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**A Primer on Partial Least Squares Structural  
Equation Modeling (PLS-SEM). Sage Publications.**

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In view of its essential role in knowledge creation, multivariate data analysis prevails in the social sciences literature. The field of tourism is not an exception, specifically in the widely adoption of structural equation modeling (SEM), a multivariate technique, by tourism researchers over the past decade. While there are two major types of SEM including covariance-based SEM (CB-SEM) and variance-based SEM (PLS-SEM), the former dominated previous tourism research. However, increasing use of PLS-SEM in tourism research has been witnessed in recent years. This upward trend is likely to persist in the near future given the growing popularity of PLS-SEM in other social sciences domains like marketing, strategic management, and management information system, as specified in the preface of the book. Indeed, PLS-SEM, in relative to CB-SEM, provides more flexibility in handling of data. For instance, PLS-SEM is well-suited for accommodating small sample sizes and

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complex model, for testing a model containing both formative and reflective constructs, and for handling single-item measures. To this end, the timely introduction of the book "A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)" helps tourism researchers stand at the front edge of the SEM technique and make effective use of the PLS-SEM in data analysis. Additionally, the book illustrates the application of PLS-SEM with a free downloadable software namely SmartPLS which is essential to extend the application of PLS-SEM in tourism research.

Authored by Hair, Hult, Ringo, and Sarstedt, the book consists of eight chapters. To equip the readers with the basic knowledge of PLS-SEM, Chapter 1 delineates the meaning of SEM and its relationship with multivariate data analysis, followed by a description of the major elements in multivariate data analysis. Then the basic elements of PLS-SEM are explained. Finally, PLS-SEM is distinguished

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from its counterpart namely CB-SEM while the major characteristics of PLS-SEM and the conditions where the PLS-SEM are more adequate than CB-SEM and vice versa are discussed. To step in the application of PLS-SEM, Chapter 2 firstly explicates the concepts in structural model specification including mediation, moderation, and higher-order models. Then specification of measurement model is explained with a special focus on the differences between reflective and formative measures. After that, the issues that need to be addressed after data collection are discussed. The chapter ends by creating the model in the SmartPLS is illustrated. With an established model, Chapter 3 focuses on model estimation. The chapter explains the algorithm underpinning the estimation and the statistical properties of the PLS-SEM method, as well as the options and parameter settings for running the algorithm. Following that, the issues about interpretation of results are explained. The final section illustrates the execution of model estimation in the SmartPLS.

Based on the model estimation, empirical measures of the measurement and structural models are derived, where evaluation of the models takes place. Chapter 4 exhibits the major steps in model evaluation in the beginning. Thereafter, the chapter explains the evaluation of reflective measurement models according to three major criteria including internal consistency reliability, convergent validity, and discriminant validity, followed by an illustration with the SmartPLS. Chapter 5 explains the assessment of formative measurement models with respect to the criteria of convergent validity, collinearity, and significance and relevance of the formative indicators. The chapter also elucidates the basic concepts of bootstrapping which is used to examine the statistical significance of estimates in PLS-SEM. An illustration of the assessment of formative measurement model in the SmartPLS follows. Chapter 6 continues the topic on model evaluation by focusing on the assessment of structural model. First, the five major assessment criteria including collinearity, significance of the structural

model relationships, coefficient of determination, effect size, and predictive relevance are detailed. Then, the importance of heterogeneity in structural model evaluation is highlighted and discussed. By the end of the chapter, an illustration of how to report the structural model results in the SmartPLS is provided.

Chapter 7 focuses on three advanced topics of PLS-SEM. First, PLS-SEM importance-performance matrix analysis (IPMA) is introduced, followed by a demonstration on how to execute the analysis. Second, mediator analysis is explained, followed by an illustration of how it is performed in PLS-SEM. Third, four types of hierarchical component models (HCM) including reflective-reflective, reflective-formative, formative-reflective, and formative-formative are elaborated. Finally, an application of the reflective-reflective HCM in PLS-SEM is illustrated.

Chapter 8 continues the introduction of advanced topics of PLS-SEM. Initially the chapter highlights the importance of modeling heterogeneity in PLS-SEM, setting the ground to explain moderator effects thereafter. The chapter introduces and illustrates a parametric approach to examine categorical moderator effects via PLS-SEM multigroup analysis (PLS-MGA), followed by an illustration on performing the analysis. The chapter also emphasizes the importance of handling unobserved heterogeneity and provides corresponding suggestions. Finally, the chapter explains the examination of continuous moderating effects in PLS-SEM with special focuses on three-way interactions and creation of interaction variables. An illustration of the examination of continuous moderating effects in the SmartPLS follows.

The organization of book chapters is well designed. Given the basic knowledge of SEM in Chapter 1, chapters 2 through 6 lead the reader through all stages of performing PLS-SEM analyses while illustrations are provided subsequent to the explanations and discussions of concepts. The advanced topics were covered in the last two chapters of the book. The language used in the book is

simple and straightforward, facilitating the reader to comprehend the contents. Mathematical equations and formulas, which usually demand painstaking efforts from non-statisticians, are limitedly used in the book. Rule-of-thumbs, which are always the information that social sciences researchers look for in a statistics text, are clearly exhibited in the book. However, a few typos are found. In general, the content presentation of the book facilitates readers' learning process, leading toward the achievement of the authors' goal of communicating the PLS-SEM method to broad audience.

Illustration is a major component that determines the value of an application-oriented statistics text. The authors refer all illustrations to a single case, so that readers do not need to expend great efforts on comprehending and thinking about a variety of cases and, thus making the learning process more efficient. Another credit for the authors is on their selection of a free downloadable software namely SmartPLS to illustrate the analyses. Their choice is likely to reinforce the popularity of PLS-SEM.

Although there is a plethora of articles and edited book regarding PLS-SEM, they were not dedicated to novices of PLS-SEM. Many issues in the application of PLS-SEM are still debatable which may confuse researchers

when applying the technique. These gaps, however, leave rooms for the book. The authors made a systematic and comprehensive review of the recent literature and thorough discussions on those controversial issues in order to provide general guidelines for the readers. In this regard, contribution of the book to the advancement of knowledge is notable, especially in the field of tourism where the application of PLS-SEM is still at the infant stage.

Although the book has a lot of merits, there are still rooms for improvement. While the authors have introduced four types of HCM in Chapter 7, they only illustrate one type in the chapter. In their future edition, if any, the authors may cover all types of HCM in the part of illustration. Additionally, Chapter 8 stated that there are several approaches of PLS-MGA. However, the authors merely incorporate one of the approaches without providing justifications on excluding the others. In the future, the authors may explain and illustrate all the approaches and discuss the pros and cons of these approaches.

In summary, the book is of good quality as its content is easy-to-read, comprehensive, and up-to-date. Tourism researchers are highly recommended to read this book if they want to catch up with the latest trend of application of SEM techniques.