

Partial Least Squares Structural Equation Modeling (PLS-SEM)

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Room: tba

1 Instructor

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2 Course objectives

Partial least squares structural equation modeling (PLS-SEM) has recently received considerable attention in a variety of disciplines, including marketing, strategic management, management information systems, and many more.

PLS is a composite-based approach to SEM, which aims at maximizing the explained variance of dependent constructs in the path model. Compared to other SEM techniques, PLS allows researchers to estimate very complex models with many constructs and indicator variables. Furthermore, PLS-SEM allows to estimate reflective and formative constructs and generally offers much flexibility in terms of data requirements.

This half-day workshop introduces participants to the state-of-the-art of PLS-SEM using the SmartPLS 3 software. After a brief introduction to the basic principles of structural equation modeling, participants will learn the foundations of PLS-SEM and how to apply the method by means of the SmartPLS software. The workshop will cover various aspects related to the evaluation of measurement and structural model results. For this purpose, the instructor will make use of several examples and exercises.

3 Learning outcomes

This workshop is designed to familiarize with the potentials of using PLS-SEM in business research. The objectives of this course are to provide a methodological introduction into the PLS-SEM approach (the nature of causal modeling, analytical objectives, some statistics) and the evaluation of measurement and structural model results. More specifically, participants will understand the following topics:

- Fundamentals of PLS-SEM
- Current debates about PLS-SEM
- Assessment and reporting of measurement model results, including the new criterion for discriminant validity testing: The heterotrait-monotrait ratio of correlations (HTMT)
- Assessment and reporting of structural model results
- Outlook on advanced topics such as mediation, moderation, higher-order models, and treatment of (un)observed heterogeneity

This course has been designed for PhD students who are interested in learning how to use the PLS-SEM method in their own research applications. A basic knowledge of multivariate statistics and SEM techniques is helpful, but not required.

4 Teaching and learning methods

- The course is based on the PLS-SEM textbooks:
Hair, J. F., Hult, G. T. M., Ringle, C. M., and Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. 2nd edition. Thousand Oaks, CA: Sage.
Hair, J. F., Sarstedt, M., Ringle, C. M., and Gudergan, S. P. (2018). *Advanced Issues in Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Thousand Oaks, CA: Sage.
- Presentations: The session will cover theory and its application.
- Computer exercises using the latest SmartPLS 3 version: Specifically, theoretical explanations underlying the software procedures and practical exercises where participants will apply their learning to real-world examples provided by the instructors.

5 Registration and practical issues

- Registration: tba
- Bring your laptop computer and a 2 or 3-way power extension lead.
- Download and install the SmartPLS software from <http://www.smartpls.com/> before coming to the workshop. Participants will receive detailed instructions – including a two-months license key – shortly before the course starts.

6 Teaching resources

Comprehensive lecture slides will be provided to all participants

Books:

- Hair, J. F., Hult, G. T. M., Ringle, C. M., and Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. 2nd edition. Thousand Oaks, CA: Sage.
- Hair, J. F., Sarstedt, M., Ringle, C. M., and Gudergan, S. P. (2018). *Advanced Issues in Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Thousand Oaks: Sage.

Journal Articles (selection):

- Hair, J. F., Sarstedt, M., Ringle, C. M., & 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.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., and Thiele, K. O. (2017). Mirror, Mirror on the Wall: A Comparative Evaluation of Composite-based Structural Equation Modeling Methods. *Journal of the Academy of Marketing Science*, 45(5), 616-632.
- Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Ketchen, D. J. J., Hair, J. F., Hult, G. T. M., & Calantone, R. J. (2014). Common Beliefs and Reality about Partial Least Squares: Comments on Rönkkö & Evermann (2013). *Organizational Research Methods*, 17(2), 182-209.
- Rigdon, E. E., Becker, J.-M., & Sarstedt, M. (2019). Factor Indeterminacy as Metrological Uncertainty: Implications for Advancing Psychological Measurement. *Multivariate Behavioral Research*, forthcoming.

- Sharma, P. N., Sarstedt, M., Shmueli, G., & Thiele, K. O. (2019). PLS-based Model Selection: The Role of Alternative Explanations in IS Research. *Journal of the Association for Information Systems*, forthcoming.
- Sharma, P. N., Shmueli, G., Sarstedt, M., Danks, N., & Ray, S. (2018). Prediction-oriented Model Selection in Partial Least Squares Path Modeling. *Decision Sciences*, forthcoming.
- Sarstedt, M., Ringle, C. M., and Gudergan, S. P. (2016). Guidelines for Treating Unobserved Heterogeneity in Tourism Research: A Comment on Marques and Reis (2015), *Annals of Tourism Research*, 57, 279-284.
- Sarstedt, M., Hair, J. F., Ringle, C. M., Thiele, K. O., and Gudergan, S. P. (2016). Estimation Issues with PLS and CBSEM: Where the Bias Lies!, *Journal of Business Research*, 69(10), 3998-4010.

7 Schedule

- Location: tba
- Room: tba

Time	Topic
09:00 – 10:30	Introduction and fundamentals of measurement
10:30 – 10:45	Break
10:45 – 12:15	Fundamentals of PLS-SEM
12:15 – 13:15	Lunch
13:15 – 15:00	Assessment of PLS-SEM results and exercises
15:00 – 15:15	Break
15:15 – 16:00	Assessment of PLS-SEM results and exercises Outlook on advanced topics

8 Instructor's short bio

Marko Sarstedt is a Chaired Professor of Marketing at the Otto-von-Guericke-University Magdeburg (Germany) and Adjunct Professor at the Monash University Malaysia (Malaysia). His main research interests are in the advancement of research methods to further the understanding of consumer behavior. His research has been published in, for example, *Journal of Marketing Research*, *Journal of the Academy of Marketing Science*, *International Journal of Research in Marketing*, *Organizational Research Methods*, *Multivariate Behavioral Research*, *Decision Sciences*, *MIS Quarterly*, *Journal of Business Research*, *Journal of World Business*, *Marketing Letters*, and *Long Range Planning*. Marko has co-edited several special issues of leading journals and co-authored four widely adopted textbooks, including “A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)” (together with Joe F. Hair, G. Tomas M. Hult, and Christian M. Ringle). Marko's works have been awarded with several citation and best paper awards. According to the 2018 F.A.Z. ranking, he is among the three most influential economists in the category research. He has recently been included in the Clarivate Analytics' Highly Cited Researchers list. Additional information: <http://www.marketing.ovgu.de>