HW15

Question 1) Create a PLS path model using SmartPLS, with the following characteristics:

a).Create a PLS path model using SmartPLS, with the following characteristics:

i.   Measurement of constructs by items
  1.   Trust in website (TRUST): reflective construct with items TRST1-4
  2.   Perceived security of website (SEC): reflective construct with items PSEC1-4
  3.   Reputation of website (REP): formative construct with items PREP1-4
  4.   Investment in website (INV): reflective construct with PINV1-3
  5.   Perception of policy (POL): reflective construct with items PPSS1-3
  6.   Familiarity with website (FAML): single-item construct measured by FAML1

ii.   Interaction between REP and POL (use orthogonalized product terms)
iii. Structural paths between constructs (shown as causal models -- note direction of arrows):
  1.   SEC ← REP + INV + POL + FAML + REP.POL
  2.   TRUST ← SEC

My scratch of the SEM.
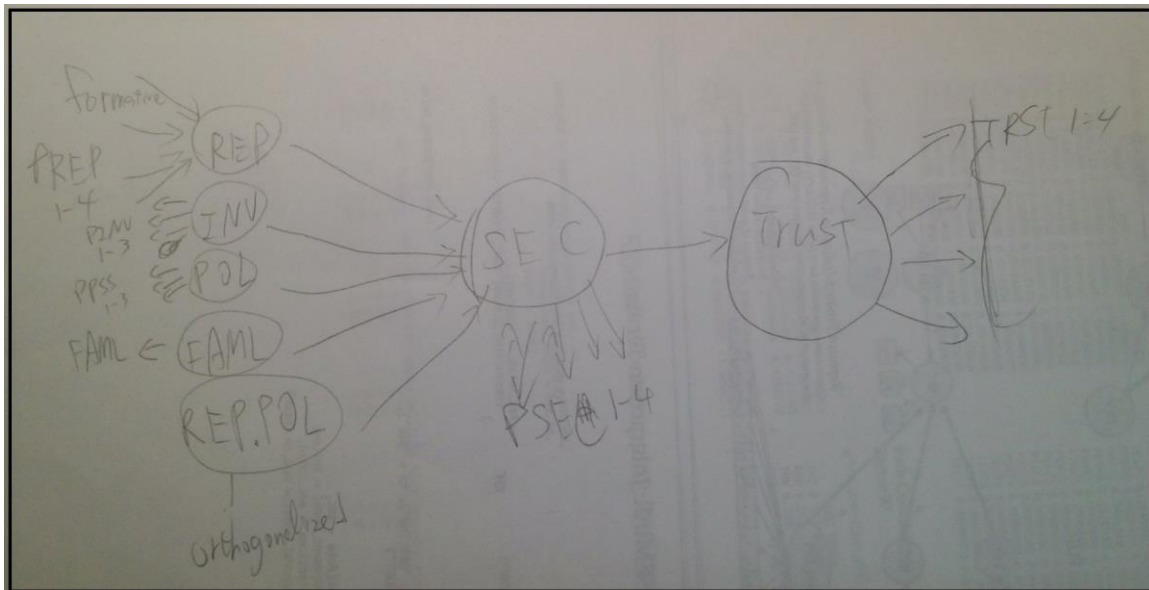

```
library(seminr)

##
## Attaching package: 'seminr'
```

```
## The following object is masked from 'package:base':
##
##     structure

sec = read.csv("security_data.csv")

# Measurement Model
sec_mm <- measure(
  form("REP",multi_items("PREP",1:4)),
  reflect("INV", multi_items("PINV",1:3)),
  reflect("POL", multi_items("PPSS",1:3)),
  reflect("FAML","FAML1"),
  reflect("TRUST", multi_items("TRST", 1:4)),
  reflect("SEC",multi_items("PSEC",1:4))
)

#interaction term
sec_intxn <- interact(
  interaction_ortho("REP","POL")
)

#Structural Model
sec_sm <- structure(
  paths(from = c("REP","INV","POL","FAML","REP.POL"), to = "SEC"),
  paths(from = "SEC", to = "TRUST")
)

#run PLS

sec_pls <- estimate_model(data = sec,
                          measurement_model = sec_mm,
                          structural_model = sec_sm,
                          interactions = sec_intxn)

## Generating the plsm model
```

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

i.   Loadings of reflective factors / Weights of formative factors

```
sec_pls$outer_loadings
```

	REP	INV	POL	FAML	REP.POL	SEC	TRUST
PREP1	0.5623877	0.0000000	0.0000000	0	0.0000000	0.0000000	0.0000000
PREP2	0.8723808	0.0000000	0.0000000	0	0.0000000	0.0000000	0.0000000
PREP3	0.9127721	0.0000000	0.0000000	0	0.0000000	0.0000000	0.0000000
PREP4	0.7500201	0.0000000	0.0000000	0	0.0000000	0.0000000	0.0000000
PINV1	0.0000000	0.9034426	0.0000000	0	0.0000000	0.0000000	0.0000000
PINV2	0.0000000	0.9248641	0.0000000	0	0.0000000	0.0000000	0.0000000
PINV3	0.0000000	0.8546257	0.0000000	0	0.0000000	0.0000000	0.0000000
PPSS1	0.0000000	0.0000000	0.8678161	0	0.0000000	0.0000000	0.0000000
PPSS2	0.0000000	0.0000000	0.8931576	0	0.0000000	0.0000000	0.0000000
PPSS3	0.0000000	0.0000000	0.9110954	0	0.0000000	0.0000000	0.0000000
FAML1	0.0000000	0.0000000	0.0000000	1	0.0000000	0.0000000	0.0000000
TRST1	0.0000000	0.0000000	0.0000000	0	0.0000000	0.0000000	0.8997565
TRST2	0.0000000	0.0000000	0.0000000	0	0.0000000	0.0000000	0.9092024
TRST3	0.0000000	0.0000000	0.0000000	0	0.0000000	0.0000000	0.9045716
TRST4	0.0000000	0.0000000	0.0000000	0	0.0000000	0.0000000	0.8381919
PSEC1	0.0000000	0.0000000	0.0000000	0	0.0000000	0.8106163	0.0000000
PSEC2	0.0000000	0.0000000	0.0000000	0	0.0000000	0.8652285	0.0000000
PSEC3	0.0000000	0.0000000	0.0000000	0	0.0000000	0.8680697	0.0000000
PSEC4	0.0000000	0.0000000	0.0000000	0	0.0000000	0.8094425	0.0000000
PREP1.PPSS1	0.0000000	0.0000000	0.0000000	0	0.5836738	0.0000000	0.0000000
PREP1.PPSS2	0.0000000	0.0000000	0.0000000	0	0.5125196	0.0000000	0.0000000
PREP1.PPSS3	0.0000000	0.0000000	0.0000000	0	0.5088870	0.0000000	0.0000000
PREP2.PPSS1	0.0000000	0.0000000	0.0000000	0	0.5134612	0.0000000	0.0000000
PREP2.PPSS2	0.0000000	0.0000000	0.0000000	0	0.4244352	0.0000000	0.0000000
PREP2.PPSS3	0.0000000	0.0000000	0.0000000	0	0.3398300	0.0000000	0.0000000
PREP3.PPSS1	0.0000000	0.0000000	0.0000000	0	0.2395725	0.0000000	0.0000000
PREP3.PPSS2	0.0000000	0.0000000	0.0000000	0	0.5576592	0.0000000	0.0000000
PREP3.PPSS3	0.0000000	0.0000000	0.0000000	0	0.4690182	0.0000000	0.0000000
PREP4.PPSS1	0.0000000	0.0000000	0.0000000	0	0.9011031	0.0000000	0.0000000
PREP4.PPSS2	0.0000000	0.0000000	0.0000000	0	0.8363827	0.0000000	0.0000000
PREP4.PPSS3	0.0000000	0.0000000	0.0000000	0	0.8599362	0.0000000	0.0000000

```
sec_pls$outer_weights
```

```
                 REP        INV        POL FAML    REP.POL        SEC      TRUST
PREP1      -0.2434963 0.0000000 0.0000000    0 0.00000000 0.0000000 0.0000000
PREP2       0.4418170 0.0000000 0.0000000    0 0.00000000 0.0000000 0.0000000
PREP3       0.5144356 0.0000000 0.0000000    0 0.00000000 0.0000000 0.0000000
PREP4       0.3759155 0.0000000 0.0000000    0 0.00000000 0.0000000 0.0000000
PINV1       0.0000000 0.3633141 0.0000000    0 0.00000000 0.0000000 0.0000000
PINV2       0.0000000 0.3949797 0.0000000    0 0.00000000 0.0000000 0.0000000
PINV3       0.0000000 0.3585944 0.0000000    0 0.00000000 0.0000000 0.0000000
PPSS1       0.0000000 0.0000000 0.3604446    0 0.00000000 0.0000000 0.0000000
PPSS2       0.0000000 0.0000000 0.3947092    0 0.00000000 0.0000000 0.0000000
PPSS3       0.0000000 0.0000000 0.3673192    0 0.00000000 0.0000000 0.0000000
FAML1       0.0000000 0.0000000 0.0000000    1 0.00000000 0.0000000 0.0000000
TRST1       0.0000000 0.0000000 0.0000000    0 0.00000000 0.0000000 0.2820685
TRST2       0.0000000 0.0000000 0.0000000    0 0.00000000 0.0000000 0.2803331
TRST3       0.0000000 0.0000000 0.0000000    0 0.00000000 0.0000000 0.2856284
TRST4       0.0000000 0.0000000 0.0000000    0 0.00000000 0.0000000 0.2779270
PSEC1       0.0000000 0.0000000 0.0000000    0 0.00000000 0.2708136 0.0000000
PSEC2       0.0000000 0.0000000 0.0000000    0 0.00000000 0.3163641 0.0000000
PSEC3       0.0000000 0.0000000 0.0000000    0 0.00000000 0.3064275 0.0000000
PSEC4       0.0000000 0.0000000 0.0000000    0 0.00000000 0.2974225 0.0000000
PREP1.PPSS1 0.0000000 0.0000000 0.0000000    0 0.23907580 0.0000000 0.0000000
PREP1.PPSS2 0.0000000 0.0000000 0.0000000    0 0.03097791 0.0000000 0.0000000
PREP1.PPSS3 0.0000000 0.0000000 0.0000000    0 0.02135493 0.0000000 0.0000000
PREP2.PPSS1 0.0000000 0.0000000 0.0000000    0 0.04728616 0.0000000 0.0000000
PREP2.PPSS2 0.0000000 0.0000000 0.0000000    0 -0.10299005 0.0000000 0.0000000
PREP2.PPSS3 0.0000000 0.0000000 0.0000000    0 -0.22637248 0.0000000 0.0000000
PREP3.PPSS1 0.0000000 0.0000000 0.0000000    0 -0.33874387 0.0000000 0.0000000
PREP3.PPSS2 0.0000000 0.0000000 0.0000000    0 0.09519373 0.0000000 0.0000000
PREP3.PPSS3 0.0000000 0.0000000 0.0000000    0 0.10857661 0.0000000 0.0000000
PREP4.PPSS1 0.0000000 0.0000000 0.0000000    0 0.44220480 0.0000000 0.0000000
PREP4.PPSS2 0.0000000 0.0000000 0.0000000    0 0.38056606 0.0000000 0.0000000
PREP4.PPSS3 0.0000000 0.0000000 0.0000000    0 0.27087812 0.0000000 0.0000000
```

ii.   Regression coefficients of paths between factors

```
print_paths(sec_pls)
```

```
##              SEC TRUST
## R^2        0.44  0.37
## REP        0.30     .
## INV        0.17     .
## POL        0.32     .
## FAML       0.01     .
## REP.POL   -0.11     .
## SEC           .  0.61
```

iii.   Bootstrapped path coefficients: t-values, p-values (are any paths not significant at p=5% ?)

```
boot_pls <- bootstrap_model(data = sec,
                    measurement_model = sec_mm,
                    structural_model = sec_sm,
                    interactions = sec_intxn,
                    nboot = 1000)

## Bootstrapping model using simplePLS...
```

```
print_paths(boot_pls)
```

```
         SEC PLS Est.  SEC Boot Mean  SEC Boot SE  t value  Pr(>|t|)
REP              0.30           0.31         0.05     5.70      0.00
INV              0.17           0.17         0.05     3.31      0.00
POL              0.32           0.32         0.05     6.01      0.00
FAML             0.01           0.01         0.05     0.16      0.87
REP.POL         -0.11          -0.06         1.43    -0.04      0.97
SEC              0.00           0.00         0.00     0.00      0.00
         TRUST PLS Est.  TRUST Boot Mean  TRUST Boot SE  t value  Pr(>|t|)
REP               0.00             0.00           0.00     0.00         0
INV               0.00             0.00           0.00     0.00         0
POL               0.00             0.00           0.00     0.00         0
FAML              0.00             0.00           0.00     0.00         0
REP.POL           0.00             0.00           0.00     0.00         0
SEC               0.61             0.61           0.04    16.67         0
```

From the above table, we can find out that **FAML** and **REP.POL** are insignificant paths.