A STRUCTURAL EQUATIONS MODEL OF CORPORATE REPUTATION USING R

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Corporate reputation

- Warren Buffet: “*You need 20 years to build a reputation and only 5 minutes to destroy it*”
- Benjamin Franklin: "*It takes a lot of good things to build a good reputation and only one bad thing to lose it*"

Corporate reputation

- Is a valuable and highly sensitive intangible asset
- Is the result of repeated actions obtained in time and from experience accumulated
- Is the way that others perceive us
- Helps a company to achieve its objectives and to maintain competitive advantage

The rationale of our study

- Each stakeholder may perceive *a slightly different* dimension of the reputational phenomenon

- The aim is to test the perception about corporate reputation:
  - from the posture of a potential buyer
  - from the posture of a potential investor
  - from the posture of a potential employee
  - from the posture of an individual that recommends the company to other people

The approach

- A 46-items questionnaire and answers were measured on a 5-point Likert scale
- The questionnaire was adapted in Romanian from the study of Puncheva-Michelotti (2008)
- It follows the line of the Reputation Quotient scale, considered a balanced instrument of inquiry in this area

Ten latent variables

1. Emotions associated to reputation or the perception on reputation work place
2. Workplace
3. The customer value for the company
4. Management and leadership
5. Product/service differentiation
6. The credibility of the company
7. Social contribution and impact on customers
8. Ethics and social responsibility
9. Economic performance
10. Patriotism

Research method: structural equation modeling (SEM)

- Explains on average between 57% and 65% of the total variance in the reputation of the company
- Emphasizes the set of significant latent factors named earlier for each of the four cases

Implementation of SEM in R

- *install.packages("lavaan", dependencies = TRUE)*
- *install.packages("semTools")*
- *install.packages("semPlots")*

Call those packages using the function “library”

- *library(lavaan)*
- *library(semPlots)*
- *library(semTools)*

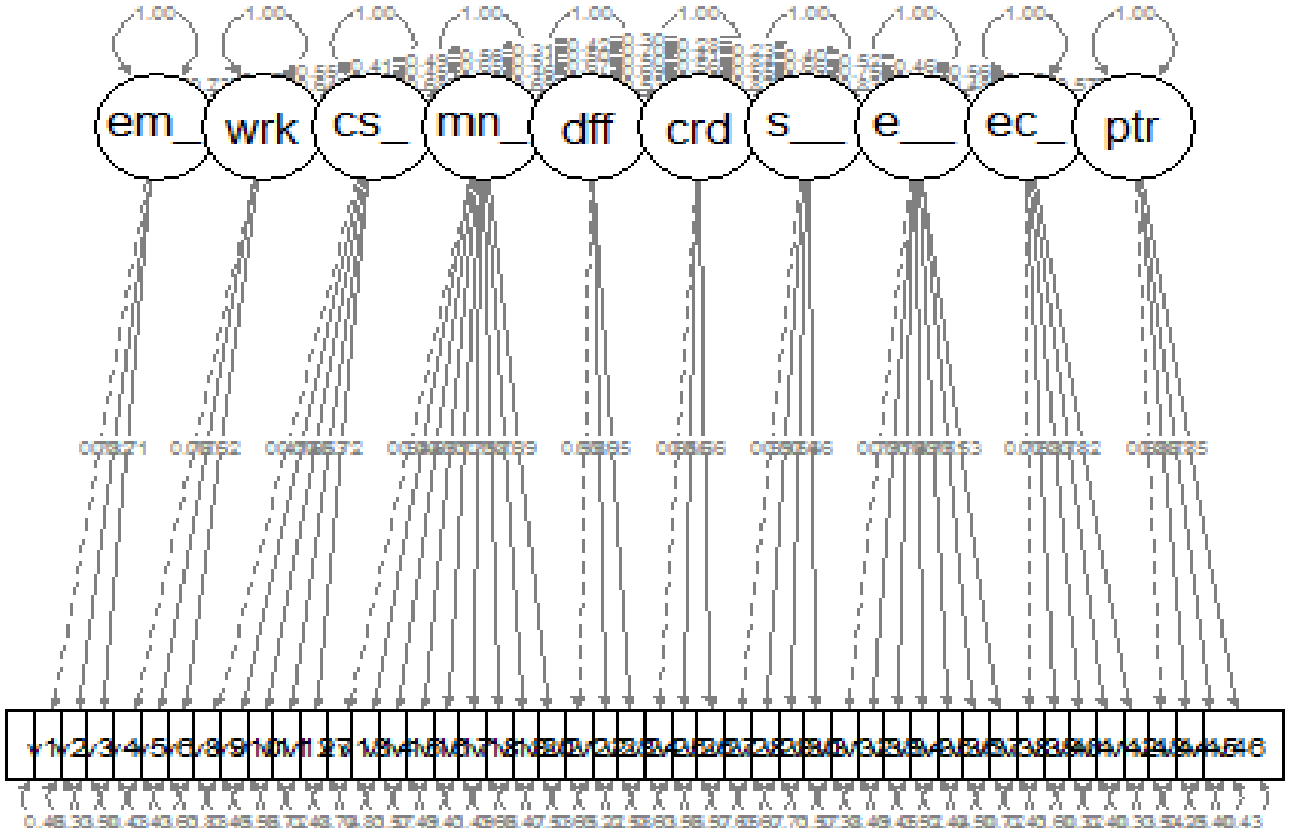
Examine the working dataset

- *class(…)*
- *str(….)*
- *head(…)*

The R code for the baseline model

```
myModel <- "
emotional_appeal =~ v1 + v2 + v3
workplace =~ v4 + v5 + v6
customer_value =~ v8 + v9 + v10 + v11 + v12
management_leadership =~ v7 + v13 + v14 + v15 + v16 + v17 + v18 + v19 + v20
differentiating =~ v21 + v22 + v23
credibility =~ v24 + v25 + v26
social_contribution_customer_impact =~ v27 + v28 + v29 + v30
ethical_social_responsibility =~ v31 + v32 + v33 + v34 + v35 + v36 + v37
economical_performance =~ v38 + v39 + v40 + v41 + v42
patriotism =~ v43 + v44 + v45 + v46"
```

Graphic representation of the baseline model



Step 1.
Confirmatory factor analysis (CFA)

- *fit <- cfa(myModel, data = ….)*
- *summary(fit, fit.measures = TRUE, rsq=T)*

The output of CFA consists of three parts:

1. The first six line form the header

2. The second part contains additional fit measures

3. The third part contains the parameter estimates

CFA output for buying decision

```
lavaan (0.5-20) converged normally after 151 iterations

  Number of observations                           105

  Estimator                                         ML
  Minimum Function Test Statistic             1906.653
  Degrees of freedom                               944
  P-value (Chi-square)                           0.000

Model test baseline model:

  Minimum Function Test Statistic             4013.718
  Degrees of freedom                              1035
  P-value                                        0.000

User model versus baseline model:

  Comparative Fit Index (CFI)                    0.677
  Tucker-Lewis Index (TLI)                       0.646

Loglikelihood and Information Criteria:

  Loglikelihood user model (H0)              -5437.166
  Loglikelihood unrestricted model (H1)      -4483.840

  Number of free parameters                        137
  Akaike (AIC)                               11148.333
  Bayesian (BIC)                             11511.926
  Sample-size adjusted Bayesian (BIC)        11079.117

Root Mean Square Error of Approximation:

  RMSEA                                          0.099
  90 Percent Confidence Interval          0.092  0.105
  P-value RMSEA <= 0.05                          0.000

Standardized Root Mean Square Residual:

  SRMR                                           0.098

Parameter Estimates:

  Information                                 Expected
  Standard Errors                             Standard
```

CFA for the four models

Indicator	Expected value	Value in the model (buy from a company)	Value in the model (invest in a company)	Value in the model (work for a company)	Value in the model (promote a company)
Convergence & number of iterations		Yes, 151 iterations	Yes, 172 iterations	Yes, 139 iterations	Yes, 164 iterations
Observations	As big as possible	105	102	108	99
Chi-square	> 0.05	0.000	0.000	0.000	0.000
CFI	> 0.95	0.677	0.707	0.736	0.741
TLI	> 0.95	0.646	0.679	0.710	0.716
RMSEA	< 0.07	0.099	0.097	0.079	0.086
90% Confident Interval	(0; 1)	(0.092; 0.105)	(0.090; 0.103)	(0.072; 0.086)	(0.079; 0.093)
SRMR	< 0.08	0.098	0.098	0.087	0.086
AIC	As small as possible	11148.333	8599.412	10704.875	8624.821

Improving the model

- We can eliminate variables with an R-squared value smaller than 0.5
- OR,
- We can eliminate those variables that do not fit; (by calculating modification indices and eliminating those with the biggest values - *modindices(fit))*

CFA for the four models after improvements

Indicator	Expected value	Value in the model (buy from a company)	Value in the model (invest in a company)	Value in the model (work for a company)	Value in the model (promote a company)
Observations	As big as possible	105	102	108	99
Chi-square	> 0.05	0.298	0.084	0.063	0.148
CFI	> 0.95	0.992	0.981	0.969	0.979
TLI	> 0.95	0.989	0.968	0.957	0.974
RMSEA	< 0.07	0.033	0.070	0.061	0.037
90% Confident Interval	(0; 1)	(0; 0.082)	(0; 0.123)	(0; 0.100)	(0; 0.064)
SRMR	< 0.08	0.046	0.051	0.056	0.067
AIC	As small as possible	2434.637	1329.810	2172.685	3395.625

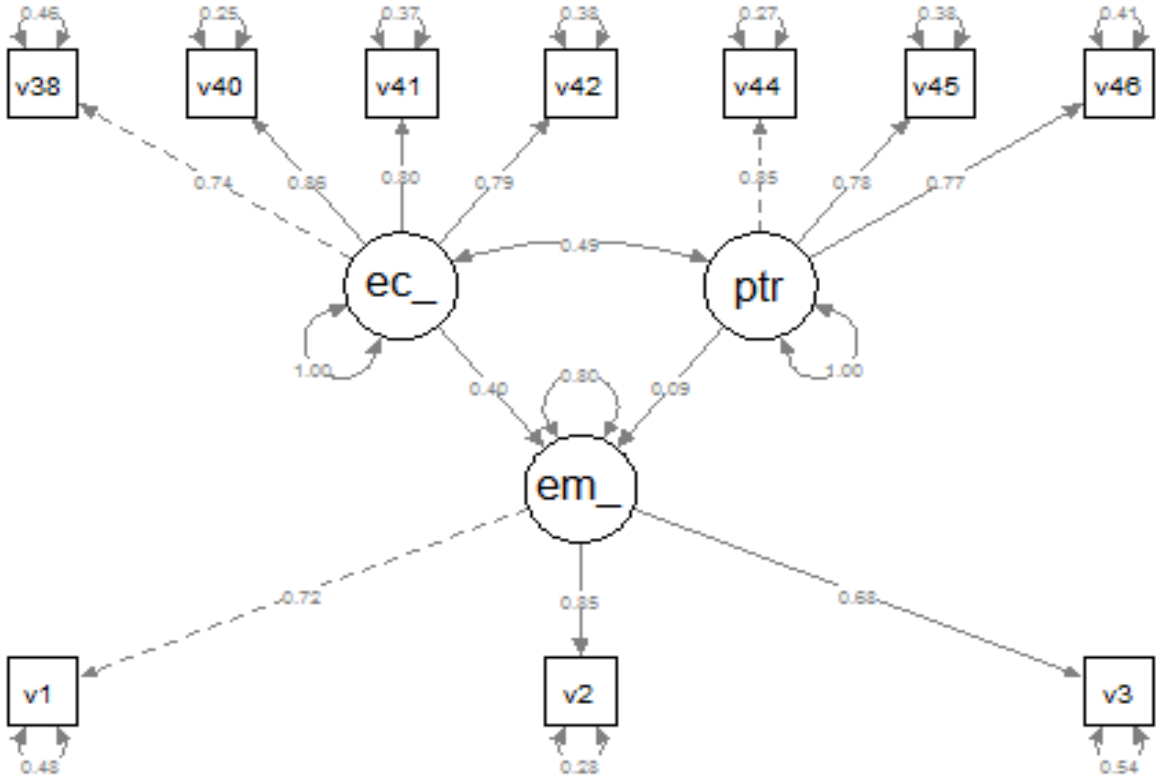
Step 2.
Structural equation modeling

- To perform *sem()* first we will complete the code for the baseline model with the following syntax:
  - *emotional_appeal ~ workplace + customer_value + management_leadership + differentiating + credibility + social_contribution_customer_impact + ethical_social_responsibility + economical_performance + patriotism*
- The R code used to fit the model and to see the results is the following:
  - *fit <- sem(myModel, data = ...)*
  - *summary(fit, standardized=TRUE)*

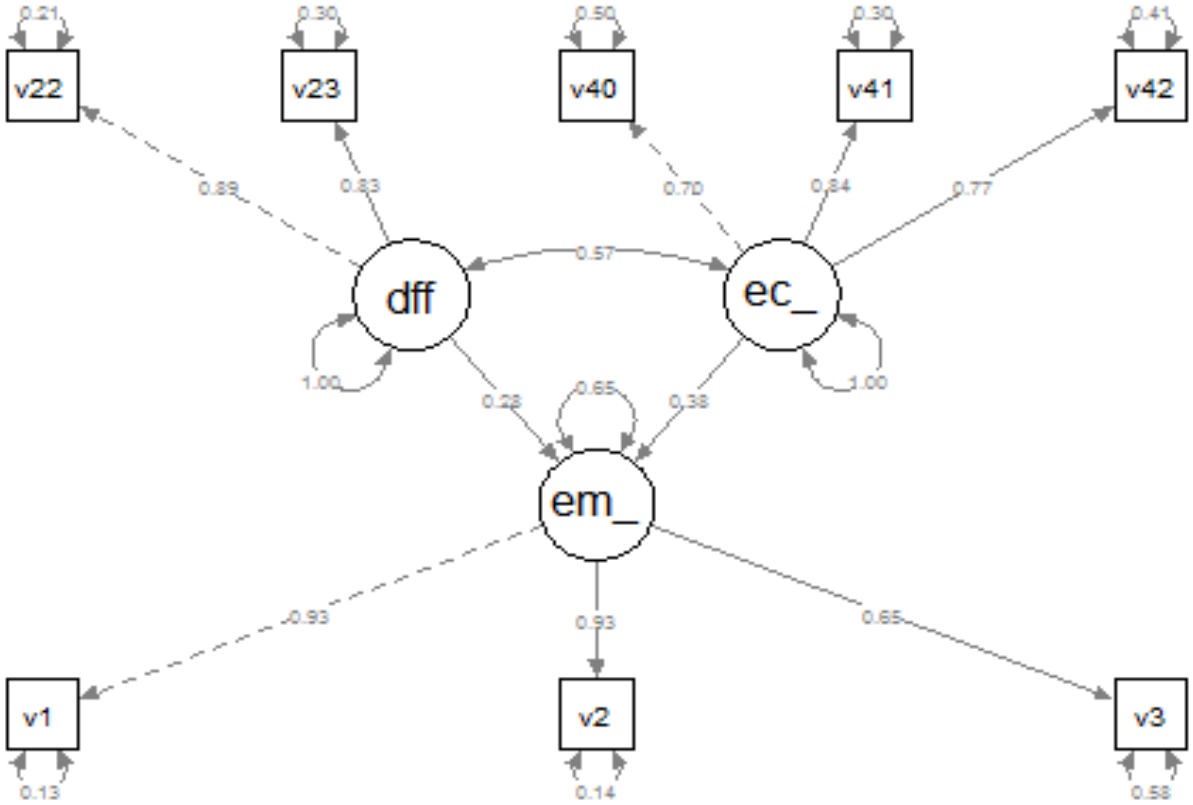
The R code for the SEM

- *plot resulted using semPaths function in qplots*
  - *semPaths(fit,"std",edge.label.cex = 0.5, curvePivot= TRUE, layout="tree")*
- *or*
  - *semPaths(fit, what='path', whatLabels='std')*

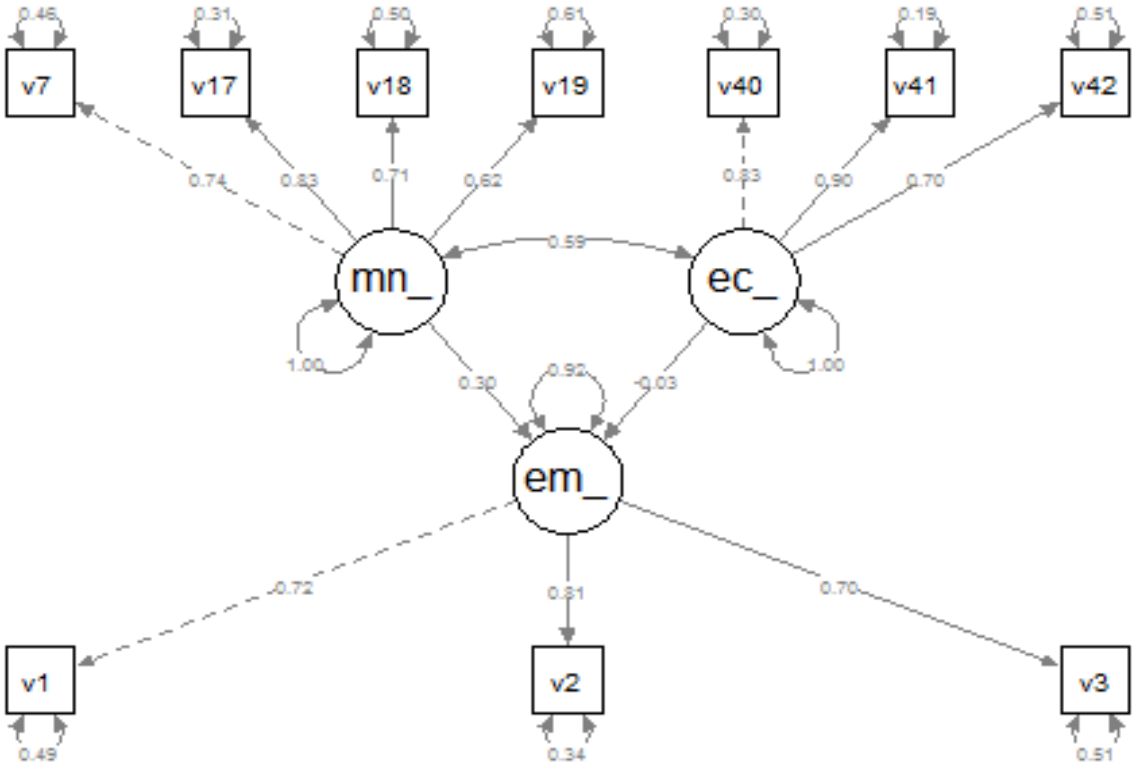
Model 1 - the “buy from a company” case



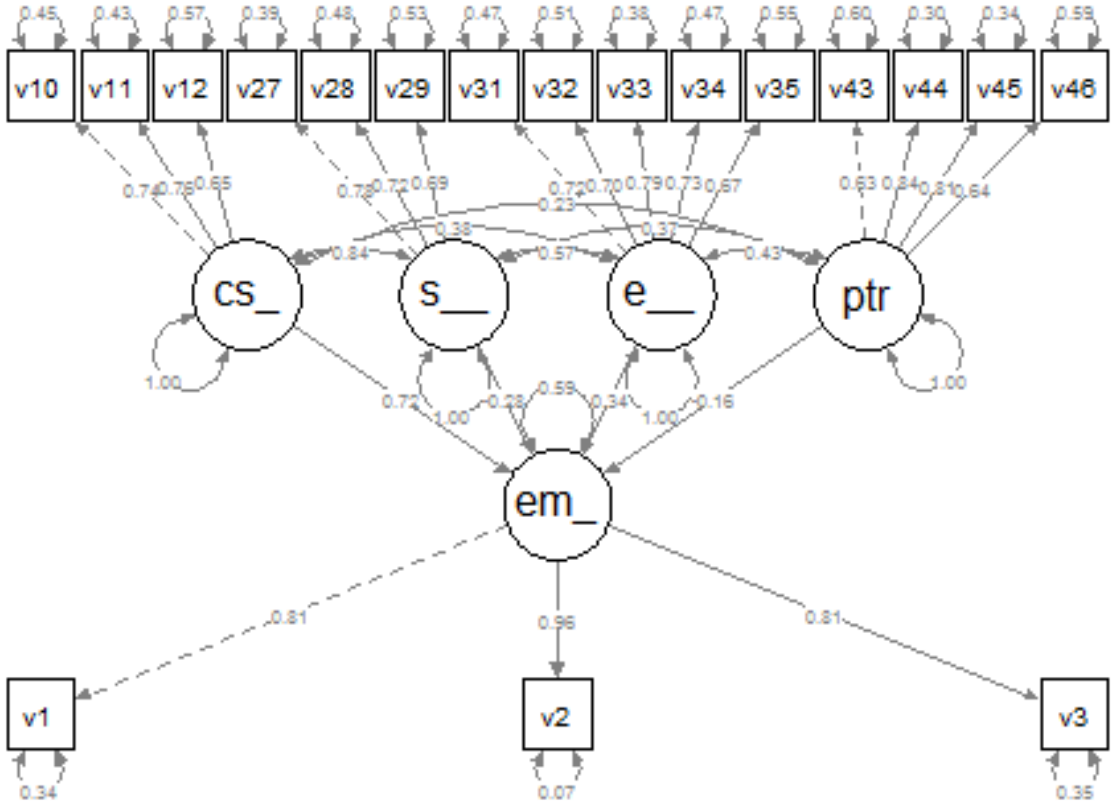
Model 2 - the “invest in a company” case



Model 3 - the “work for a company” case



Model 4 - the “promoting a company” case



Conclusions (1)

- Latent variables that determine "emotional appeal" in the four different cases analyzed:
  - for the decision to buy from a company - economical performance of the company and the patriotism;
  - for the decision to invest in a company - differentiating and economical performance;
  - for the decision to work for a company - management &leadership and economical performance;
  - for the decision to promote a company - customer value, social contribution & customer impact, ethical & social responsibility and patriotism.

Conclusions (2)

- Reputation is a representation in the mind.
- It affects attitudes, which in turn affect behavior.
- Economic performance is present in three of the four cases analyzed – dominance of economic rationality for the formation of corporate reputation
- The fourth case is distinctive from the others – economic performance was replaced by more intrinsic attributes like customer values, social contribution and ethical aspects.

Thank you for your attention!

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