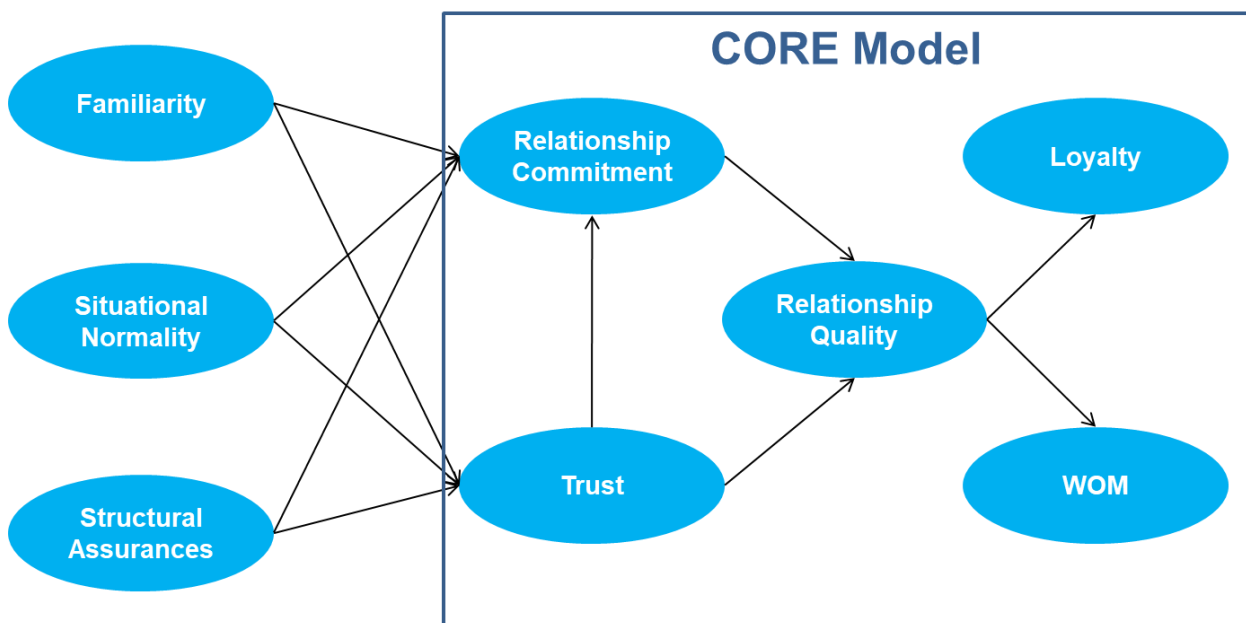


## ASSIGNMENT 2

### Correlation and Regression Analysis <sup>1</sup>

In this assignment we will use data from an online survey conducted for DELL in 2015 by a Maastricht University research team on online relationships. In contrast to AN(C)OVA, correlation and (OLS) regression analysis typically assume metric independent variables. Ever since DELL started selling PC systems through its website in 1996 online relationships with its customers have been pivotal to its marketing strategy. The conceptual model for this study is based on Morgan and Hunt (1994) and Gefen et al. (2003) and highlights the role of trust and commitment in online relationships. The conceptual model for the online relationship study is depicted in Figure 1.

**Figure 1: Conceptual Model**



<sup>1</sup> **Disclaimer:** This assignment was prepared for class discussion purposes only and does not represent the views of DELL or their affiliates. The scenario presented in the assignment, the questionnaire (and other materials) and the data are hypothetical, but resemble real marketing research problems, questionnaires (and materials) and data.

The SPSS data file **DELL.REL.sav** contains 669 respondents (response rate: 19.8%) from the 2015 DELL Online Relationship study. The data have been cleaned and validated. The measurement instruments used in the survey are included in Table 1 in the Appendix.

## ASSIGNMENTS

*DELL Online Relationship Study* (Malhotra, 2010, Ch. 17 & Ch. 18 (pp. 620-633); Pallant, 2016, Ch. 11, Ch. 12, Ch. 13 & Ch. 14)

- (1) Explore the (bivariate) relationships in the conceptual model (See Figure 1) among familiarity (**FAM**), situational normality (**SN**), structural assurances (**SA**), relationship commitment (**RC**), trust (**TR**), relationship quality (**RQ**), loyalty (**LOY**) and word of mouth (**WOM**). Please, calculate a mean score on the basis of the items for each construct <sup>2</sup>. Formulate the hypotheses ( $H_0$  and  $H_1$ ), conduct the appropriate tests, assess the assumptions, and interpret the SPSS output (**Hint**: You might want to consider a graphical representation of your results). What are the implications of these results for the study?
- (2) Determine the sample size for a regression analysis with loyalty (**LOY**) as dependent variable and relationship quality (**RQ**), relationship commitment (**RC**) and trust (**TR**) as potential independent variables. Assume a  $R^2$  of 0.25, or  $f^2=0.25/(1-0.25)=0.33$ , a significance level of 0.05 and a power of 0.80. What would happen to the required sample size if DELL management would like to add familiarity (**FAM**), situational normality (**SN**), structural assurances (**SA**) as additional independent variables? Finally, assume a  $R^2$  of 0.05, or  $f^2=0.05/(1-0.05)=0.05$ , a significance level of 0.05 and a power of 0.80 to determine the sample size in the two scenarios outlined above. **Hint**: You may use the R package pwr (<https://cran.r-project.org/web/packages/pwr/index.html>) in SPSS, or G\*Power (Faul et al., 2009).
- (3) Conduct a simple (or bivariate) regression with relationship commitment (**RC**) as dependent variable and trust (**TR**) as independent variable. Prepare a scatter plot and fit a linear relationship in the plot. Do you think outliers might affect your results? Formulate the hypotheses ( $H_0$  and  $H_1$ ), conduct the appropriate tests, evaluate model fit, assess the assumptions, and interpret the SPSS output. What are the implications of these results for the study?
- (4) The conceptual model in Figure 1 suggests that familiarity (**FAM**), situational normality (**SN**) and structural assurances (**SA**) might be added as independent variables to the model in assignment 2 (3). Is the explanatory power of the model significantly increased by adding familiarity (**FAM**), situational normality (**SN**) and structural assurances (**SA**) to the model? Please, calculate a mean score on the basis of the items for each construct. Formulate the hypotheses ( $H_0$  and  $H_1$ ), conduct the appropriate tests, evaluate model fit, assess the assumptions, and interpret the SPSS output. What are the implications of these results for the study?
- (5) Could multicollinearity potentially affect the results in assignment 2 (4)? Explain the concept of multicollinearity for OLS regression analysis, how it potentially could affect your findings and how it can be diagnosed?
- (6) DELL management thinks that gender (**GENDER**), relationship length (**AGE**) and education (**EDUCATION**) might affect relationship commitment (**RC**) and thus the analysis in assignment 2 (4).

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<sup>2</sup> A construct, sometimes referred to as a latent variable, is an abstraction from particulars, typically operationalized by a number of (manifest) variables. For example, perceived ease of use is a construct operationalized by three variables or items (See Appendix A).

Basically, they feel that males, older customers and higher-educated customers show a higher level of relationship commitment (**RC**). Relationship commitment (**RC**) should therefore be corrected ("controlled") for the potential impact of gender, age and education. How can this be accomplished (**Hint**: Consider recoding the variables)? Formulate the hypotheses ( $H_0$  and  $H_1$ ), conduct the appropriate tests, evaluate model fit, assess the assumptions, and interpret the SPSS output. What are the implications of these results for the study?

- (7) DELL management assumes that the potential impact of relationship commitment (**RC**) on relationship quality (**RQ**) will be stronger than the impact of trust (**TR**) on relationship quality (**RQ**) in the core model. Formulate the hypotheses ( $H_0$  and  $H_1$ ), conduct the appropriate test, and interpret the SPSS output. Report your findings, discuss the implications and provide recommendations to DELL management. **Hint**: you may want to use the SPSS macro **TestEqualityofCoefficients.sps** or the SPSS extension provided in **TestEqualityofCoefficients.spe** (installed under Extensions).
- (8) Estimate the remaining relationships in the **CORE** model in Figure 1. Do the direct effects of trust (**TR**) and relationship commitment (**RC**) significantly affect loyalty (**LOY**) and word of mouth (**WOM**)? **Please note**: these direct effects are not hypothesized in Figure 1! Formulate the hypotheses ( $H_0$  and  $H_1$ ), conduct the appropriate tests, evaluate model fit, assess the assumptions, and interpret the SPSS output. What are the implications of these results for the study?
- (9) The core model in Figure 1 suggests that the relationships between trust (**TR**), respectively relationship commitment (**RC**), and loyalty (**LOY**) and word of mouth (**WOM**), are mediated by relationship quality (**RQ**). As suggested by Preacher and Hayes (2004) and Hayes (2013) the Sobel test may be used to test for mediation. You may use the process macro provided by Hayes (2013), which can be downloaded from: <http://processmacro.org/download.html>. The mediation model is referred to as model 4 in the menu of the macro. Formulate the hypotheses ( $H_0$  and  $H_1$ ), conduct the appropriate test(s), assess the assumptions, and interpret the SPSS output. Report your findings, discuss the implications and provide recommendations to DELL management.
- (10) DELL senior management feels the length of the relationship (**LENGTH**) might strengthen and income (**INCOME**) might "weaken", or attenuate (i.e. moderate) the relationship between relationship quality (**RQ**), and respectively loyalty (**LOY**) and word of mouth (**WOM**). More in particular, they expect a stronger impact of respondents with a longer relationships and weaker impact for more affluent respondents. You may use the process macro provided by Hayes (2013), which can be downloaded from: <http://processmacro.org/download.html>. The moderation model is referred to as model 1 in the menu of the macro.
- (11) Summarize the main findings of the above analysis for the senior management of DELL and provide your recommendations.

## References

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## APPENDIX

<b>TABLE 1: Measurement Instruments</b>	
<b>FAMILIARITY <sup>a</sup></b>	
FAM01	I am familiar with DELL through the press.
FAM02	I am familiar with DELL by visiting the DELL website.
FAM03	I am familiar with DELL by purchasing online on the DELL website.
<b>SITUATIONAL NORMALITY <sup>a</sup></b>	
SN01	The steps required for ordering on the DELL website are typical of other similar websites.
SN02	The information requested from me while ordering on the DELL website is typical of other similar websites.
SN03	The nature of the interaction with the DELL website is typical of other similar websites.
SN04	The payment process on the DELL website is typical of other similar websites.
<b>STRUCTURAL ASSURANCE <sup>a</sup></b>	
SA01	I feel safe conducting online transactions with DELL because of its privacy policy.
SA02	I feel safe conducting online transactions with DELL because it provides a toll-free telephone number for customer contacts.
SA03	I feel safe conducting online transactions with DELL because of its warranty policy.
SA04	I feel safe conducting online transactions with DELL because of its customer support policy.
<b>TRUST <sup>a</sup></b>	
TR01	Based on my previous experience with DELL I feel that it is honest.
TR02	DELL cares about its customers.
TR03	I can trust DELL as a customer.
TR04	DELL will not behave opportunistically.
<b>RELATIONSHIP COMMITMENT <sup>a</sup></b>	
RC01	I feel emotionally attached to DELL.
RC02	DELL has great personal meaning for me.
RC03	I feel like part of the "DELL family."
RC04	DELL means a lot to me.
<b>RELATIONSHIP QUALITY</b>	
RQ01	Quality of the relationship with DELL <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span> <span>2</span> <span>3</span> <span>4</span> <span>5</span> <span>6</span> <span>7</span> </div> <i>Dissatisfied</i> <span style="float: right;"><i>Satisfied</i></span>
RQ02	Quality of the relationship with DELL <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span> <span>2</span> <span>3</span> <span>4</span> <span>5</span> <span>6</span> <span>7</span> </div> <i>Displeased</i> <span style="float: right;"><i>Pleased</i></span>
RQ03	Quality of the relationship with DELL <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span> <span>2</span> <span>3</span> <span>4</span> <span>5</span> <span>6</span> <span>7</span> </div> <i>Poor</i> <span style="float: right;"><i>Good</i></span>
<b>LOYALTY <sup>a</sup></b>	
LOY01	I consider DELL my first choice for buying IT-related items.
LOY02	I will do more business with DELL in the future.
LOY03	I never consider switching to a competitor for buying IT-related items.
<b>WORD OF MOUTH <sup>a</sup></b>	
WOM01	I will recommend DELL to friends and relatives.
WOM02	I will encourage friends and relatives to do more business with DELL.
WOM03	I will say positive things about DELL to other people.



DEMOGRAPHICS	
GENDER	Male (1) Female (2)
AGE	___ years old
EDUCATION	(1) Some high school or less (2) High school graduate (3) Some College/Technical School (4) College graduate or higher
INCOME	Gross yearly income: \$ ___
LENGTH OF RELATIONSHIP	___ years

a Measured on a scale from 1 'strongly disagree' to 7 'strongly agree'.