



International
Marketing
Trends
Conference

WORKSHOP

Partial Least Squares Structural Equation Modeling (PLS-SEM): Foundations

1 Instructors

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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 enables 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 4 software. After a brief introduction to the basic principles of structural equation modeling (SEM), participants will understand the foundations of PLS-SEM and how to apply the method by means of the SmartPLS 4 software. The workshop will cover various aspects related to the evaluation of measurement and structural model results. For this purpose, the instructors 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 research. The objectives of this course are to provide a *brief* methodological introduction into the PLS-SEM approach (the nature of causal-predictive modeling, analytical objectives, some statistics) and the evaluation of measurement and structural model results. More specifically, participants will comprehend the following topics:

- Fundamentals of PLS-SEM,
- Model set up and estimation,
- Assessment and reporting of measurement model results,
- Assessment and reporting of structural model results, particularly focusing on the prediction-oriented results assessment,
- Outlook on advanced techniques such as necessary condition analysis.

This course has been designed for PhD students and research faculty 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 Schedule

Friday, January 24, 2025

Time	Topic
14:00 – 15:00	Foundations of structural equation modeling & introduction to PLS-SEM
15:00 – 15:45	Model creation and estimation & case study: the corporate reputation model
15:45 – 16:00	Short break
16:00 – 17:00	Measurement model assessment & case study using SmartPLS 4
17:00 – 18:00	Structural model assessment & case study using SmartPLS 4

1 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. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. 3rd edition. Thousand Oaks, CA: Sage.
 - Hair, J. F., Sarstedt, M., Ringle, C. M., and Gudergan, S. P. (2024). *Advanced Issues in Partial Least Squares Structural Equation Modeling (PLS-SEM)*. 2nd edition. Thousand Oaks, CA: Sage.
- Presentations: The session will cover theory and its application.
- Computer exercises using the latest SmartPLS 4 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.

2 Registration and practical issues

- The course is part of the International Marketing Trends Conference (IMTC) program.
- Software: Computer exercises use the latest SmartPLS 4 version. Course participants will receive a 90-days fully functional version of the software [SmartPLS 4](#).

3 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. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. 3rd edition. Thousand Oaks, CA: Sage.
- Hair, J.F., Sarstedt, M., Ringle, C.M., and Gudergan, S.P. (2024). *Advanced Issues in Partial Least Squares Structural Equation Modeling (PLS-SEM)*. 2nd edition. Thousand Oaks: Sage.

Journal Articles (selection):

- Cho, G., Sarstedt, M., & Hwang, H. (2021). [A Comparative Evaluation of Factor- and Component-based Structural Equation Modelling Approaches Under \(In\)correct Construct Representations](#). *British Journal of Mathematical and Statistical Psychology*, 43(1), 115-135.
- Hair, J.F., Sarstedt, M., Ringle, C.M., Sharma, P.N., & Liengaard, B.D. (2024). [Going Beyond the Untold Facts in PLS-SEM and Moving Forward](#). *European Journal of Marketing*, 58(13), 81-106.
- Hair, J.F., Sarstedt, M., Ringle, C.M., Sharma, P.N., & Liengaard, B.D. (2024). [The Shortcomings of Equal Weights Estimation and the Composite Equivalence Index in PLS-SEM](#). *European Journal of Marketing*, 58 (13), 30-55.
- Rigdon, E.E., Becker, J.-M., & Sarstedt, M. (2019). [Parceling Cannot Reduce Factor Indeterminacy in Factor Analysis: A Research Note](#). *Psychometrika*, 84(3), 772-780.
- Rigdon, E.E., Becker, J.-M., & Sarstedt, M. (2019). [Factor Indeterminacy as Metrological Uncertainty: Implications for Advancing Psychological Measurement](#). *Multivariate Behavioral Research*, 54(3), 429-443.
- Rigdon, E.E., Sarstedt, M., & Becker, J.-M. (2020). [Quantify Uncertainty in Behavioral Research](#). *Nature Human Behaviour*, 4, 329-331.
- Ringle, C.M., Sarstedt, M., Sinkovics, N., & Sinkovics, R.R. (2023). A Perspective on Using Partial Least Squares Structural Equation Modelling in Data Articles. *Data in Brief*, 48, 109074. <https://doi.org/https://doi.org/10.1016/j.dib.2023.109074>
- Sarstedt, M., Adler, S.J., Ringle, C.M., Cho, G., Diamantopoulos, A., Hwang, H., & Liengaard, B.D. (2024). [Same Model, Same Data, But Different Outcomes: Evaluating the Impact of Method Choices in Structural Equation Modeling](#). *Journal of Product Innovation Management*, advance online publication.
- Sarstedt, M., Hair, J.F., Cheah, J.-H., Becker, J.-M., & Ringle, C.M. (2019). [How to Specify, Estimate, and Validate Higher-order Constructs in PLS-SEM](#). *Australasian Marketing Journal*, 27(3), 197-211.
- Sarstedt, M., & Moisescu, O.I. (2024). [Quantifying Uncertainty in PLS-SEM-based Mediation Analyses](#). *Journal of Marketing Analytics*, 12, 87-96.
- Sharma, P.M., Liengaard, B.D., Hair, J.F., Sarstedt, M., & Ringle, C.M. (2023). [Predictive Model Assessment and Selection in Composite-based Modeling Using PLS-SEM: Extensions and Guidelines for Using CVPAT](#). *European Journal of Marketing*, 57(6), 1662-1677.
- Sharma, P.N., Sarstedt, M., Shmueli, G., Kim, K.H. & Thiele, K.O. (2019). [PLS-Based Model Selection: The Role of Alternative Explanations in Information Systems Research](#). *Journal of the Association for Information Systems*, 20(4), 346-397.
- Sharma, P.N., Shmueli, G., Sarstedt, M., Danks, N. & Ray, S. (2021). [Prediction-oriented Model Selection in Partial Least Squares Path Modeling](#). *Decision Sciences*, 52(3), 567-607.

5 Instructors' short bio

Christian M. Ringle is a chaired Professor of Management and Decision Sciences at the Hamburg University of Technology (Germany) and James Cook University (Australia). His research, which has been cited more than 250,000 times (Google Scholar), focuses on management and marketing topics, method development, business analytics, machine learning, and the application of business research methods to decision making. His contributions have been published in journals such as *Industrial Marketing Management*, *International Journal of Research in Marketing*, *Information Systems Research*, *Journal of Business Research*, *Journal of Service Research*, *Journal of the Academy of Marketing Science*, *Long Range Planning*, and *MIS Quarterly*. Since 2018, Christian has been included in the Clarivate Analytics' Highly Researchers list. He regularly teaches doctoral seminars on business analytics and multivariate statistics. Christian is a co-founder and co-developer of the statistical software SmartPLS (<https://www.smartpls.com>).

Marko Sarstedt is a chaired professor of marketing at the Ludwig-Maximilians-University Munich (Germany) and an adjunct research professor at Babeş-Bolyai-University Cluj-Napoca (Romania). His main research interest is the advancement of research methods to further the understanding of consumer behavior. His research has been published in *Nature Human Behaviour*, *Journal of Marketing Research*, *Journal of the Academy of Marketing Science*, *Multivariate Behavioral Research*, *Organizational Research Methods*, *MIS Quarterly*, *Psychometrika*, *Structural Equation Modeling: A Multidisciplinary Journal*, and *British Journal of Mathematical and Statistical Psychology*, among others. Marko's research has been cited over 250,000 times according to Google Scholar and he has repeatedly named member of Clarivate Analytics' Highly Cited Researchers List, which includes the "world's most impactful scientific researchers."