hw15

111078513

Help By 108078467

```
library(seminr)
sec_q <- read.table("security_data_sem.csv", header = TRUE, sep = ",")
```

Question 1) Composite Path Models using PLS-PM

a. Create a PLS path model using SEMinR, with all the following characteristics:

(i) Measurement model – all constructs are measured as composites:

```
sec_q_intxn_mm <- constructs(
  composite("TRUST", multi_items("TRST", 1:4)),
  composite("SEC", multi_items("PSEC", 1:4)),
  composite("REP", multi_items("PREP", 1:4)),
  composite("INV", multi_items("PINV", 1:3)),
  composite("POL", multi_items("PPSS", 1:3)),
  composite("FAML", single_item("FAML1")),
  interaction_term(iv="REP", moderator="POL", method=orthogonal)
)
```

(ii). Structural Model – paths between constructs as shown in this causal model:

```
sec_q_intxn_sm <- relationships(
  paths(from = c("REP", "POL", "REP*POL"), to = "SEC"),
  paths(from = "SEC", to = "TRUST")
)
```

b. Show us the following results in table or figure formats:

(i) Plot a figure of the estimated model

```
sec_q_intxn_pls <- estimate_pls(data = sec_q,
                                measurement_model = sec_q_intxn_mm,
                                structural_model = sec_q_intxn_sm)
```

```
## Generating the seminr model
```

```
## All 405 observations are valid.
```

```
plot(sec_q_intxn_pls)
```

(ii) Weights and loadings of composites

```
sec_q_report <- summary(sec_q_intxn_pls)

# weight
sec_q_report$weights
```

```
##                  REP   POL REP*POL   SEC TRUST
## TRST1          0.000 0.000   0.000 0.000 0.282
## TRST2          0.000 0.000   0.000 0.000 0.280
## TRST3          0.000 0.000   0.000 0.000 0.286
## TRST4          0.000 0.000   0.000 0.000 0.278
## PSEC1          0.000 0.000   0.000 0.279 0.000
## PSEC2          0.000 0.000   0.000 0.313 0.000
## PSEC3          0.000 0.000   0.000 0.308 0.000
## PSEC4          0.000 0.000   0.000 0.290 0.000
## PREP1          0.215 0.000   0.000 0.000 0.000
## PREP2          0.334 0.000   0.000 0.000 0.000
## PREP3          0.349 0.000   0.000 0.000 0.000
## PREP4          0.287 0.000   0.000 0.000 0.000
## PPSS1          0.000 0.360   0.000 0.000 0.000
## PPSS2          0.000 0.395   0.000 0.000 0.000
## PPSS3          0.000 0.367   0.000 0.000 0.000
## PREP1*PPSS1    0.000 0.000   0.239 0.000 0.000
## PREP1*PPSS2    0.000 0.000   0.031 0.000 0.000
## PREP1*PPSS3    0.000 0.000   0.021 0.000 0.000
## PREP2*PPSS1    0.000 0.000   0.045 0.000 0.000
## PREP2*PPSS2    0.000 0.000  -0.105 0.000 0.000
## PREP2*PPSS3    0.000 0.000  -0.229 0.000 0.000
## PREP3*PPSS1    0.000 0.000  -0.342 0.000 0.000
## PREP3*PPSS2    0.000 0.000   0.095 0.000 0.000
## PREP3*PPSS3    0.000 0.000   0.108 0.000 0.000
## PREP4*PPSS1    0.000 0.000   0.443 0.000 0.000
## PREP4*PPSS2    0.000 0.000   0.383 0.000 0.000
## PREP4*PPSS3    0.000 0.000   0.272 0.000 0.000
```

```
# loadongs
sec_q_report$loadings
```

```
##                REP    POL REP*POL    SEC  TRUST
## TRST1        0.000  0.000  -0.000  0.000  0.900
## TRST2        0.000  0.000  -0.000  0.000  0.909
## TRST3        0.000  0.000  -0.000  0.000  0.905
## TRST4        0.000  0.000  -0.000  0.000  0.838
## PSEC1        0.000  0.000  -0.000  0.814  0.000
## PSEC2        0.000  0.000  -0.000  0.865  0.000
## PSEC3        0.000  0.000  -0.000  0.868  0.000
## PSEC4        0.000  0.000  -0.000  0.806  0.000
## PREP1        0.800  0.000   0.000  0.000  0.000
## PREP2        0.913  0.000   0.000  0.000  0.000
## PREP3        0.908  0.000   0.000  0.000  0.000
## PREP4        0.718  0.000   0.000  0.000  0.000
## PPSS1        0.000  0.868   0.000  0.000  0.000
## PPSS2        0.000  0.893   0.000  0.000  0.000
## PPSS3        0.000  0.911   0.000  0.000  0.000
```

```
## PREP1*PPSS1 -0.000 -0.000   0.579 -0.000 -0.000
## PREP1*PPSS2 -0.000 -0.000   0.509 -0.000 -0.000
## PREP1*PPSS3 -0.000 -0.000   0.504 -0.000 -0.000
## PREP2*PPSS1 -0.000 -0.000   0.507 -0.000 -0.000
## PREP2*PPSS2 -0.000  0.000   0.419  0.000  0.000
## PREP2*PPSS3 -0.000 -0.000   0.333  0.000  0.000
## PREP3*PPSS1 -0.000 -0.000   0.234  0.000  0.000
## PREP3*PPSS2 -0.000  0.000   0.553 -0.000 -0.000
## PREP3*PPSS3 -0.000 -0.000   0.464 -0.000 -0.000
## PREP4*PPSS1  0.000  0.000   0.899 -0.000 -0.000
## PREP4*PPSS2 -0.000 -0.000   0.836 -0.000  0.000
## PREP4*PPSS3  0.000  0.000   0.858 -0.000  0.000
```

(iii) Regression coefficients of paths between factors

```
sec_q_intxn_pls$path_coef
```

```
##          REP POL REP*POL        SEC     TRUST
## REP        0   0       0  0.3451419 0.0000000
## POL        0   0       0  0.3764288 0.0000000
## REP*POL    0   0       0 -0.1234258 0.0000000
## SEC        0   0       0  0.0000000 0.6056369
## TRUST      0   0       0  0.0000000 0.0000000
```

(iv) Bootstrapped path coefficients: t-values, 95% CI

```
boot_pls <- bootstrap_model(sec_q_intxn_pls, nboot = 1000)
```

```
## Bootstrapping model using seminr...
```

```
## SEMinR Model successfully bootstrapped
```

```
summary(boot_pls)$bootstrapped_total_paths
```

```
##                     Original Est. Bootstrap Mean Bootstrap SD T Stat. 2.5% CI
## REP  ->  SEC                0.345          0.347        0.047   7.405   0.258
## REP  ->  TRUST              0.209          0.212        0.034   6.165   0.151
## POL  ->  SEC                0.376          0.379        0.049   7.750   0.280
## POL  ->  TRUST              0.228          0.232        0.033   6.880   0.168
## REP*POL  ->  SEC           -0.123         -0.035        0.136  -0.907  -0.216
## REP*POL  ->  TRUST         -0.075         -0.022        0.083  -0.896  -0.135
## SEC  ->  TRUST              0.606          0.611        0.034  17.846   0.542
##                     97.5% CI
## REP  ->  SEC           0.433
## REP  ->  TRUST         0.279
## POL  ->  SEC           0.475
## POL  ->  TRUST         0.299
## REP*POL  ->  SEC       0.196
## REP*POL  ->  TRUST     0.122
## SEC  ->  TRUST         0.671
```

Question 2) Common-Factor Models using CB-SEM

a. Create a common factor model using SEMinR, with the following characteristics:

(i) Either respecify all the constructs as being reflective(), or use the as.reflective() function to convert your earlier measurement model to being entirely reflective.

```
sec_q_intxn_cf_mm <- constructs(
  reflective("TRUST", multi_items("TRST", 1:4)),
  reflective("SEC", multi_items("PSEC", 1:4)),
  reflective("REP", multi_items("PREP", 1:4)),
  reflective("INV", multi_items("PINV", 1:3)),
  reflective("POL", multi_items("PPSS", 1:3)),
  reflective("FAML", single_item("FAML1")),
  interaction_term(iv="REP", moderator="POL", method=orthogonal)
)
```

(ii) Use the same structural model as before.

```
sec_q_intxn_sm <- relationships(
  paths(from = c("REP", "POL", "REP*POL"), to = "SEC"),
  paths(from = "SEC", to = "TRUST")
)
sec_q_intxn__cf_pls <- estimate_cbsem( data = sec_q,
                                measurement_model = sec_q_intxn_cf_mm,
                                structural_model = sec_q_intxn_sm)
```

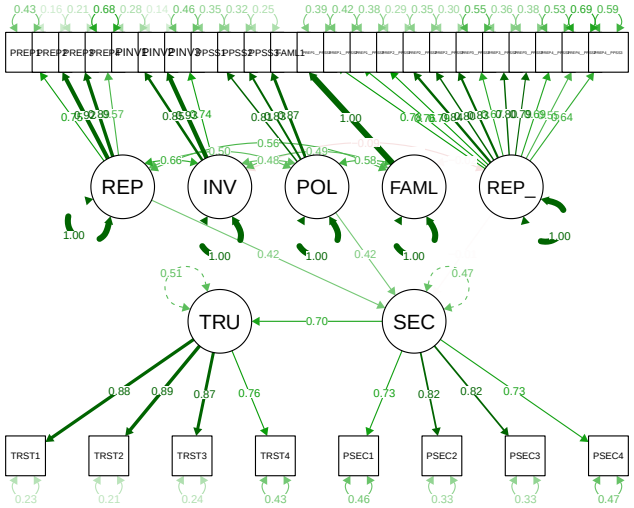
```
## Generating the seminr model for CBSEM
```

b. Show us the following results in table or figure formats

(i) Plot a figure of the estimated model (it will look different from your PLS model!)

```
plot(sec_q_intxn__cf_pls)
```

```
## Plotting of lavaan models using semPlot.
```



```
## NULL
```

(ii) Loadings of composites

```
sec_q_intxn__cf_pls_report <- summary(sec_q_intxn__cf_pls)
sec_q_intxn__cf_pls_report$loadings
```

```
## $coefficients
##           TRUST       SEC       REP       INV       POL FAML
## TRST1 0.8797929        NA        NA        NA        NA   NA
## TRST2 0.8887303        NA        NA        NA        NA   NA
## TRST3 0.8692887        NA        NA        NA        NA   NA
## TRST4 0.7574583        NA        NA        NA        NA   NA
## PSEC1        NA 0.7328446        NA        NA        NA   NA
## PSEC2        NA 0.8167529        NA        NA        NA   NA
## PSEC3        NA 0.8159224        NA        NA        NA   NA
## PSEC4        NA 0.7250304        NA        NA        NA   NA
## PREP1        NA        NA 0.7537709        NA        NA   NA
## PREP2        NA        NA 0.9179888        NA        NA   NA
## PREP3        NA        NA 0.8872095        NA        NA   NA
## PREP4        NA        NA 0.5670567        NA        NA   NA
## PINV1        NA        NA        NA 0.8513823        NA   NA
## PINV2        NA        NA        NA 0.9267945        NA   NA
## PINV3        NA        NA        NA 0.7379759        NA   NA
## PPSS1        NA        NA        NA        NA 0.8055024   NA
## PPSS2        NA        NA        NA        NA 0.8266024   NA
## PPSS3        NA        NA        NA        NA 0.8661612   NA
## FAML1        NA        NA        NA        NA        NA    1
##
## $significance
##                              Std Estimate         SE      t-Value   2.5% CI
## TRUST -> TRST1                  0.8797929 0.02274972 0.000000e+00 0.8352042
## TRUST -> TRST2                  0.8887303 0.03330407 0.000000e+00 0.8234555
## TRUST -> TRST3                  0.8692887 0.03747729 0.000000e+00 0.7958346
## TRUST -> TRST4                  0.7574583 0.04850725 0.000000e+00 0.6623859
## SEC -> PSEC1                    0.7328446 0.03631803 0.000000e+00 0.6616626
## SEC -> PSEC2                    0.8167529 0.04454918 0.000000e+00 0.7294381
## SEC -> PSEC3                    0.8159224 0.03704994 0.000000e+00 0.7433059
## SEC -> PSEC4                    0.7250304 0.03811877 0.000000e+00 0.6503190
## REP -> PREP1                    0.7537709 0.04439099 0.000000e+00 0.6667662
## REP -> PREP2                    0.9179888 0.02668946 0.000000e+00 0.8656784
## REP -> PREP3                    0.8872095 0.03995511 0.000000e+00 0.8088989
## REP -> PREP4                    0.5670567 0.04555708 0.000000e+00 0.4777665
## INV -> PINV1                    0.8513823 0.04466410 0.000000e+00 0.7638423
## INV -> PINV2                    0.9267945 0.04495345 0.000000e+00 0.8386873
## INV -> PINV3                    0.7379759 0.04512369 0.000000e+00 0.6495351
## POL -> PPSS1                    0.8055024 0.04361793 0.000000e+00 0.7200128
## POL -> PPSS2                    0.8266024 0.02817243 0.000000e+00 0.7713854
## POL -> PPSS3                    0.8661612 0.03318219 0.000000e+00 0.8011253
## FAML -> FAML1                   1.0000000 0.00000000           NA 1.0000000
## REP_x_POL -> PREP1_x_PPSS1      0.7782914 0.05797616 0.000000e+00 0.6646602
## REP_x_POL -> PREP1_x_PPSS2      0.7597967 0.05931773 0.000000e+00 0.6435361
## REP_x_POL -> PREP1_x_PPSS3      0.7879180 0.05013944 0.000000e+00 0.6896465
## REP_x_POL -> PREP2_x_PPSS1      0.8447593 0.03648278 0.000000e+00 0.7732543
```

```
## REP_x_POL -> PREP2_x_PPSS2    0.8033636 0.03638478 0.000000e+00 0.7320508
## REP_x_POL -> PREP2_x_PPSS3    0.8340911 0.03539642 0.000000e+00 0.7647154
## REP_x_POL -> PREP3_x_PPSS1    0.6735260 0.12960483 2.027851e-07 0.4195052
## REP_x_POL -> PREP3_x_PPSS2    0.8011717 0.03779061 0.000000e+00 0.7271035
## REP_x_POL -> PREP3_x_PPSS3    0.7901717 0.06415103 0.000000e+00 0.6644380
## REP_x_POL -> PREP4_x_PPSS1    0.6856568 0.06908216 0.000000e+00 0.5502582
## REP_x_POL -> PREP4_x_PPSS2    0.5533191 0.06211637 0.000000e+00 0.4315732
## REP_x_POL -> PREP4_x_PPSS3    0.6406829 0.05795247 0.000000e+00 0.5270982
##                              97.5% CI
## TRUST -> TRST1              0.9243815
## TRUST -> TRST2              0.9540051
## TRUST -> TRST3              0.9427429
## TRUST -> TRST4              0.8525308
## SEC -> PSEC1                0.8040266
## SEC -> PSEC2                0.9040677
## SEC -> PSEC3                0.8885390
## SEC -> PSEC4                0.7997419
## REP -> PREP1                0.8407756
## REP -> PREP2                0.9702991
## REP -> PREP3                0.9655201
## REP -> PREP4                0.6563470
## INV -> PINV1                0.9389223
## INV -> PINV2                1.0149016
## INV -> PINV3                0.8264167
## POL -> PPSS1                0.8909920
## POL -> PPSS2                0.8818193
## POL -> PPSS3                0.9311971
## FAML -> FAML1               1.0000000
## REP_x_POL -> PREP1_x_PPSS1 0.8919226
## REP_x_POL -> PREP1_x_PPSS2 0.8760573
## REP_x_POL -> PREP1_x_PPSS3 0.8861895
## REP_x_POL -> PREP2_x_PPSS1 0.9162642
## REP_x_POL -> PREP2_x_PPSS2 0.8746765
## REP_x_POL -> PREP2_x_PPSS3 0.9034668
## REP_x_POL -> PREP3_x_PPSS1 0.9275468
## REP_x_POL -> PREP3_x_PPSS2 0.8752400
## REP_x_POL -> PREP3_x_PPSS3 0.9159054
## REP_x_POL -> PREP4_x_PPSS1 0.8210553
## REP_x_POL -> PREP4_x_PPSS2 0.6750649
## REP_x_POL -> PREP4_x_PPSS3 0.7542677
```

(iii) Regression coefficients of paths between factors, and their p-values

```
sec_q_intxn__cf_pls_report$paths[c("coefficients", "pvalues")]
```

```
## $coefficients
##                    SEC     TRUST
## R^2        0.52676788 0.4934642
## REP        0.42318633        NA
## POL        0.41557154        NA
## REP_x_POL -0.01219801        NA
## SEC                NA 0.7024701
##
## $pvalues
```

```
##                     SEC TRUST
## REP       2.811085e-13    NA
## POL       4.527045e-12    NA
## REP_x_POL 8.072900e-01    NA
## SEC                NA     0
```