = element_text( size=7),

        axis.title.y = element_text(size=9, face="bold"),

        legend.text = element_text(size=8),

        legend.title = element_blank(),

        legend.position = c(0.8,0.9),

        legend.key.size = unit(0.8,"line"),

        plot.title=element_text( hjust=0.00, face='bold', size=11),
```

```
        panel.background = element_blank(),

        panel.grid.major.y = element_line(size = 0.1, linetype = 'solid', c
olour = "white"),

     panel.ontop = TRUE )
```