마케팅 어날리틱스 스터디

Session7 | Chapter10: CFA and SEM

Chad (Chungil Chae)

温州肯恩大学
WENZHOU-KEAN UNIVERSITY

2022/01/01 (updated: 2022-02-19)

Ice breaking Question

어느날 여느때처럼 일에 찌들은 당신에게 시간여행자가 나타나 단 한번 앞으로든 뒤로든 당신의 일생에 한 시점에 돌아가 당신 자신에게 한마디 해줄 수 있다면, 언제 그리고 어떤 말을 자신에게 해주고 싶은가요?

Introduction

종류:

- Covariance-based (CB-SEM)
- Partial least squares (PLE-SEM)

Structural models are helpful when:

- you need to evaluate interconnections of multiple data points
- you wish to include unobserved latent variables
- you wish to estimate the overall fit between
  - observed data and
  - a proposed model with latent variables or
  - complex connections.

In marketing perspective

- to determine whether concepts on a survey match assumptions
  - to assess whether items are in fact related to an underlying construct as one hopes
- to estimate the association between outcomes such as purchase behavior and underlying attitudes that influence those, such as satisfaction and brand perception.
- An even more complex model
  - in multiple ways to observed consumer behaviors such as purchases.

Motivation

Often interested to test complex models.

- Consider a consumer's likelihood to purchase a new product
    - prior product experience,
    - perception of brand and features,
    - price sensitivity,
    - promotional effects, and so forth.
- A common way to test complex models of this kind in marketing is structural equation modeling (SEM).:
    - to include multiple influences,
    - to posit unobserved concepts that underlie the observed indicators
    - to specify how those concepts influence one another,
    - to assess the model's overall congruence to the data, and
    - to determine whether the model fits the data better than alternative models.

Terms

- manifest variable: observed, (i.e., that have data points, and
- latent variables: conceived to underlie the observed data (product involvement)
- structural model: The set of relationships among the latent variables
- measurement model: the linkage between those elements and the observed, manifest variables

---

Simiarity and Difference

- SEM assesses the relationships among many variables, with models that may be more complex than simply predictors and outcomes.
- Second, whereas linear regression only models existing, observed variables, SEM allows modeling of latent variables that represent underlying constructs that are conceived as manifested imperfectly
- Third, SEM allows relationships to have multiple “downstream” effects.

- =~ is manifested by
- ~~ a correlation between variables

Warning: Interpretation in casality

- it is tempting to interpret structural models as being about causation
- it is possible to use these models as part of causal reasoning
- In general, however, you consciously avoid all discussion of causation, and instead talk about relationships or association among the latent variables.

Example

- Scale Assessment: CFA
  - Survey scale reflects a theoretical model in which product involvement is a hierarchical construct comprising factors
  - We might develop communication
  - positioning strategies
  - maybe used to inform targeting
- General SEM
  - A more general form of structural models, where latent constructs may influence one another in more complex ways

PLE SEM

When to use?

- Small sample
- When CB-SEM fails

References

Chapman, C. and E. M. Feit (2019). R for marketing research and analytics. 2nd edition: © Springer Nature Switzerland AG 2019. Vol. 67. Springer.

Schwarz, J. S., C. Chapman, and E. M. Feit (2020). Python for marketing research and analytics. Springer.