

Questionnaire

Qiang Liu

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First include basic settings and related packages.

```
> library(tidyverse)
```

```
## Warning:  'tidyverse' R 4.2.1
```

```
## Warning:  'ggplot2' R 4.2.1
```

```
## Warning:  'tibble' R 4.2.1
```

```
## Warning:  'dplyr' R 4.2.1
```

```
## Warning:  'forcats' R 4.2.1
```

```
> library(skimr)
```

```
## Warning:  'skimr' R 4.2.1
```

```
> library(MASS)
```

```
## Warning:  'MASS' R 4.2.1
```

```
> library(openxlsx)
```

```
## Warning:  'openxlsx' R 4.2.1
```

```
> library(pander)
```

```
## Warning:  'pander' R 4.2.1
```

```
> library(ggplot2)
```

```
> library(Rcpp)
```

```
## Warning:  'Rcpp' R 4.2.1
```

```
> library(dplyr)
> library(ggstatsplot)
```

```
## Warning: 'ggstatsplot' R 4.2.1
```

```
> library(plyr)
> library(maptools)
> library(PerformanceAnalytics)
```

```
## Warning: 'PerformanceAnalytics' R 4.2.1
```

```
## Warning: 'xts' R 4.2.1
```

```
> library(corrplot)
```

Read and roughly view data ‘Questionnaire’ in project’s working directory

```
> questionnaire <- read.xlsx("Questionnaire.xlsx")
> head(questionnaire)
```

```
##   Gender Age Income Knowledge.of.exosome Acceptance.of.new.method
## 1   Male  42    20                0                1
## 2   Male  17    20                3                1
## 3   Male  33    24                1                2
## 4 Female  59    25                0                1
## 5 Female  51    23                0                2
## 6 Female  65    21                0                0
##   Acceptance.of.price Degree.of.anxiety Knowledge.of.market Acceptance.of.EM
## 1                4                1                2                4
## 2                5                0                1                0
## 3                3                3                1                3
## 4                3                1                2                2
## 5                3                2                3                2
## 6                3                1                2                1
```

```
> skim(questionnaire)
```

Table 1: Data summary

Name	questionnaire
Number of rows	337

Table 1: Data summary

Number of columns	9
Column type frequency:	
character	1
numeric	8
Group variables	None

Variable type: character

skim_variable	n_missing	complete_rate	min	max	empty	n_unique	whitespace
Gender	0	1	4	6	0	2	0

Variable type: numeric

skim_variable	n_missing	complete_rate	mean	sd	p0	p25	p50	p75	p100	hist
Age	0	1	28.66	12.50	16	19	25	34	65	
Income	0	1	4.21	4.25	1	2	3	5	25	
Knowledge.of.exosome	0	1	1.15	1.50	0	0	0	2	5	
Acceptance.of.new.method	0	1	2.39	1.20	0	2	2	3	5	
Acceptance.of.price	0	1	12.63	14.19	3	5	7	10	60	
Degree.of.anxiety	0	1	2.55	1.18	0	2	3	3	5	
Knowledge.of.market	0	1	2.44	0.92	1	2	2	3	5	
Acceptance.of.EM	0	1	2.63	1.22	0	2	3	3	5	

```
> cor_questionnaire <- questionnaire[, -1]
> head(cor_questionnaire)
```

```
##   Age Income Knowledge.of.exosome Acceptance.of.new.method Acceptance.of.price
## 1  42    20                    0                        1                4
## 2  17    20                    3                        1                5
## 3  33    24                    1                        2                3
## 4  59    25                    0                        1                3
## 5  51    23                    0                        2                3
## 6  65    21                    0                        0                3
##   Degree.of.anxiety Knowledge.of.market Acceptance.of.EM
## 1                1                2                4
## 2                0                1                0
## 3                3                1                3
## 4                1                2                2
## 5                2                3                2
## 6                1                2                1
```

```
> skim(cor_questionnaire)
```

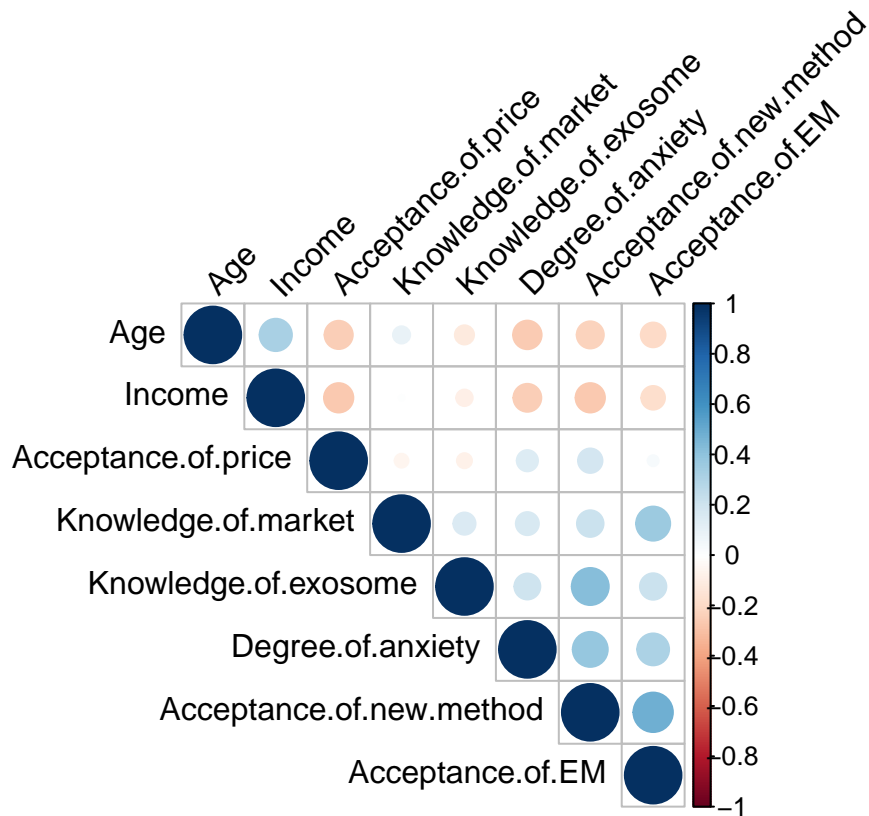
Table 4: Data summary

Name	cor_questionnaire
Number of rows	337
Number of columns	8
<hr/>	
Column type frequency:	
numeric	8
<hr/>	
Group variables	None

Variable type: numeric

skim_variable	n_missing	complete_rate	mean	sd	p0	p25	p50	p75	p100	hist
Age	0	1	28.66	12.50	16	19	25	34	65	
Income	0	1	4.21	4.25	1	2	3	5	25	
Knowledge.of.exosome	0	1	1.15	1.50	0	0	0	2	5	
Acceptance.of.new.method	0	1	2.39	1.20	0	2	2	3	5	
Acceptance.of.price	0	1	12.63	14.19	3	5	7	10	60	
Degree.of.anxiety	0	1	2.55	1.18	0	2	3	3	5	
Knowledge.of.market	0	1	2.44	0.92	1	2	2	3	5	
Acceptance.of.EM	0	1	2.63	1.22	0	2	3	3	5	

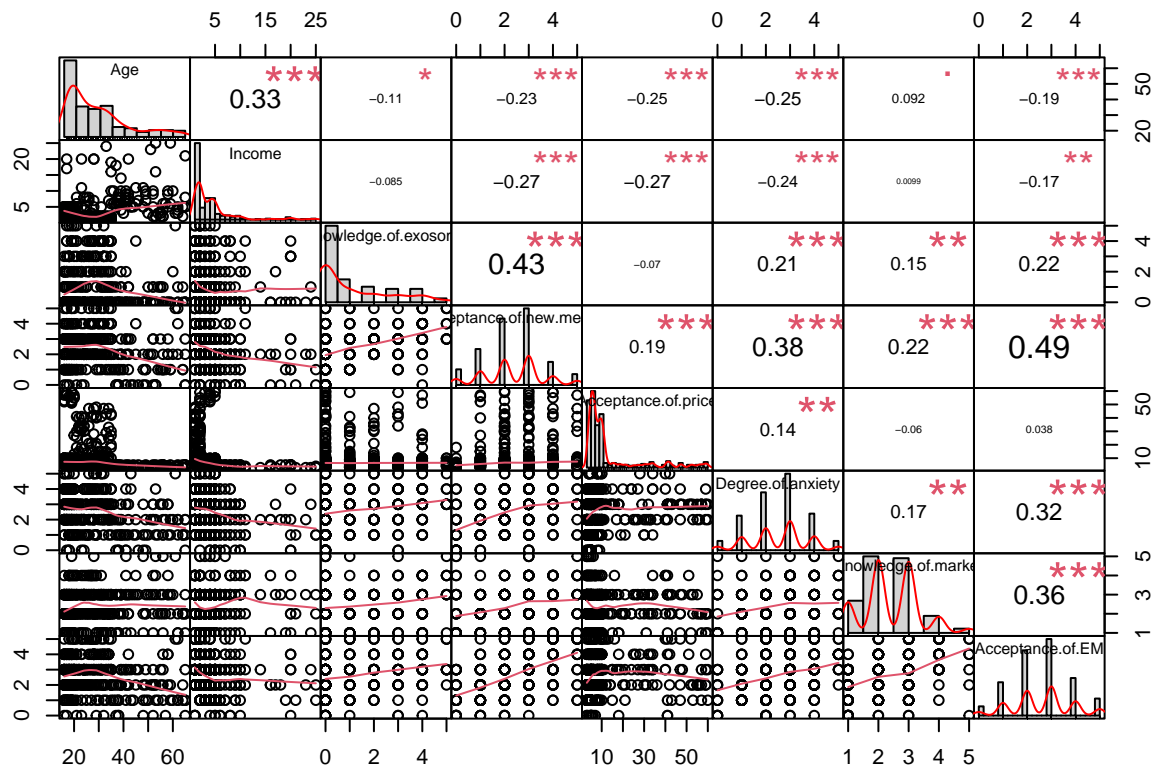
```
> cor_matr = cor(cor_questionnaire)
> write.table(cor_matr, file="cor_matr.xls",row.names=F,
  ↪ col.names=T,quote=FALSE,sep="\t")
> corrplot(cor_matr, type="upper", order="hclust", tl.col="black", tl.srt=45)
```



```
> chart.Correlation(cor_questionnaire, histogram = TRUE, pch=30)
```

```
## Warning in par(usr): argument 1 does not name a graphical parameter
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```



```
> pander::pander(rcorr(as.matrix(cor_questionnaire)))
```

Quitting from lines 63-68 (Questionnaire.Rmd) Error in rcorr(as.matrix(cor_questionnaire)) : "rcorr"
Calls: ... eval_with_user_handlers -> eval -> eval ->

```
> full.model1 <- lm(Acceptance.of.new.method ~ ., data = cor_questionnaire)
> summary(full.model1)
```

```
##
## Call:
## lm(formula = Acceptance.of.new.method ~ ., data = cor_questionnaire)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.3570 -0.5743  0.0160  0.5352  3.7124
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.759113   0.243521   3.117  0.00199 **
## Age          -0.002636   0.004516  -0.584  0.55976
## Income        -0.028571   0.013095  -2.182  0.02982 *
## Knowledge.of.exosome 0.254516   0.035440   7.182 4.63e-12 ***
```

```
## Acceptance.of.price    0.012138    0.003797    3.197  0.00153 **
## Degree.of.anxiety      0.157927    0.047634    3.315  0.00102 **
## Knowledge.of.market    0.052706    0.060220    0.875  0.38209
## Acceptance.of.EM       0.321049    0.047557    6.751  6.66e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.927 on 329 degrees of freedom
## Multiple R-squared:  0.4204, Adjusted R-squared:  0.4081
## F-statistic: 34.1 on 7 and 329 DF,  p-value: < 2.2e-16
```

```
> stepwiseSelection1 <-
  ↳ stepAIC(full.model1,direction="both",trace=FALSE,k=log(NROW(cor_questionnaire)))
> summary(stepwiseSelection1)
```

```
##
## Call:
## lm(formula = Acceptance.of.new.method ~ Knowledge.of.exosome +
##     Acceptance.of.price + Degree.of.anxiety + Acceptance.of.EM,
##     data = cor_questionnaire)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.3030 -0.5602 -0.0546  0.5691  3.6288
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.521696   0.148091   3.523 0.000487 ***
## Knowledge.of.exosome 0.261723   0.035392   7.395 1.16e-12 ***
## Acceptance.of.price 0.014489   0.003637   3.984 8.33e-05 ***
## Degree.of.anxiety  0.182288   0.046604   3.911 0.000111 ***
## Acceptance.of.EM    0.347543   0.044503   7.809 7.60e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9316 on 332 degrees of freedom
## Multiple R-squared:  0.4093, Adjusted R-squared:  0.4022
## F-statistic: 57.52 on 4 and 332 DF,  p-value: < 2.2e-16
```

```
> #Ssadasdasdasdasdsadasdsa
> #sadsadsadasdasdsadsadasd
> #sadasdasdasdasdassadasdasda
> #sadasgregerhgefwarefasfd
> #sdzgayhrhava bgfâhd
> #dgdsfhsjhrthjerherh
> #sdgsdghsdhdfhhfdgsgsd
> #Ssadasdasdasdasdsadasdsa
> #sadsadsadasdasdsadsadasd
> #sadasdasdasdasdassadasdasda
> #sadasgregerhgefwarefasfd
```



```
> #sdzgayhrhava bgfdhd
> #dgdsfhsjhrthjerherh
> #sdgsdghsdhdfhhfdgsgsd
> pander::pander(stepwiseSelection1)
```

Table 6: Fitting linear model: Acceptance.of.new.method ~ Knowledge.of.exosome + Acceptance.of.price + Degree.of.anxiety + Acceptance.of.EM

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	0.5217	0.1481	3.523	0.0004868
Knowledge.of.exosome	0.2617	0.03539	7.395	1.164e-12
Acceptance.of.price	0.01449	0.003637	3.984	8.334e-05
Degree.of.anxiety	0.1823	0.0466	3.911	0.0001113
Acceptance.of.EM	0.3475	0.0445	7.809	7.602e-14

$\text{Acceptance.of.new.method} = 0.5185 + 0.2615 * \text{Knowledge.of.exosome} + 0.0135 * \text{Acceptance.of.price (Hundred)} + 0.1919 * \text{Degree.of.anxiety}$

```
> full.model2 <- lm(Acceptance.of.price ~ . , data = cor_questionnaire)
> summary(full.model2)
```

```
##
## Call:
## lm(formula = Acceptance.of.price ~ . , data = cor_questionnaire)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -18.305  -7.656  -4.704   1.593  44.203
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    19.17099     3.37136   5.686 2.86e-08 ***
## Age            -0.18660     0.06378  -2.926  0.00368 **
## Income         -0.59194     0.18574  -3.187  0.00158 **
## Knowledge.of.exosome -1.69576     0.53696  -3.158  0.00174 **
## Acceptance.of.new.method  2.48169     0.77636   3.197  0.00153 **
## Degree.of.anxiety   0.57323     0.69168   0.829  0.40784
## Knowledge.of.market -0.57213     0.86150  -0.664  0.50708
## Acceptance.of.EM    -1.04192     0.72331  -1.440  0.15068
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.26 on 329 degrees of freedom
## Multiple R-squared:  0.1457, Adjusted R-squared:  0.1275
## F-statistic: 8.015 on 7 and 329 DF, p-value: 5.351e-09
```

```
> stepwiseSelection2 <-
  ↪ stepAIC(full.model2,direction="both",trace=FALSE,k=log(NROW(cor_questionnaire)))
> summary(stepwiseSelection2)
```

```
##
## Call:
## lm(formula = Acceptance.of.price ~ Age + Income + Knowledge.of.exosome +
##     Acceptance.of.new.method, data = cor_questionnaire)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -15.838  -7.796  -4.621   1.972  46.168
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    17.73699     2.66504   6.655 1.17e-10 ***
## Age            -0.19259     0.06201  -3.106  0.00206 **
## Income         -0.60596     0.18449  -3.285  0.00113 **
## Knowledge.of.exosome -1.70553     0.53547  -3.185  0.00158 **
## Acceptance.of.new.method  2.06434     0.69344   2.977  0.00313 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 13.27 on 332 degrees of freedom
## Multiple R-squared:  0.1361, Adjusted R-squared:  0.1257
## F-statistic: 13.07 on 4 and 332 DF,  p-value: 6.74e-10
```

```
> pander::pander(stepwiseSelection2)
```

Table 7: Fitting linear model: $\text{Acceptance.of.price} \sim \text{Age} + \text{Income} + \text{Knowledge.of.exosome} + \text{Acceptance.of.new.method}$

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	17.74	2.665	6.655	1.169e-10
Age	-0.1926	0.06201	-3.106	0.002062
Income	-0.606	0.1845	-3.285	0.00113
Knowledge.of.exosome	-1.706	0.5355	-3.185	0.001584
Acceptance.of.new.method	2.064	0.6934	2.977	0.003125

$\text{Acceptance.of.}\hat{\text{price}}(\text{Hundred}) = 18.98 - 0.1973 * \text{Age} - 0.6794 * \text{Income}(\text{Thousand}) - 1.787 * \text{Knowledge.of.exosome} + 2.007 * \text{Acceptance.of.new.method}$
