



**Course Title: Latent Variable Structural Equation Modeling –
Using Partial Least Squares**

Course number	14266.0015
Time and Location	21.10.2016, 10am – 2pm, Room 327 WiSo-Building 14.11.2016, full day, Room 327 WiSo-Building 25.11.2016, full day, Room 327 WiSo-Building 13.01.2017, full day, Room 327 WiSo-Building
Credit Points	6 ECTS
Type of course	„Fachspezifische Kurse“

1. Objectives

Structural equation modeling depicts an extension of the classical factor analysis model to explain relations among latent conceptual variables. Thus, it enables empirical validation of theoretically established causal models in the various social science disciplines. Partial Least Squares Path Modelling (PLS-PM) is one possible procedure for estimating such models. It proxies latent conceptual variables with linear weighted composites that aim at maximizing explained variances among the set of determinate composite scores. As such, it has a special emphasis on prediction orientation. In contrast to covariance based structural equation modeling (CB-SEM) it trades parameter efficiency for prediction accuracy, simplicity and fewer assumptions. Thus, the method is applicable to large and complex models with relatively few observations. It has gained popularity in various fields such as marketing, management, and information systems.

The objective of this course is to provide an in-depth introduction into the development of structural equation models and the operationalization of latent conceptual variables. It will cover the nature of causal modeling, analytical objectives and some statistics, as well as the evaluation of the estimation results with a focus on the PLS-PM method and an introduction to available software packages (e.g., SmartPLS).

Practical applications and a discussion of the applicability of the method for your own research are an integral part of the course.

2. Prerequisites

Students should have a solid foundation in statistics and be familiar with multivariate data analysis. In addition, a basic understanding of factor analytic approaches, regression analysis as well as testing procedures is helpful, but not an essential requirement for understanding the content of the course.

3. Maximum number of participants

The course is open to all doctoral students of the Faculty of Management, Economics and Social Sciences. In addition, it is open to master students in the research track “Schwerpunktmodul Research in Marketing”. The course is limited to a maximum number of 10 participants.





4. Language of instruction

German or English (may be decided at the beginning of the course based on the participants).

5. Registration

Students who want to attend this course need to register. Master students need to register via KLIPS in the first application phase (20.07. – 01.08.2016). Doctoral students apply via e-mail. The deadline for doctoral student registration is 10.10.2016. Please send an email (in German or English) to Dr. Jan-Michael Becker (j.becker[at]wiso.uni-koeln.de) which should inform about:

- your name
- your contact email address
- whether you are a CGS-student or a doctoral student of the Faculty of Management, Economics and Social Sciences
- the supervisor of your doctoral thesis and topic
- your background in statistics/econometrics and empirical research as well as any prior knowledge of PLS or any other SEM method.

6. Working requirements and assessment method

The course is eligible for 6 ECTS. The grade will be based on the following assignments:

- 20 page term paper that either 1) discusses the applicability of the PLS-PM method for an existing project/dataset and executes a data analysis with the PLS-PM method, 2) develops a detailed research idea and design that utilizes the strengths and circumvents the weaknesses of the PLS-PM method or 3) discusses an advanced methodological extension and conducts a small simulation study to validate the method. The term paper must be submitted by January 08, 2017.
- Presentation and discussion of research idea / data analysis / method in the class.
- Class participation

7. Teaching staff & Contact

Dr. Jan-Michael Becker (Department of Marketing and Brand Management)

8. Readings

Students have to read all articles before the third meeting. All papers are essential for a thorough understanding of the presented methods and concepts and are necessary to successfully develop the term paper and its presentation.

Baron, R. B. & Kenny, D. A. (1986): The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.





- Diamantopoulos, A. and Winklhofer, H. (2001). "Index Construction with Formative Indicators: An Alternative to Scale Development," *Journal of Marketing Research*, 38 (2): 269-277.
- Dijkstra, T. K. and Henseler, J. (2015). "Consistent Partial Least Squares Path Modeling." *MIS Quarterly*, 39 (2): 297-316.
- Hair, J. F., Sarstedt, M., Ringle, C. M., and Mena, J. A. (2012). "An Assessment of the Use of Partial Least Squares Structural Equation Modeling in Marketing Research." *Journal of the Academy of Marketing Science*, 40 (3): 414-433.
- Henseler, J. and Chin, W. W. (2010). "A Comparison of Approaches for the Analysis of Interaction Effects Between Latent Variables Using Partial Least Squares Path Modeling." *Structural Equation Modeling: A Multidisciplinary Journal*, 17 (1): 82-109.
- Henseler, J., Ringle, C. M., and Sarstedt, M. 2015. "A New Criterion for Assessing Discriminant Validity in Variance-based Structural Equation Modeling." *Journal of the Academy of Marketing Science*, 43 (1): 115-135.
- Henseler, J., Ringle, C. M., and Sarstedt, M. (2015), "Examining the Measurement Invariance of Composite Models using Variance-based Structural Equation Modeling." *International Marketing Review*: forthcoming.
- Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Ketchen, D. J., Jr., Hair, J. F., Hult, G. T. M., and Calantone, R. J. (2014). "Common Beliefs and Reality about PLS: Comments on Rönkkö and Evermann (2013)." *Organizational Research Methods*, 17 (2): 182-209.
- Jarvis, C. B., MacKenzie, S. B., and Podsakoff, P. M. (2003). "A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research." *Journal of Consumer Research*, 30: 199-218.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879–891.
- Reinartz, W., Haenlein, M., and Henseler, J. (2009). "An Empirical Comparison of the Efficacy of Covariance-Based and Variance-Based SEM." *International Journal of Research in Marketing*, 26 (4): 332-344.
- Ringle C. M., Sarstedt M., and Straub D. W. (2012). "A Critical Look at the Use of PLS-SEM in MIS Quarterly." *MIS Quarterly*, 36 (1): iii-xiv.
- Rönkkö, M., and Evermann, J. (2013). "A critical examination of common beliefs about partial least squares path modeling." *Organizational Research Methods*, 16 (3): 425-448.
- Sarstedt, M., Henseler, J., and Ringle, C. M. (2011). "Multigroup Analysis in Partial Least Squares (PLS) Path Modeling: Alternative Methods and Empirical Results." *Advances in International Marketing*, 22: 195-218.
- Zhao, X., Lynch, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37(2), 197-206.

