PCCA Survey 2022

Don Lim

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Contents


```
library(readxl)
library(tidyverse)
library(dplyr)
library(ggplot2)
library(scales)
library(estimatr)
library(stargazer)
library(pastecs)
library(reshape2)

library(ggpubr)
library(rstatix)
library(vtable)
```

Data cleanup

Imports data and removes redundant first row

```
survey <- read_excel("SoGoSurvey_PCCA Grower-Owner Survey 3-25-22.xls",
    col_types = c("skip", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text",
```

```
        "text", "text", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text",
        "text", "text", "text", "text", "text", "text", "text"))

survey <- survey[-c(1), ]
survey <- survey[-c(355:362), ]
```

Rename columns

```
names(survey) <- c("number", "status", "gathering information",
    "social media", "traditional media", "interpersonal communication",
    "industry organization", "my cooperative", "other", "new media",
    "facebook", "twitter", "instagram", "youtube", "snapchat",
    "tiktok", "other2", "podcast or radio", "podcast list", "satisfaction",
    "market information", "crop information", "industry news",
    "farm operation", "other3", "website", "email", "member access",
    "mypcca", "text", "social media2", "print", "local coop",
    "other4", "area pcca does best", "mypcca app", "social media3",
    "email2", "text2", "printed", "other5", "communication improvements",
    "topic", "accessible", "responsive", "courteous", "marketing pool",
    "the seam", "pcca direct", "forward contracting", "most used marketing method",
    "information", "change", "influence", "best performance",
    "minimize risk", "control", "reliability", "price information",
    "why member", "opportunities", "how", "open and voluntary",
    "member control", "economic participation", "autonomy", "education",
    "cooperation", "community", "coop vs noncoop", "knowledge of coop",
    "coop meetings", "up to date", "age", "description", "active",
    "farming duration", "region", "operation", "education level",
    "membership duration", "thoughts")
```

Dummy variables

Replaces 1 if true, 0 if false

```
survey <- mutate_at(survey, c("social media", "traditional media",
    "interpersonal communication", "industry organization", "my cooperative",
    "facebook", "twitter", "instagram", "youtube", "snapchat",
    "tiktok", "market information", "crop information", "industry news",
    "farm operation", "website", "email", "member access", "mypcca",
    "text", "social media2", "print", "local coop", "mypcca app",
    "social media3", "email2", "text2", "printed"), ~replace(.,
    !is.na(.), 1))

survey <- mutate_at(survey, c("social media", "traditional media",
    "interpersonal communication", "industry organization", "my cooperative",
    "facebook", "twitter", "instagram", "youtube", "snapchat",
    "tiktok", "market information", "crop information", "industry news",
    "farm operation", "website", "email", "member access", "mypcca",
    "text", "social media2", "print", "local coop", "mypcca app",
```

```
    "social media3", "email2", "text2", "printed"), ~replace(.,
    is.na(.), 0))
```

```
survey <- survey %>%
    mutate(across(c(`new media`, `podcast or radio`, opportunities,
        active), ~factor(ifelse(.x == "Yes", 1, 0))))
```

Converts Likert answers to numerical values: Strongly disagree is 1, disagree is 2, somewhat disagree is 3, somewhat agree is 4, agree is 5, and strongly agree is 6. Also changes knowledge answers to numerical values: no knowledge is 1, some knowledge is 2, and extensive knowledge is 3.

```
survey <- mutate_at(survey, c("accessible", "responsive", "courteous",
    "minimize risk", "control", "reliability", "price information"),
    funs(recode(., `Strongly Disagree` = 1, Disagree = 2, `Somewhat Disagree` = 3,
        `Somewhat Agree` = 4, Agree = 5, `Strongly Agree` = 6)))

survey <- mutate_at(survey, c("marketing pool", "the seam", "pcca direct",
    "forward contracting"), funs(recode(., `No Knowledge` = 1,
    `Some Knowledge` = 2, `Extensive Knowledge` = 3)))
```

The following code converts character columns into numeric

```
cols.num <- c("number", "social media", "traditional media",
    "interpersonal communication", "industry organization", "my cooperative",
    "new media", "facebook", "twitter", "instagram", "youtube",
    "snapchat", "tiktok", "podcast or radio", "satisfaction",
    "market information", "crop information", "industry news",
    "farm operation", "website", "email", "member access", "mypcca",
    "text", "social media2", "print", "local coop", "mypcca app",
    "social media3", "email2", "text2", "printed", "accessible",
    "responsive", "courteous", "marketing pool", "the seam",
    "pcca direct", "forward contracting", "minimize risk", "control",
    "reliability", "price information", "opportunities", "open and voluntary",
    "member control", "economic participation", "autonomy", "education",
    "cooperation", "community", "coop vs noncoop", "knowledge of coop")

survey[cols.num] <- sapply(survey[cols.num], as.numeric)
```

Data summary

```
stat.desc(survey[cols.num])
```

```
##                     number social media traditional media
## nbr.val      3.540000e+02 354.00000000      354.00000000
## nbr.null     0.000000e+00 258.00000000      185.00000000
## nbr.na       0.000000e+00   0.00000000        0.00000000
## min          1.000000e+00   0.00000000        0.00000000
## max          3.540000e+02   1.00000000        1.00000000
## range        3.530000e+02   1.00000000        1.00000000
## sum          6.283500e+04  96.00000000      169.00000000
## median       1.775000e+02   0.00000000        0.00000000
## mean         1.775000e+02   0.27118644        0.47740113
## SE.mean      5.439056e+00   0.02366219        0.02658512
## CI.mean.0.95 1.069703e+01   0.04653659        0.05228514
## var          1.047250e+04   0.19820425        0.25019606
```

```
## std.dev      1.023352e+02   0.44520136        0.50019602
## coef.var     5.765365e-01   1.64168003        1.04774788
##              interpersonal communication industry organization my cooperative
## nbr.val                     354.00000000          354.00000000   354.00000000
## nbr.null                    157.00000000          175.00000000   159.00000000
## nbr.na                        0.00000000            0.00000000     0.00000000
## min                           0.00000000            0.00000000     0.00000000
## max                           1.00000000            1.00000000     1.00000000
## range                         1.00000000            1.00000000     1.00000000
## sum                         197.00000000          179.00000000   195.00000000
## median                        1.00000000            1.00000000     1.00000000
## mean                          0.55649718            0.50564972     0.55084746
## SE.mean                       0.02644188            0.02661062     0.02647435
## CI.mean.0.95                  0.05200343            0.05233528     0.05206728
## var                           0.24750724            0.25067621     0.24811543
## std.dev                       0.49750100            0.50067575     0.49811186
## coef.var                      0.89398656            0.99016321     0.90426461
##                  new media     facebook      twitter    instagram      youtube
## nbr.val      353.00000000 354.00000000 354.00000000 354.00000000 354.00000000
## nbr.null       0.00000000 220.00000000 320.00000000 325.00000000 218.00000000
## nbr.na         1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
## min            1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
## max            2.00000000   1.00000000   1.00000000   1.00000000   1.00000000
## range          1.00000000   1.00000000   1.00000000   1.00000000   1.00000000
## sum          510.00000000 134.00000000  34.00000000  29.00000000 136.00000000
## median         1.00000000   0.00000000   0.00000000   0.00000000   0.00000000
## mean           1.44475921   0.37853107   0.09604520   0.08192090   0.38418079
## SE.mean        0.02648694   0.02581506   0.01568281   0.01459654   0.02588851
## CI.mean.0.95   0.05209256   0.05077066   0.03084349   0.02870713   0.05091512
## var            0.24765001   0.23591172   0.08706647   0.07542293   0.23725613
## std.dev        0.49764446   0.48570744   0.29507028   0.27463235   0.48708944
## coef.var       0.34444803   1.28313757   3.07220229   3.35240871   1.26786517
##                   snapchat       tiktok podcast or radio satisfaction
## nbr.val      354.00000000 354.00000000     353.00000000 3.430000e+02
## nbr.null     336.00000000 331.00000000       0.00000000 0.000000e+00
## nbr.na         0.00000000   0.00000000       1.00000000 1.100000e+01
## min            0.00000000   0.00000000       1.00000000 1.000000e+00
## max            1.00000000   1.00000000       2.00000000 6.000000e+00
## range          1.00000000   1.00000000       1.00000000 5.000000e+00
## sum           18.00000000  23.00000000     436.00000000 1.502000e+03
## median         0.00000000   0.00000000       1.00000000 5.000000e+00
## mean           0.05084746   0.06497175       1.23512748 4.379009e+00
## SE.mean        0.01169271   0.01311859       0.02260346 6.962938e-02
## CI.mean.0.95   0.02299614   0.02580043       0.04445481 1.369557e-01
## var            0.04839871   0.06092252       0.18035346 1.662950e+00
## std.dev        0.21999708   0.24682488       0.42468043 1.289554e+00
## coef.var       4.32660915   3.79895682       0.34383530 2.944854e-01
##              market information crop information industry news farm operation
## nbr.val            354.00000000     354.00000000  354.00000000   354.00000000
## nbr.null            58.00000000     138.00000000  161.00000000   232.00000000
## nbr.na               0.00000000       0.00000000    0.00000000     0.00000000
## min                  0.00000000       0.00000000    0.00000000     0.00000000
## max                  1.00000000       1.00000000    1.00000000     1.00000000
## range                1.00000000       1.00000000    1.00000000     1.00000000
```

```
## sum               296.00000000     216.00000000  193.00000000   122.00000000
## median              1.00000000       1.00000000    1.00000000     0.00000000
## mean                0.83615819       0.61016949    0.54519774     0.34463277
## SE.mean             0.01970014       0.02595827    0.02650336     0.02529492
## CI.mean.0.95        0.03874440       0.05105232    0.05212435     0.04974769
## var                 0.13738577       0.23853652    0.24865959     0.22650086
## std.dev             0.37065586       0.48840200    0.49865779     0.47592106
## coef.var            0.44328437       0.80043661    0.91463657     1.38095128
##                      website        email member access       mypcca         text
## nbr.val      354.00000000 354.00000000  354.00000000 354.00000000 354.00000000
## nbr.null     210.00000000 183.00000000  154.00000000 237.00000000 267.00000000
## nbr.na         0.00000000   0.00000000    0.00000000   0.00000000   0.00000000
## min            0.00000000   0.00000000    0.00000000   0.00000000   0.00000000
## max            1.00000000   1.00000000    1.00000000   1.00000000   1.00000000
## range          1.00000000   1.00000000    1.00000000   1.00000000   1.00000000
## sum          144.00000000 171.00000000  200.00000000 117.00000000  87.00000000
## median         0.00000000   0.00000000    1.00000000   0.00000000   0.00000000
## mean           0.40677966   0.48305085    0.56497175   0.33050847   0.24576271
## SE.mean        0.02614570   0.02659702    0.02638668   0.02503667   0.02291525
## CI.mean.0.95   0.05142093   0.05230855    0.05189487   0.04923979   0.04506759
## var            0.24199357   0.25042013    0.24647493   0.22189946   0.18588851
## std.dev        0.49192842   0.50041995    0.49646241   0.47106205   0.43114790
## coef.var       1.20932402   1.03595709    0.87873847   1.42526467   1.75432593
##               social media2        print   local coop   mypcca app social media3
## nbr.val       354.00000000 354.00000000 354.00000000 354.00000000  354.00000000
## nbr.null      327.00000000 269.00000000 178.00000000 193.00000000  315.00000000
## nbr.na          0.00000000   0.00000000   0.00000000   0.00000000    0.00000000
## min             0.00000000   0.00000000   0.00000000   0.00000000    0.00000000
## max             1.00000000   1.00000000   1.00000000   1.00000000    1.00000000
## range           1.00000000   1.00000000   1.00000000   1.00000000    1.00000000
## sum            27.00000000  85.00000000 176.00000000 161.00000000   39.00000000
## median          0.00000000   0.00000000   0.00000000   0.00000000    0.00000000
## mean            0.07627119   0.24011299   0.49717514   0.45480226    0.11016949
## SE.mean         0.01412749   0.02273500   0.02661189   0.02650336    0.01666468
## CI.mean.0.95    0.02778464   0.04471309   0.05233779   0.05212435    0.03277454
## var             0.07065348   0.18297562   0.25070021   0.24865959    0.09830989
## std.dev         0.26580722   0.42775650   0.50069972   0.49865779    0.31354407
## coef.var        3.48502801   1.78148002   1.00708922   1.09642769    2.84601544
##                    email2        text2      printed   accessible   responsive
## nbr.val      354.00000000 354.00000000 354.00000000 3.490000e+02 3.400000e+02
## nbr.null     136.00000000 250.00000000 255.00000000 0.000000e+00 0.000000e+00
## nbr.na         0.00000000   0.00000000   0.00000000 5.000000e+00 1.400000e+01
## min            0.00000000   0.00000000   0.00000000 1.000000e+00 1.000000e+00
## max            1.00000000   1.00000000   1.00000000 6.000000e+00 6.000000e+00
## range          1.00000000   1.00000000   1.00000000 5.000000e+00 5.000000e+00
## sum          218.00000000 104.00000000  99.00000000 1.672000e+03 1.648000e+03
## median         1.00000000   0.00000000   0.00000000 5.000000e+00 5.000000e+00
## mean           0.61581921   0.29378531   0.27966102 4.790831e+00 4.847059e+00
## SE.mean        0.02588851   0.02424354   0.02388895 5.442349e-02 4.981721e-02
## CI.mean.0.95   0.05091512   0.04767994   0.04698257 1.070404e-01 9.798979e-02
## var            0.23725613   0.20806325   0.20202141 1.033709e+00 8.437966e-01
## std.dev        0.48708944   0.45613951   0.44946792 1.016715e+00 9.185840e-01
## coef.var       0.79096176   1.55262871   1.60718833 2.122210e-01 1.895137e-01
##                courteous marketing pool     the seam  pcca direct
```

```
## nbr.val      3.420000e+02   350.00000000 344.00000000 338.00000000
## nbr.null     0.000000e+00     0.00000000   0.00000000   0.00000000
## nbr.na       1.200000e+01     4.00000000  10.00000000  16.00000000
## min          1.000000e+00     1.00000000   1.00000000   1.00000000
## max          6.000000e+00     3.00000000   3.00000000   3.00000000
## range        5.000000e+00     2.00000000   2.00000000   2.00000000
## sum          1.776000e+03   761.00000000 597.00000000 516.00000000
## median       5.000000e+00     2.00000000   2.00000000   1.00000000
## mean         5.192982e+00     2.17428571   1.73546512   1.52662722
## SE.mean      4.805053e-02     0.03190866   0.03600114   0.03111261
## CI.mean.0.95 9.451277e-02     0.06275746   0.07081080   0.06119938
## var          7.896280e-01     0.35635694   0.44585226   0.32718206
## std.dev      8.886102e-01     0.59695640   0.66772169   0.57199831
## coef.var     1.711175e-01     0.27455288   0.38475086   0.37468106
##              forward contracting minimize risk      control  reliability
## nbr.val             342.00000000  3.380000e+02 3.370000e+02 3.420000e+02
## nbr.null              0.00000000  0.000000e+00 0.000000e+00 0.000000e+00
## nbr.na               12.00000000  1.600000e+01 1.700000e+01 1.200000e+01
## min                   1.00000000  1.000000e+00 1.000000e+00 1.000000e+00
## max                   3.00000000  6.000000e+00 6.000000e+00 6.000000e+00
## range                 2.00000000  5.000000e+00 5.000000e+00 5.000000e+00
## sum                 556.00000000  1.423000e+03 1.331000e+03 1.442000e+03
## median                2.00000000  4.000000e+00 4.000000e+00 4.500000e+00
## mean                  1.62573099  4.210059e+00 3.949555e+00 4.216374e+00
## SE.mean               0.03235610  6.505623e-02 6.592662e-02 7.100585e-02
## CI.mean.0.95          0.06364267  1.279674e-01 1.296809e-01 1.396646e-01
## var                   0.35804565  1.430522e+00 1.464710e+00 1.724306e+00
## std.dev               0.59836916  1.196044e+00 1.210252e+00 1.313128e+00
## coef.var              0.36806161  2.840920e-01 3.064274e-01 3.114354e-01
##              price information opportunities open and voluntary member control
## nbr.val           3.400000e+02  329.00000000        302.0000000    302.0000000
## nbr.null          0.000000e+00    0.00000000          0.0000000      0.0000000
## nbr.na            1.400000e+01   25.00000000         52.0000000     52.0000000
## min               1.000000e+00    1.00000000          1.0000000      1.0000000
## max               6.000000e+00    2.00000000          7.0000000      7.0000000
## range             5.000000e+00    1.00000000          6.0000000      6.0000000
## sum               1.402000e+03  582.00000000       1067.0000000   1162.0000000
## median            4.000000e+00    2.00000000          3.0000000      3.5000000
## mean              4.123529e+00    1.76899696          3.5331126      3.8476821
## SE.mean           6.644147e-02    0.02327203          0.1185325      0.1322962
## CI.mean.0.95      1.306895e-01    0.04578127          0.2332573      0.2603426
## var               1.500920e+00    0.17818222          4.2430860      5.2856923
## std.dev           1.225120e+00    0.42211636          2.0598752      2.2990633
## coef.var          2.971048e-01    0.23861904          0.5830200      0.5975190
##              economic participation     autonomy    education  cooperation
## nbr.val                 302.0000000 3.020000e+02  302.0000000  302.0000000
## nbr.null                  0.0000000 0.000000e+00    0.0000000    0.0000000
## nbr.na                   52.0000000 5.200000e+01   52.0000000   52.0000000
## min                       1.0000000 1.000000e+00    1.0000000    1.0000000
## max                       7.0000000 7.000000e+00    7.0000000    7.0000000
## range                     6.0000000 6.000000e+00    6.0000000    6.0000000
## sum                    1190.0000000 1.185000e+03 1262.0000000 1274.0000000
## median                    4.0000000 4.000000e+00    5.0000000    4.0000000
## mean                      3.9403974 3.923841e+00    4.1788079    4.2185430
```

```
## SE.mean                   0.1057690 9.246837e-02    0.1062576    0.1075558
## CI.mean.0.95              0.2081402 1.819663e-01    0.2091018    0.2116564
## var                       3.3784955 2.582220e+00    3.4097820    3.4936085
## std.dev                   1.8380684 1.606929e+00    1.8465595    1.8691197
## coef.var                  0.4664678 4.095296e-01    0.4418867    0.4430723
##                  community coop vs noncoop knowledge of coop
## nbr.val       302.0000000     320.0000000      3.280000e+02
## nbr.null        0.0000000       0.0000000      0.000000e+00
## nbr.na         52.0000000      34.0000000      2.600000e+01
## min             1.0000000       1.0000000      1.000000e+00
## max             7.0000000       6.0000000      6.000000e+00
## range           6.0000000       5.0000000      5.000000e+00
## sum          1316.0000000    1425.0000000      1.443000e+03
## median          4.5000000       5.0000000      5.000000e+00
## mean            4.3576159       4.4531250      4.399390e+00
## SE.mean         0.1317289       0.0803656      7.582616e-02
## CI.mean.0.95    0.2592262       0.1581136      1.491687e-01
## var             5.2404568       2.0667614      1.885871e+00
## std.dev         2.2892044       1.4376235      1.373270e+00
## coef.var        0.5253341       0.3228348      3.121501e-01
```

```
sumtable(survey[cols.num])
```

Data visualization

Blank theme formatting

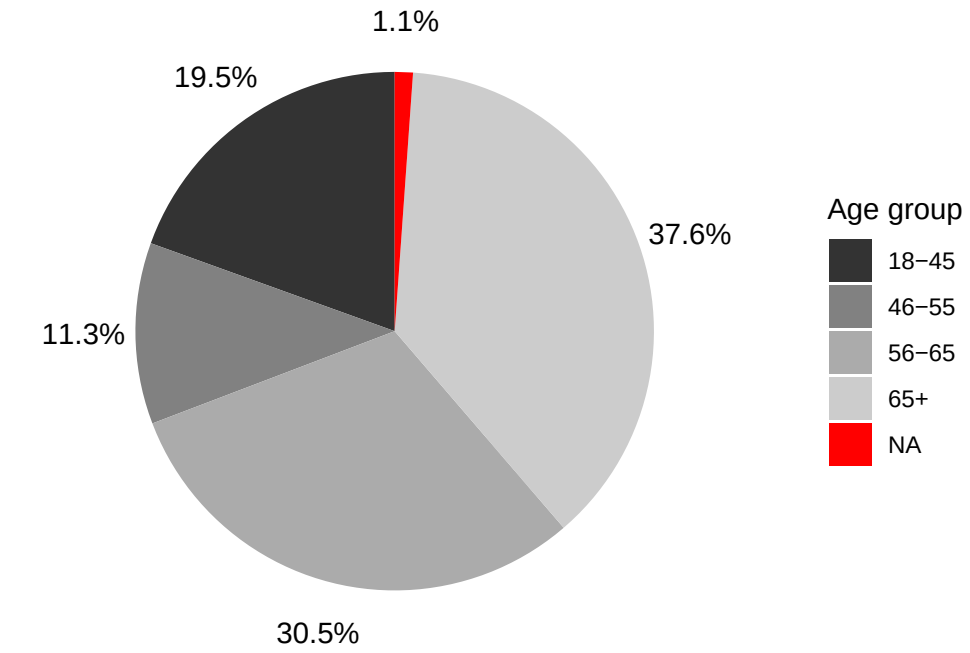
```
blank_theme <- theme_minimal() + theme(axis.title.x = element_blank(),
    axis.title.y = element_blank(), panel.border = element_blank(),
    panel.grid = element_blank(), axis.ticks = element_blank(),
    plot.title = element_text(size = 14, face = "bold"))
```

Age

```
age <- survey %>%
    group_by(age) %>%
    summarise(count = n_distinct(number))

bp <- ggplot(age, aes(x = "", y = count, fill = age)) + geom_bar(width = 1,
    stat = "identity")
pie <- bp + coord_polar("y", start = 0)

pie + scale_fill_grey() + ggtitle("Age of PCCA Members") + blank_theme +
    theme(axis.text.x = element_blank()) + geom_text(aes(x = 1.7,
    label = percent(count/354, accuracy = 0.1)), position = position_stack(vjust = 0.5)) +
    guides(fill = guide_legend(title = "Age group"))
```

Table 1: Summary Statistics

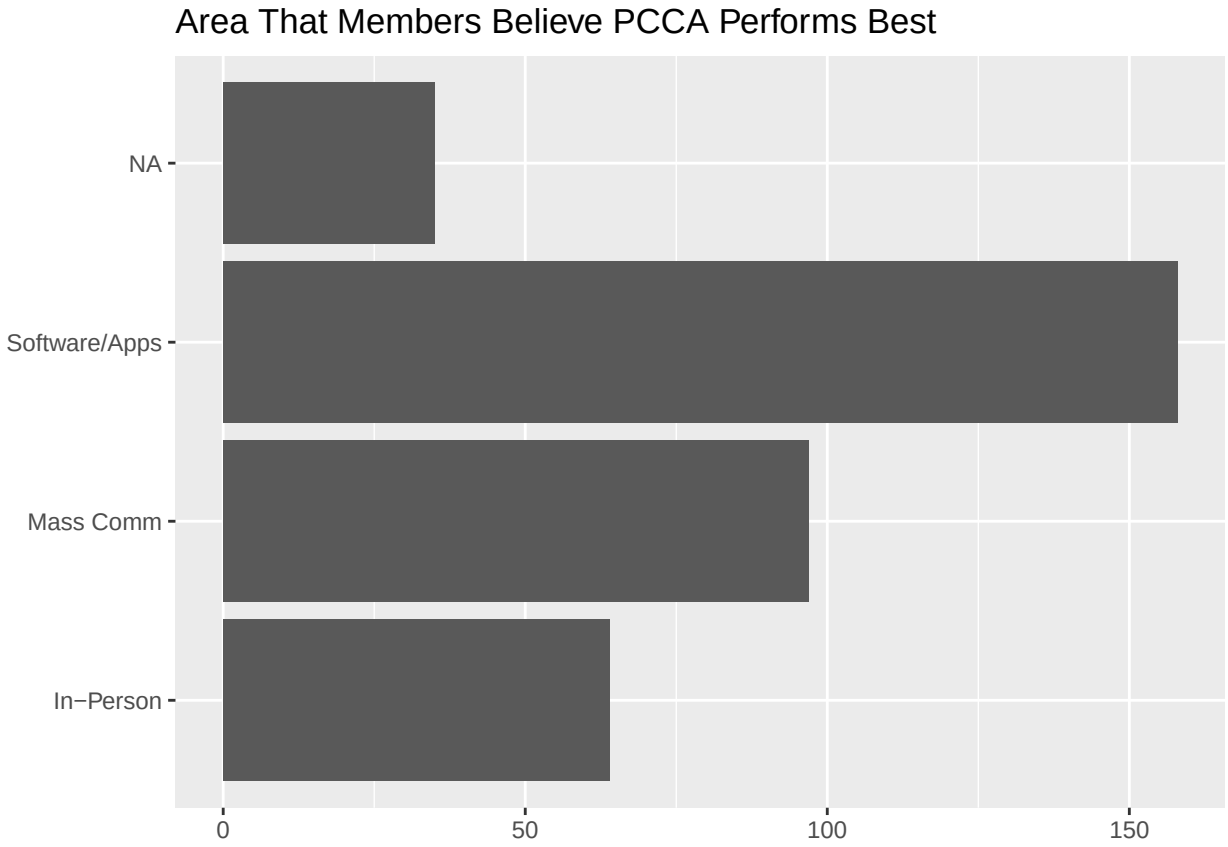
Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
number	354	177.5	102.335	1	89.25	265.75	354
social media	354	0.271	0.445	0	0	1	1
traditional media	354	0.477	0.5	0	0	1	1
interpersonal communication	354	0.556	0.498	0	0	1	1
industry organization	354	0.506	0.501	0	0	1	1
my cooperative	354	0.551	0.498	0	0	1	1
new media	353	1.445	0.498	1	1	2	2
facebook	354	0.379	0.486	0	0	1	1
twitter	354	0.096	0.295	0	0	0	1
instagram	354	0.082	0.275	0	0	0	1
youtube	354	0.384	0.487	0	0	1	1
snapchat	354	0.051	0.22	0	0	0	1
tiktok	354	0.065	0.247	0	0	0	1
podcast or radio	353	1.235	0.425	1	1	1	2
satisfaction	343	4.379	1.29	1	4	5	6
market information	354	0.836	0.371	0	1	1	1
crop information	354	0.61	0.488	0	0	1	1
industry news	354	0.545	0.499	0	0	1	1
farm operation	354	0.345	0.476	0	0	1	1
website	354	0.407	0.492	0	0	1	1
email	354	0.483	0.5	0	0	1	1
member access	354	0.565	0.496	0	0	1	1
mypcca	354	0.331	0.471	0	0	1	1
text	354	0.246	0.431	0	0	0	1
social media2	354	0.076	0.266	0	0	0	1
print	354	0.24	0.428	0	0	0	1
local coop	354	0.497	0.501	0	0	1	1
mypcca app	354	0.455	0.499	0	0	1	1
social media3	354	0.11	0.314	0	0	0	1
email2	354	0.616	0.487	0	0	1	1
text2	354	0.294	0.456	0	0	1	1
printed	354	0.28	0.449	0	0	1	1
accessible	349	4.791	1.017	1	4	5	6
responsive	340	4.847	0.919	1	5	5	6
courteous	342	5.193	0.889	1	5	6	6
marketing pool	350	2.174	0.597	1	2	3	3
the seam	344	1.735	0.668	1	1	2	3
pcca direct	338	1.527	0.572	1	1	2	3
forward contracting	342	1.626	0.598	1	1	2	3
minimize risk	338	4.21	1.196	1	4	5	6
control	337	3.95	1.21	1	3	5	6
reliability	342	4.216	1.313	1	4	5	6
price information	340	4.124	1.225	1	4	5	6
opportunities	329	1.769	0.422	1	2	2	2
open and voluntary	302	3.533	2.06	1	2	5	7
member control	302	3.848	2.299	1	2	6	7
economic participation	302	3.94	1.838	1	3	5	7
autonomy	302	3.924	1.607	1	3	5	7
education	302	4.179	1.847	1	3	6	7
cooperation	302	4.219	1.869	1	3	6	7
community	302	4.358	2.289	1	2	7	7
coop vs noncoop	320	4.453	1.438	1	4	6	6



Area that members believe PCCA performs best at

```
my.labels <- c("In-Person", "Mass Comm", "Software/Apps", "NA")
```

```
pcca_best <- survey %>%
    group_by(`area pcca does best`) %>%
    summarise(count = n_distinct(number))

best <- ggplot(pcca_best, aes(x = `area pcca does best`, y = count)) +
    geom_bar(stat = "identity") + coord_flip() + ggtitle("Area That Members Believe PCCA Performs Best")
best + theme(axis.title.y = element_blank(), axis.title.x = element_blank()) +
    scale_x_discrete(labels = my.labels)
```



Education

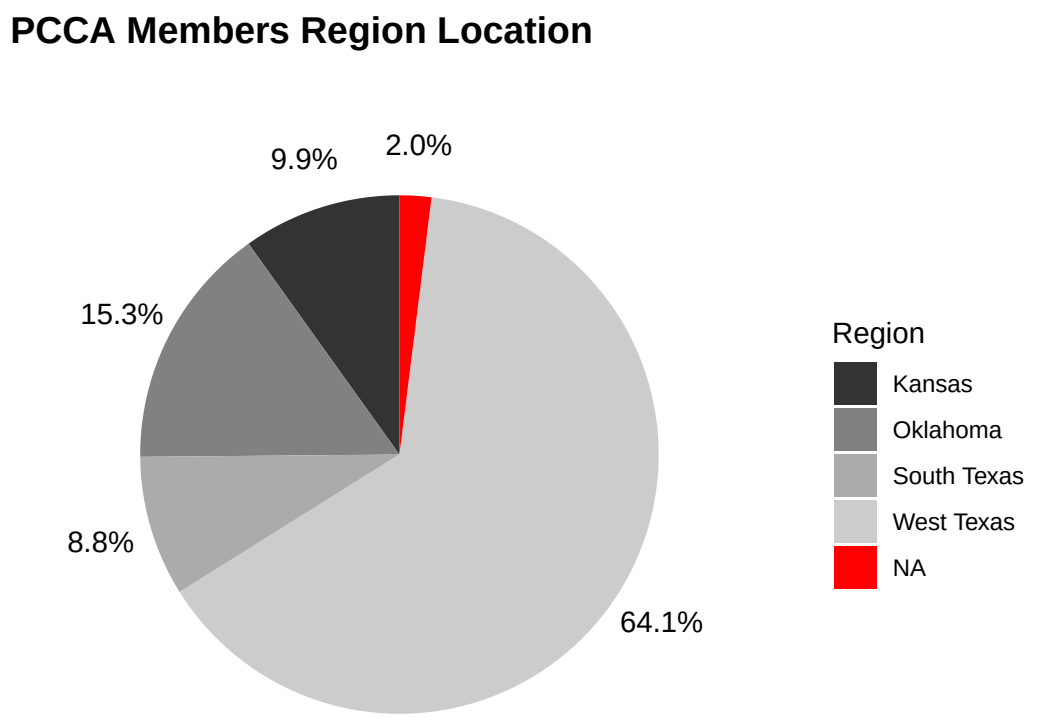
```
survey %>%
    group_by(`education level`) %>%
    summarise(count = n_distinct(number))
```

```
## # A tibble: 20 x 2
##    `education level`                                                count
##    <chr>                                                            <int>
##  1 College                                                            222
##  2 High School                                                         27
##  3 Other (Please specify):                                              2
##  4 Other (Please specify):6 grade                                       1
##  5 Other (Please specify):BBA & MBA                                     1
##  6 Other (Please specify):does my degree or lack of define my success     1
##  7 Other (Please specify):GED                                           1
##  8 Other (Please specify):graduate degree                               2
##  9 Other (Please specify):Graduate masters                              1
## 10 Other (Please specify):Graduate school                               2
## 11 Other (Please specify):Law school                                    1
## 12 Other (Please specify):Master's degree                               1
## 13 Other (Please specify):Master’s level in Agri                        1
## 14 Other (Please specify):Masters Degree                                1
## 15 Other (Please specify):MS                                            1
## 16 Other (Please specify):pharmacist                                    1
## 17 Other (Please specify):post graduate degree                          1
```

```
## 18 Some College                                                    71
## 19 Trade School                                                    12
## 20 <NA>                                                             4
```

Region

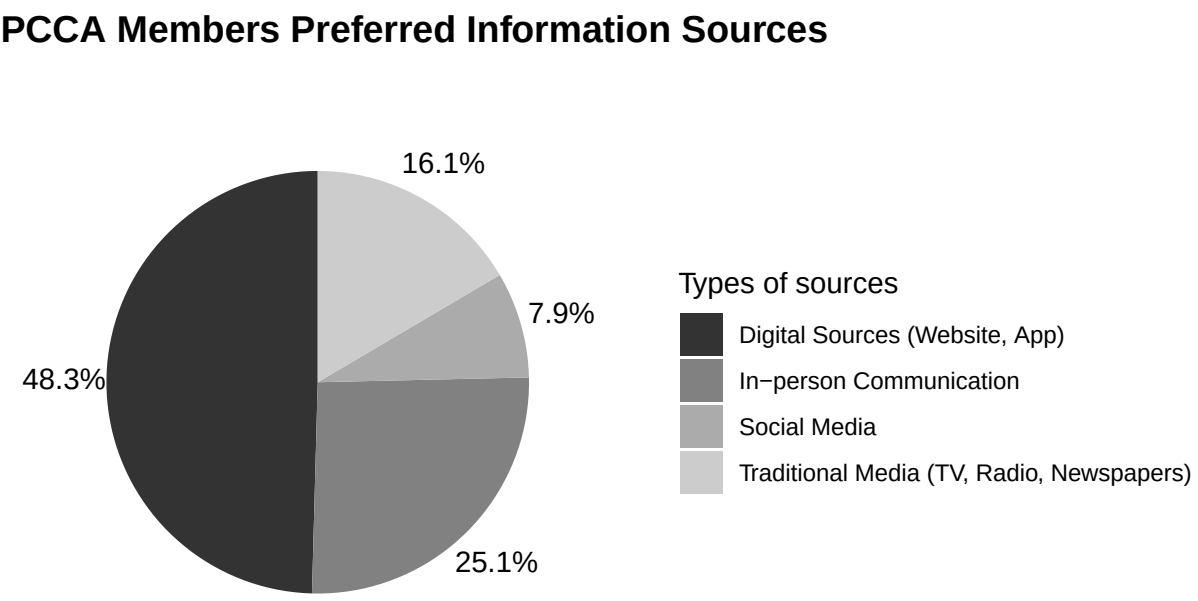
```
region <- survey %>%
    group_by(region) %>%
    summarise(count = n_distinct(number))

bp <- ggplot(region, aes(x = "", y = count, fill = region)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

pie + scale_fill_grey() + ggtitle("PCCA Members Region Location") +
    blank_theme + theme(axis.text.x = element_blank()) + geom_text(aes(x = 1.7,
    label = percent(count/354, accuracy = 0.1)), position = position_stack(vjust = 0.5)) +
    guides(fill = guide_legend(title = "Region"))
```



Preferred Information

```
information <- survey %>%
    group_by(`gathering information`) %>%
    summarise(count = n_distinct(number))
```

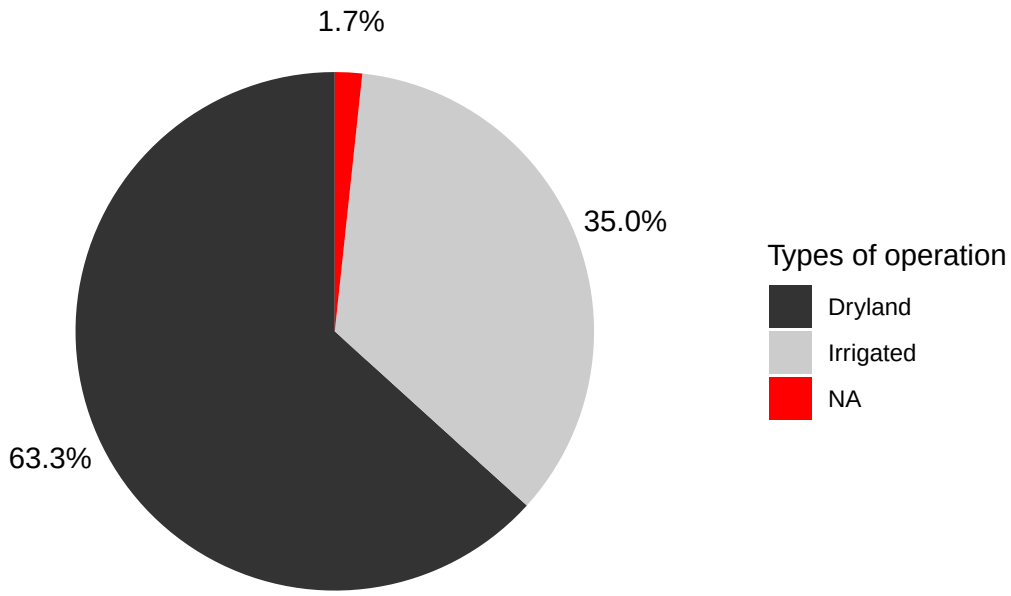
```
information <- information %>%
    filter(information$count > 4)

total <- as.numeric(nrow(survey))

bp <- ggplot(information, aes(x = "", y = count, fill = `gathering information`)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

pie + scale_fill_grey() + ggtitle("PCCA Members Preferred Information Sources") +
    blank_theme + theme(axis.text.x = element_blank()) + geom_text(aes(x = 1.7,
    label = percent(count/total, accuracy = 0.1)), position = position_stack(vjust = 0.5)) +
    guides(fill = guide_legend(title = "Types of sources"))
```



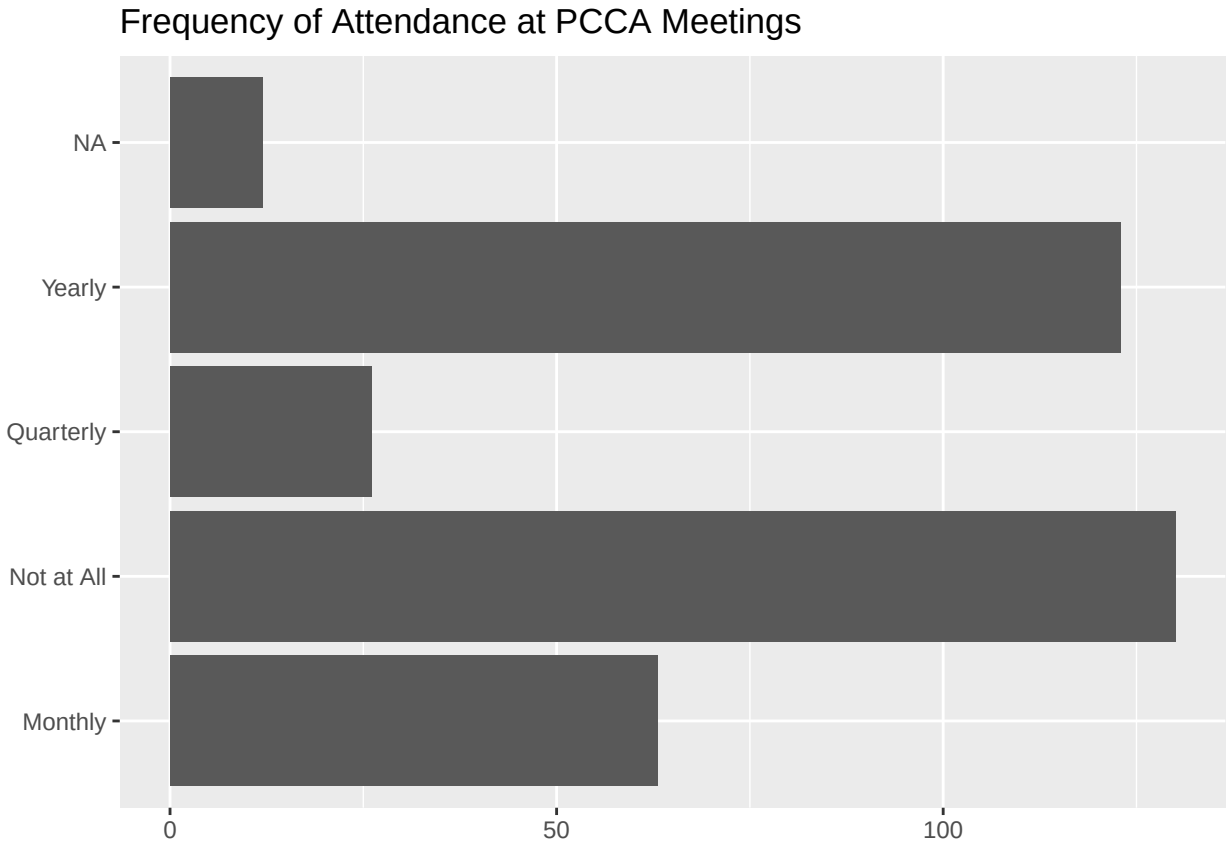
Dry or Irrigated Operation

```
operation <- survey %>%
    group_by(operation) %>%
    summarise(count = n_distinct(number))


bp <- ggplot(operation, aes(x = "", y = count, fill = operation)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)
```

```
pie + scale_fill_grey() + ggtitle("Dry or Irrigated Operation") +
    blank_theme + theme(axis.text.x = element_blank()) + geom_text(aes(x = 1.7,
    label = percent(count/354, accuracy = 0.1)), position = position_stack(vjust = 0.5)) +
    guides(fill = guide_legend(title = "Types of operation"))
```



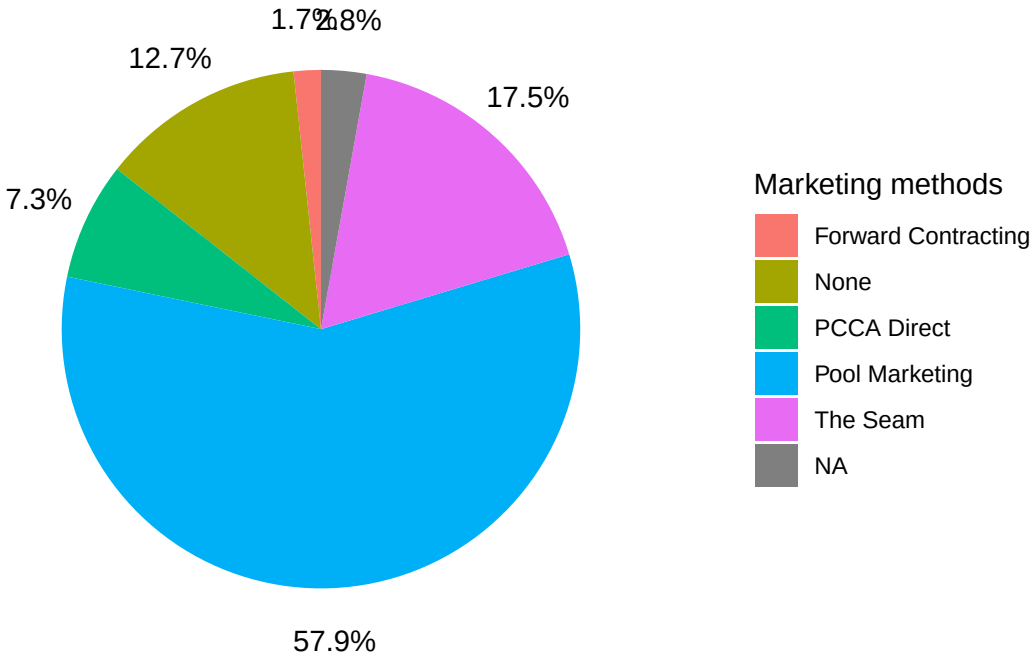

```
meetings <- survey %>%
    group_by(`coop meetings`) %>%
    summarise(count = n_distinct(number))

meetings_chart <- ggplot(meetings, aes(x = `coop meetings`, y = count)) +
    geom_bar(stat = "identity") + coord_flip() + ggtitle("Frequency of Attendance at PCCA Meetings")
meetings_chart + theme(axis.title.y = element_blank(), axis.title.x = element_blank())
```



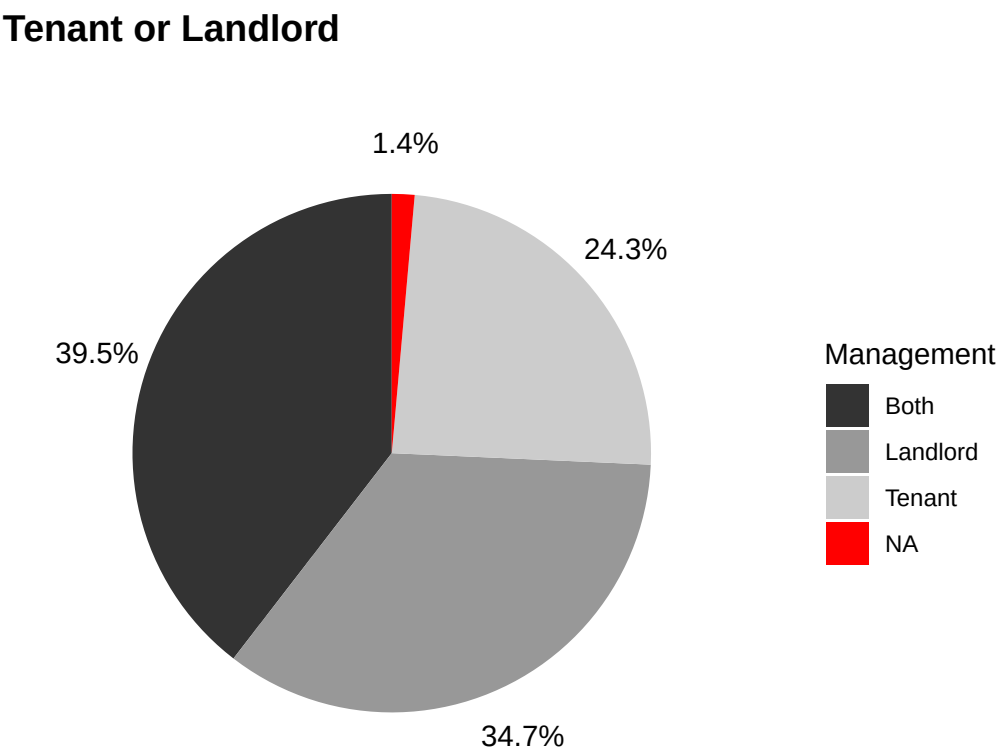
Most used marketing method

```
marketing <- survey %>%
    group_by(`most used marketing method`) %>%
    summarise(count = n_distinct(number))

lbls <- paste(names(marketing), "\n", marketing, sep = "")

total <- as.numeric(nrow(survey))

bp <- ggplot(marketing, aes(x = "", y = count, fill = `most used marketing method`)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

pie + ggtitle("Most Used Marketing Method") + blank_theme + theme(axis.text.x = element_blank()) +
    geom_text(aes(x = 1.7, label = percent(count/total, accuracy = 0.1)),
        position = position_stack(vjust = 0.5)) + guides(fill = guide_legend(title = "Marketing methods
```

Most Used Marketing Method




```
tenant <- survey %>%
    group_by(description) %>%
    summarise(count = n_distinct(number))

total <- as.numeric(nrow(survey))

bp <- ggplot(tenant, aes(x = "", y = count, fill = description)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

pie + scale_fill_grey() + ggtitle("Tenant or Landlord") + blank_theme +
    theme(axis.text.x = element_blank()) + geom_text(aes(x = 1.7,
    label = percent(count/total, accuracy = 0.1)), position = position_stack(vjust = 0.5)) +
    guides(fill = guide_legend(title = "Management"))
```



Data analysis

Prediction of membership satisfaction

```
satisfaction = lm(satisfaction ~ accessible + responsive + courteous,
    data = survey)
stargazer(satisfaction)
```

```
##
## % Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac a
## % Date and time: Wed, Apr 20, 2022 - 8:02:46 AM
## \begin{table}[!htbp] \centering
##   \caption{}
##   \label{}
## \begin{tabular}{@{\extracolsep{5pt}}lc}
## \\[-1.8ex]\hline
## \hline \\[-1.8ex]
##  & \multicolumn{1}{c}{\textit{Dependent variable:}} \\
## \cline{2-2}
## \\[-1.8ex] & satisfaction \\
## \hline \\[-1.8ex]
##  accessible & 0.266$^{**}$ \\
##   & (0.107) \\
##   & \\
##  responsive & 0.452$^{***}$ \\
##   & (0.128) \\
```

```
##   & \\
##  courteous & 0.107 \\
##   & (0.107) \\
##   & \\
##  Constant & 0.369 \\
##   & (0.357) \\
##   & \\
## \hline \\[-1.8ex]
## Observations & 329 \\
## R$^{2}$ & 0.317 \\
## Adjusted R$^{2}$ & 0.310 \\
## Residual Std. Error & 1.059 (df = 325) \\
## F Statistic & 50.194$^{***}$ (df = 3; 325) \\
## \hline
## \hline \\[-1.8ex]
## \textit{Note:}  & \multicolumn{1}{r}{$^{*}$p$<$0.1; $^{**}$p$<$0.05; $^{***}$p$<$0.01} \\
## \end{tabular}
## \end{table}
```

```
satisfaction2 = lm(satisfaction ~ accessible + responsive + courteous +
    `marketing pool` + `the seam` + `pcca direct` + `forward contracting`,
    data = survey)
stargazer(satisfaction2)
```

```
##
## % Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac a
## % Date and time: Wed, Apr 20, 2022 - 8:02:46 AM
## \begin{table}[!htbp] \centering
##   \caption{}
##   \label{}
## \begin{tabular}{@{\extracolsep{5pt}}lc}
## \\[-1.8ex]\hline
## \hline \\[-1.8ex]
##  & \multicolumn{1}{c}{\textit{Dependent variable:}} \\
## \cline{2-2}
## \\[-1.8ex] & satisfaction \\
## \hline \\[-1.8ex]
##  accessible & 0.293$^{***}$ \\
##   & (0.106) \\
##   & \\
##  responsive & 0.378$^{***}$ \\
##   & (0.129) \\
##   & \\
##  courteous & 0.168 \\
##   & (0.107) \\
##   & \\
##  `marketing pool` & 0.005 \\
##   & (0.119) \\
##   & \\
##  `the seam` & $-$0.242$^{**}$ \\
##   & (0.117) \\
##   & \\
##  `pcca direct` & 0.281$^{**}$ \\
##   & (0.115) \\
##   & \\
```

```
##  `forward contracting` & $-$0.110 \\
##   & (0.126) \\
##   & \\
##  Constant & 0.452 \\
##   & (0.415) \\
##   & \\
## \hline \\[-1.8ex]
## Observations & 311 \\
## R$^{2}$ & 0.369 \\
## Adjusted R$^{2}$ & 0.354 \\
## Residual Std. Error & 1.024 (df = 303) \\
## F Statistic & 25.267$^{***}$ (df = 7; 303) \\
## \hline
## \hline \\[-1.8ex]
## \textit{Note:}  & \multicolumn{1}{r}{$^{*}$p$<$0.1; $^{**}$p$<$0.05; $^{***}$p$<$0.01} \\
## \end{tabular}
## \end{table}
```

Separating younger and older generation

In this section, I will categorize the younger generation as the age bracket 18-45 and the older generation as the age brackets for 56-65 and 65+

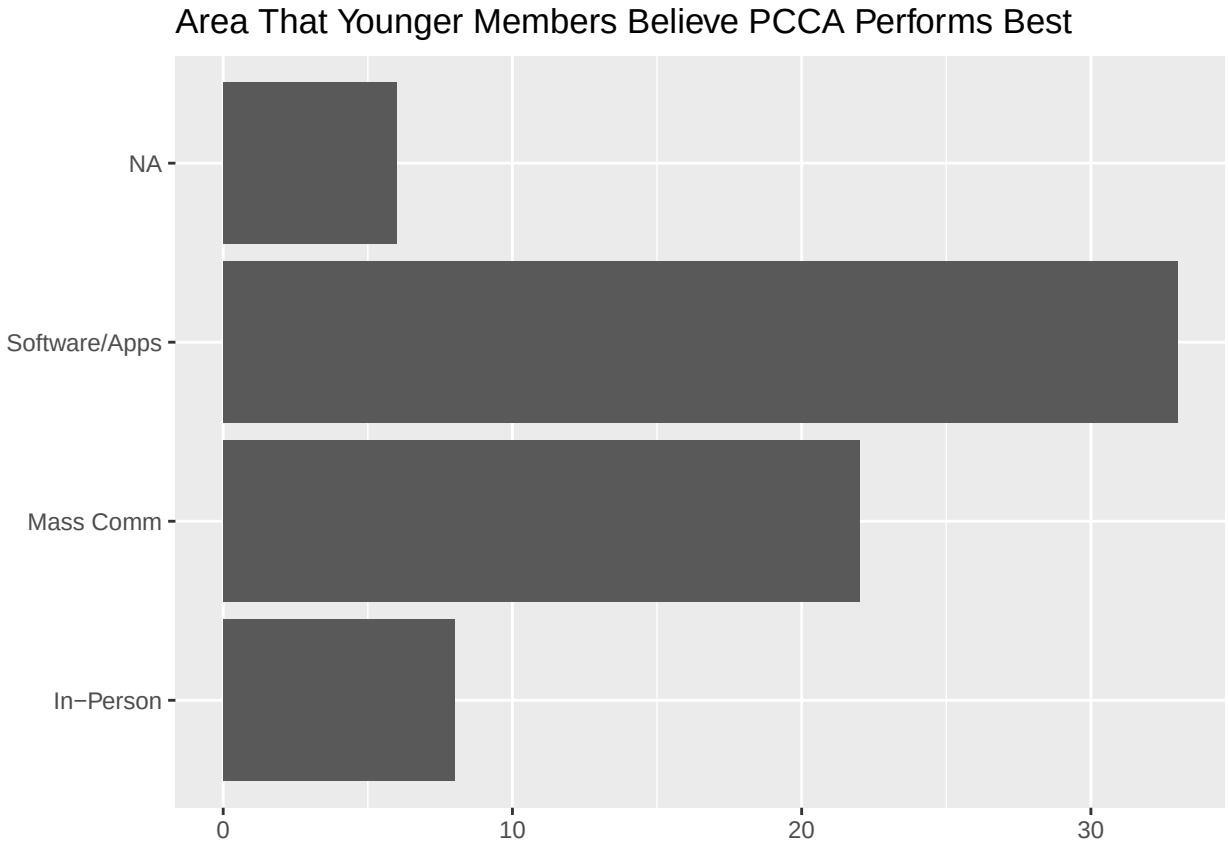
```
younger <- survey %>%
    filter(survey$age == "18-45")

older <- survey %>%
    filter(survey$age == "56-65" | survey$age == "65+")

younger$gen <- "younger"
older$gen <- "older"
```

```
satisfaction.y = lm(satisfaction ~ accessible + responsive +
    courteous, data = older)
stargazer(satisfaction.y)
```

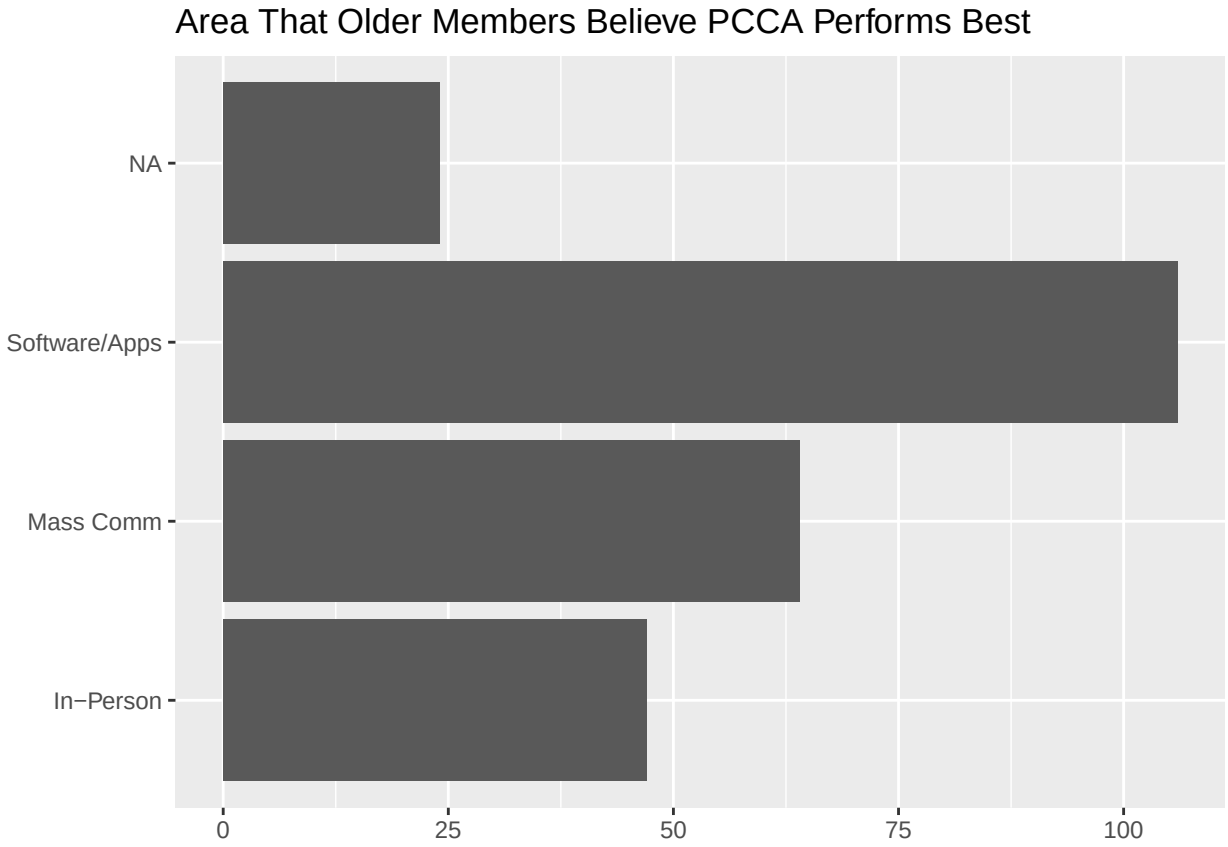
```
##
## % Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac a
## % Date and time: Wed, Apr 20, 2022 - 8:02:46 AM
## \begin{table}[!htbp] \centering
##   \caption{}
##   \label{}
## \begin{tabular}{@{\extracolsep{5pt}}lc}
## \\[-1.8ex]\hline
## \hline \\[-1.8ex]
##  & \multicolumn{1}{c}{\textit{Dependent variable:}} \\
## \cline{2-2}
## \\[-1.8ex] & satisfaction \\
## \hline \\[-1.8ex]
##  accessible & 0.296$^{**}$ \\
##   & (0.120) \\
##   & \\
##  responsive & 0.378$^{**}$ \\
##   & (0.154) \\
```

```
##   & \\
##  courteous & 0.193 \\
##   & (0.130) \\
##   & \\
##  Constant & 0.253 \\
##   & (0.417) \\
##   & \\
## \hline \\[-1.8ex]
## Observations & 221 \\
## R$^{2}$ & 0.362 \\
## Adjusted R$^{2}$ & 0.353 \\
## Residual Std. Error & 1.030 (df = 217) \\
## F Statistic & 41.078$^{***}$ (df = 3; 217) \\
## \hline
## \hline \\[-1.8ex]
## \textit{Note:}  & \multicolumn{1}{r}{$^{*}$p$<$0.1; $^{**}$p$<$0.05; $^{***}$p$<$0.01} \\
## \end{tabular}
## \end{table}
```

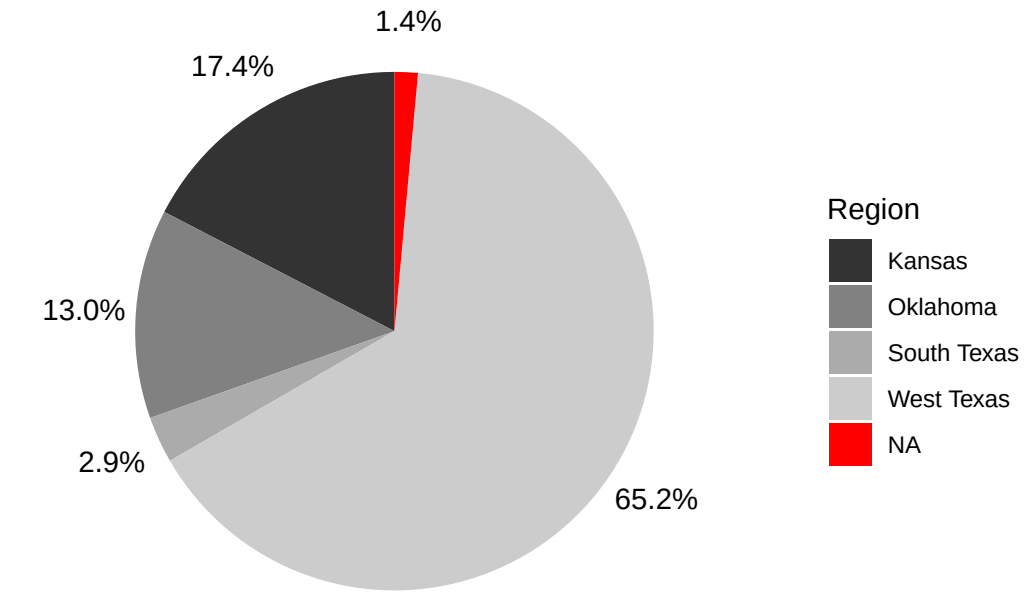
```
pcca_best <- younger %>%
    group_by(`area pcca does best`) %>%
    summarise(count = n_distinct(number))

best <- ggplot(pcca_best, aes(x = `area pcca does best`, y = count)) +
    geom_bar(stat = "identity") + coord_flip() + ggtitle("Area That Younger Members Believe PCCA Perfor
best + theme(axis.title.y = element_blank(), axis.title.x = element_blank()) +
    scale_x_discrete(labels = my.labels)
```



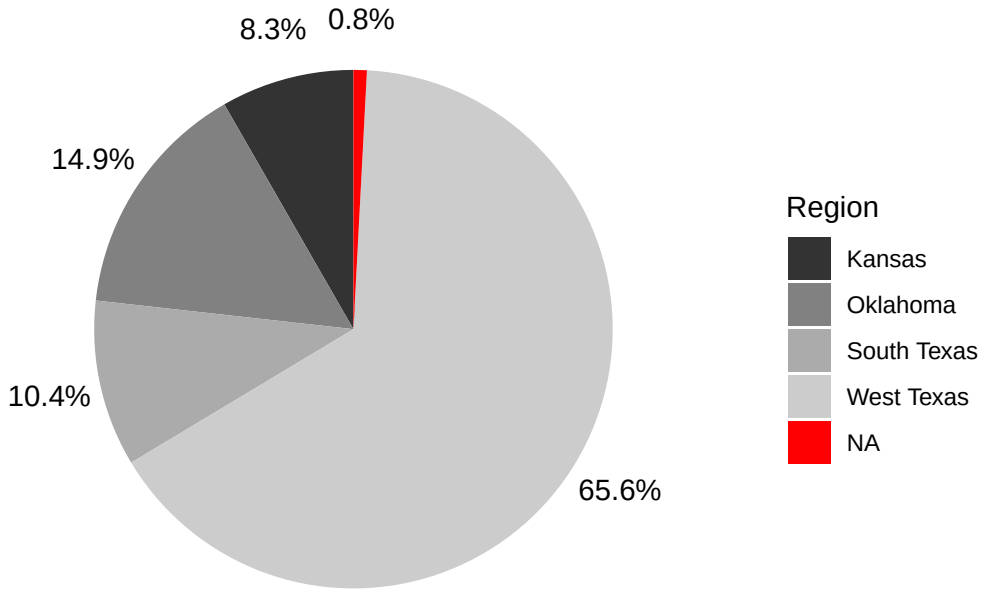

```
pcca_best <- older %>%
    group_by(`area pcca does best`) %>%
    summarise(count = n_distinct(number))

best <- ggplot(pcca_best, aes(x = `area pcca does best`, y = count)) +
    geom_bar(stat = "identity") + coord_flip() + ggtitle("Area That Older Members Believe PCCA Performs
best + theme(axis.title.y = element_blank(), axis.title.x = element_blank()) +
    scale_x_discrete(labels = my.labels)
```



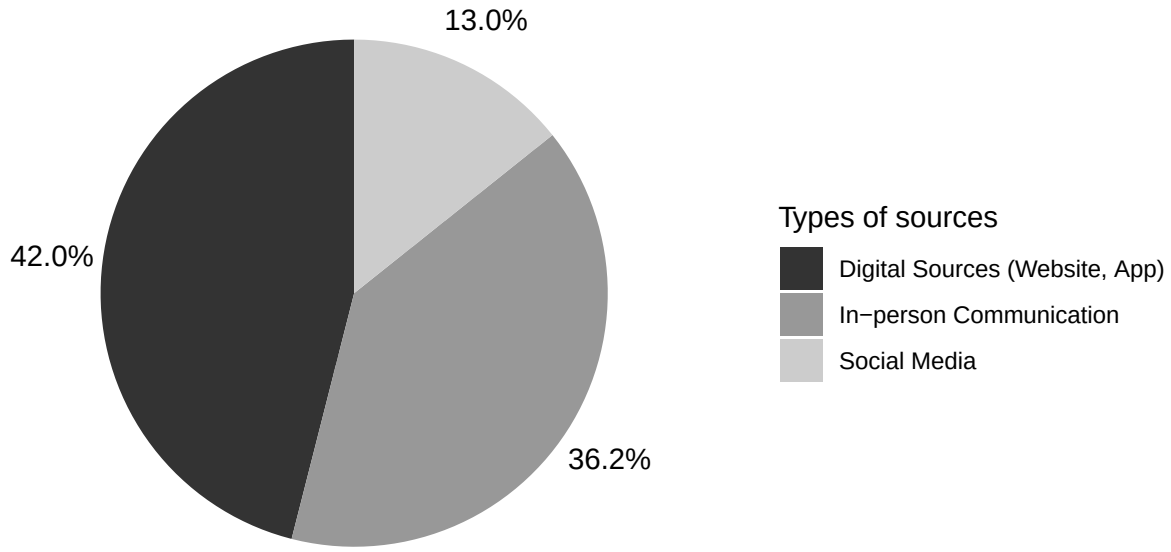

```
region <- younger %>%
    group_by(region) %>%
    summarise(count = n_distinct(number))

bp <- ggplot(region, aes(x = "", y = count, fill = region)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

total <- as.numeric(nrow(younger))

pie + scale_fill_grey() + ggtitle("Younger PCCA Members Region Location") +
    blank_theme + theme(axis.text.x = element_blank()) + geom_text(aes(x = 1.7,
    label = percent(count/total, accuracy = 0.1)), position = position_stack(vjust = 0.5)) +
    guides(fill = guide_legend(title = "Region"))
```




```
region <- older %>%
    group_by(region) %>%
    summarise(count = n_distinct(number))

bp <- ggplot(region, aes(x = "", y = count, fill = region)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

total <- as.numeric(nrow(older))

pie + scale_fill_grey() + ggtitle("Older PCCA Members Region Location") +
    blank_theme + theme(axis.text.x = element_blank()) + geom_text(aes(x = 1.7,
    label = percent(count/total, accuracy = 0.1)), position = position_stack(vjust = 0.5)) +
    guides(fill = guide_legend(title = "Region"))
```

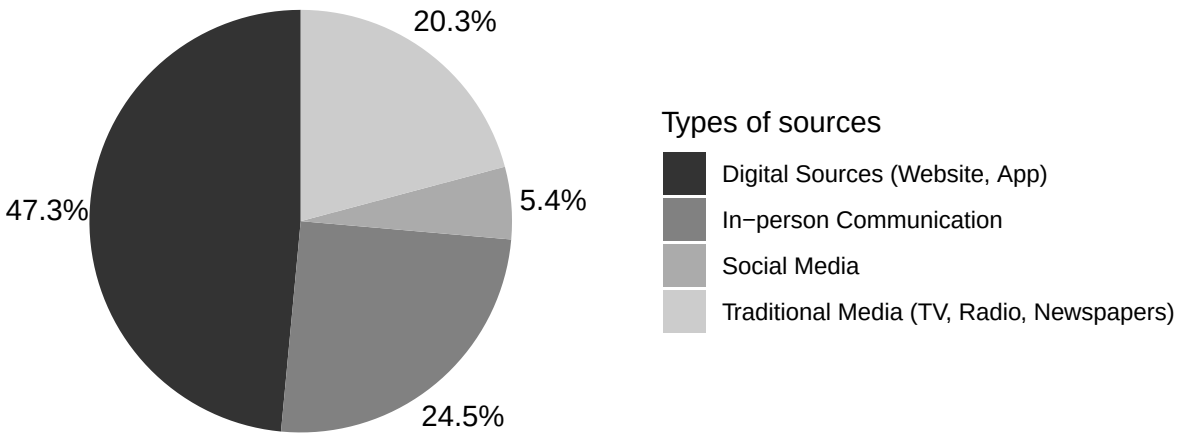



```
information <- younger %>%
    group_by(`gathering information`) %>%
    summarise(count = n_distinct(number))

information <- information %>%
    filter(information$count > 4)

total <- as.numeric(nrow(younger))

bp <- ggplot(information, aes(x = "", y = count, fill = `gathering information`)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

pie + scale_fill_grey() + ggtitle("Younger PCCA Members Preferred Information Sources") +
    blank_theme + theme(axis.text.x = element_blank()) + geom_text(aes(x = 1.7,
    label = percent(count/total, accuracy = 0.1)), position = position_stack(vjust = 0.5)) +
    guides(fill = guide_legend(title = "Types of sources"))
```

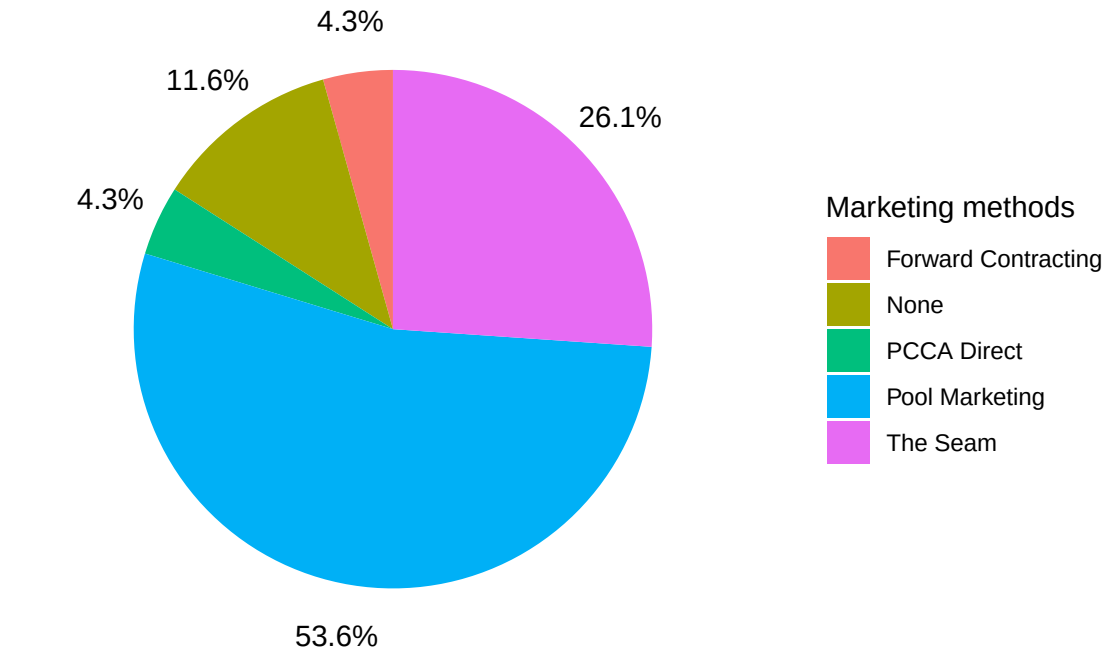



```
information <- older %>%
    group_by(`gathering information`) %>%
    summarise(count = n_distinct(number))

information <- information %>%
    filter(information$count > 4)

total <- as.numeric(nrow(older))

bp <- ggplot(information, aes(x = "", y = count, fill = `gathering information`)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

pie + scale_fill_grey() + ggtitle("Older PCCA Members Preferred Information Sources") +
    blank_theme + theme(axis.text.x = element_blank()) + geom_text(aes(x = 1.7,
    label = percent(count/total, accuracy = 0.1)), position = position_stack(vjust = 0.5)) +
    guides(fill = guide_legend(title = "Types of sources"))
```

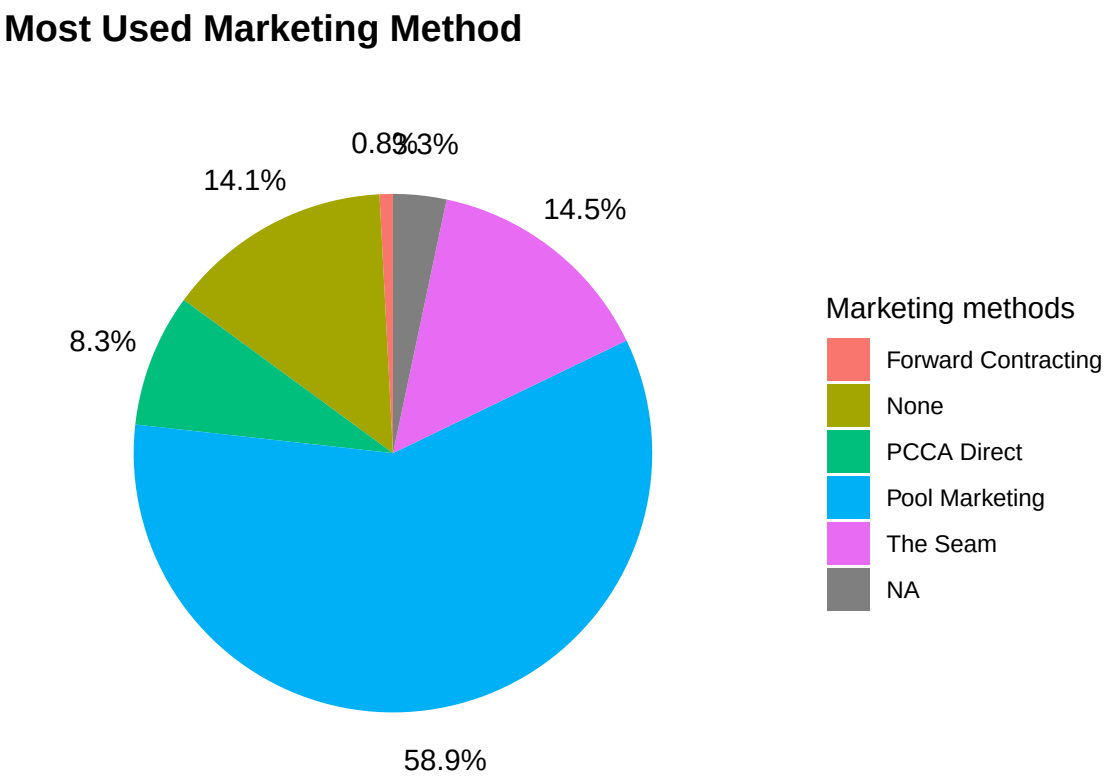
Older PCCA Members Preferred Information Sources




```
marketing <- younger %>%
    group_by(`most used marketing method`) %>%
    summarise(count = n_distinct(number))

lbls <- paste(names(marketing), "\n", marketing, sep = "")

total <- as.numeric(nrow(younger))

bp <- ggplot(marketing, aes(x = "", y = count, fill = `most used marketing method`)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

pie + ggtitle("Most Used Marketing Method") + blank_theme + theme(axis.text.x = element_blank()) +
    geom_text(aes(x = 1.7, label = percent(count/total, accuracy = 0.1)),
        position = position_stack(vjust = 0.5)) + guides(fill = guide_legend(title = "Marketing methods
```




```
marketing <- older %>%
    group_by(`most used marketing method`) %>%
    summarise(count = n_distinct(number))

lbls <- paste(names(marketing), "\n", marketing, sep = "")

total <- as.numeric(nrow(older))

bp <- ggplot(marketing, aes(x = "", y = count, fill = `most used marketing method`)) +
    geom_bar(width = 1, stat = "identity")
pie <- bp + coord_polar("y", start = 0)

pie + ggtitle("Most Used Marketing Method") + blank_theme + theme(axis.text.x = element_blank()) +
    geom_text(aes(x = 1.7, label = percent(count/total, accuracy = 0.1)),
        position = position_stack(vjust = 0.5)) + guides(fill = guide_legend(title = "Marketing methods
```



Percentages

Knowledge

```
knowledge.cols <- c("number", "marketing pool", "the seam", "pcca direct",
    "forward contracting", "gen")

knowledge.younger <- younger %>%
    select(knowledge.cols)

knowledge.older <- older %>%
    select(knowledge.cols)
```

```
knowledge.yo <- bind_rows(knowledge.younger, knowledge.older)
```

```
stat.test <- knowledge.yo %>%
    t_test(`forward contracting` ~ gen) %>%
    add_significance()

stat.test
```

```
## # A tibble: 1 x 9
##   .y.                group1 group2    n1    n2 statistic    df       p p.signif
##   <chr>              <chr>  <chr>  <int> <int>     <dbl> <dbl>   <dbl> <chr>
## 1 forward contracting older  young~   241    69     -2.63  120. 0.00967 **
```