



WORKSHOP #1

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

Date: March 16, 2020

www.pls2020.org #pls2020

1 Instructors

Prof. Dr. José L. Roldán

Professor of Management, Universidad de Sevilla (Spain)
Email: jlroldan@us.es | Internet: <https://goo.gl/PPY32K>

Prof. Dr. Gabriel Cepeda

Professor of Management, Universidad de Sevilla (Spain)
Email: gabi@us.es | Internet: <https://goo.gl/pzuig8>

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 one-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 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, including the prediction-oriented results assessment.

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

- Conference participants can register for the workshop as part of the conference registration process. Please visit: <https://www.pls2020.org>
- 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., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Castillo Apraiz, J.; Cepeda Carrión, G.E., and Roldán, J.L. (2019). *Manual de Partial least squares structural equation Modeling (PLS-SEM)*. 2^a edición. Terrasa, España: OmniaScience.
- 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):

- Cepeda Carrión, G. and Cegarra J. G. (2019). Tips to Use Partial Least Squares Structural Equation Modelling (PLS-SEM) in Knowledge Management. *Journal of Knowledge Management*, 23(1), pp. 67-89.
- Cepeda Carrión, G., Nitzl, C. and Roldán, J. L. (2017). Mediation Analyses in Partial Least Squares Structural Equation Modeling: Guidelines and Empirical Examples. In: H. Latan and R. Noonan (Eds.), *Partial Least Squares Path Modeling: Basic Concepts, Methodological Issues and Applications* (pp. 173-195). Cham: Springer.

- 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.
- Nitzl, C., Roldán, J. L., and Cepeda Carrión, G. (2016). Mediation Analysis in Partial Least Squares Path Modeling: Helping Researchers Discuss More Sophisticated Models. *Industrial Management & Data Systems*, 119(9), 1849-1864.
- Rigdon, E. E. (2012). Rethinking Partial Least Squares Path Modeling: In Praise of Simple Methods. *Long Range Planning*, 45(5-6), 341-358.
- Rigdon, E. E., Sarstedt, M., and Ringle, C. M. (2017). On Comparing Results from CB-SEM and PLS-SEM. Five Perspectives and Five Recommendations. *Marketing ZFP*, 39(3), 4-16.
- Ringle, C. M. and Sarstedt M. (2016). Gain More Insight from Your PLS-SEM Results: The Importance-Performance Map Analysis. *Industrial Management & Data Systems*, 116(9), 1865-1886.
- Roldán, J. L. and Sánchez-Franco, M. J. (2012). Variance-Based Structural Equation Modeling: Guidelines for Using Partial Least Squares in Information Systems Research. In: M. Mora, O. Gelman, A. L. Steenkamp and M. Raisinghani (Eds.), *Research Methodologies, Innovations and Philosophies in Software Systems Engineering and Information Systems* (pp. 193-221). Hershey, PA: IGI Global.
- 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: Conference Center, Beihang University, Beijing China

Time	Topic
09:00 – 10:30	Introduction to PLS-SEM and the SmartPLS software
10:30 – 11:00	Break
11:00 – 12:30	Assessing measurement model results (part I)
12:30 – 13:30	Lunch
13:30 – 15:00	Assessing measurement model results (part II)
15:00 – 15:30	Break
15:30 – 17:00	Assessing structural model results; outlook on advanced topics

8 Instructor's short bio

José L. Roldán, PhD, is Professor of Management in the Department of Business Administration and Marketing, Universidad de Sevilla, Spain. His current research interests include technology acceptance models, knowledge management, organizational culture, organizational agility and partial least squares (PLS). His recent contributions have been published in *Decision Sciences*, *Internet Research*, *Journal of Travel Research*, *European Journal of Operational Research*, *International Journal of Project Management*, *British Journal of Management*, *Journal of Business Research*, *International Business Review*, *European Journal of Information Systems*, *Computers in Human Behavior*, *Industrial Marketing Management*, among others. He is currently on the editorial board of *The Data Base for Advances in Information Systems*. He has also served as Guest Editor of the *European Journal of Information Systems*, *Journal of Business Research* and *European Management Journal*. Dr. Roldan has been conference co-chair of the *2nd International Symposium on Partial Least Squares Path Modeling - The Conference for PLS Users* (June 16-19, Seville, Spain) and the *9th International Conference on PLS and Related Methods (PLS'17)* (June 17-19, 2017, Macau, China). Along with Dr. Cepeda, he has provided more than 60 PLS seminars in Spain, Portugal and Latin-American countries since 2005.

Gabriel Cepeda is Professor of Management and the head of the Institute of Economy and Business at the Universidad de Sevilla, Spain. He holds a PhD from the PhD program for Management and Marketing Department at the same university. He is also the director of the Development and Innovation of People and Firm's Chair at the Universidad de Sevilla. His research has been published in well-known journals such as *Management Decision*, *The Service Industries Journal*, *Journal of Business Research*, *British Journal of Management*, *Journal of Knowledge Management*, *Internet Research*, and *European Management Journal*. Dr. Cepeda co-authored a Spanish version of the textbook on PLS-SEM and is translator of SmartPLS, a software tool with a graphical user interface for the application of the PLS-SEM method. Gabriel has co-edited several special issues of leading journals. He is co-founder of Facebook group: "PLS en español" (PLS in Spanish). Dr. Cepeda has been conference co-chair of the *2nd International Symposium on Partial Least Squares Path Modeling - The Conference for PLS Users* (June 16-19, Seville, Spain) and the *9th International Conference on PLS and Related Methods (PLS'17)* (June 17-19, 2017, Macau, China).