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THE PERFORMANCE OF RELIABILITY AND VALIDITY USING 5 AND 7 LIKERT POINT SCALES

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Abstract

Determination of number Likert point scale is one of the issues that should be compromised by the researchers to construct the questionnaire in social study. The objective of the present study is to review literatures regarding the influence of different Likert point scale on reliability of measurement reflective model. The study also gives a review on validity of the measurement reflective model when using different Likert point scale. The result indicates that 7 Likert point scale shows the highest reliability and validity are better compared to 5 Likert point scale.

Keywords: Partial Least Square (PLS-SEM), Covariance-Based (CB-SEM), Reliability, Validity

Introduction

Structural equation modeling (SEM) is multivariate statistical analysis technique that used to evaluate structural relationships between directly and indirectly observed variable (latent construct) for instance identifying the cause and effect relationship. It is a combination of confirmatory factor analysis, path analysis or regression analysis, partial least square modeling by Hair, Hult, Ringle and Sarstedt (2017) plus latent growth modeling.

Recently Partial Least Square (PLS-SEM) become another approach been use by many fields of researcher organization compared to covariance-based modeling (CB-SEM) such as in behavior science (Bass et al., 2003). More in business research likes marketing (Henseler et al., 2009), strategy (Hulland, 1999), organization (Sosik et al., 2009) and management information system (Chin et al., 2003) due to their specific advantages and disadvantages.

Many researchers confirm that PLS-SEM is more flexible method compare to CB-SEM due to less restrictive in assumption about data distribution (Vinzi et al., 2010) and small sample size. Additional the applications have less theory, predictive accuracy is paramount and correct model specification cannot be ensured (Bacon, 1999), (Hwang et al., 2010) and (Wong, 2010). Hair et al. (2013) identify suitable techniques for choosing an appropriate sample size consider to the value of significant level, the value coefficient of determination supposed to be small but large number of path pointed to latent variable. Hoyle (1995) suggests that the suitable sample size is between 100 and 200.

PLS-SEM is used to analyse the variance using difference software such as PLS-Graph, VisualPLS and WardPLS. The objective of PSL-SEM is vice versa with CB-SEM of focusing on explaining the variance of dependent latent constructs (Hair et al., 2001). According to previous study made by Hair et al. (2001), stated that if the objective of the research is about theory testing and confirmation then CB-SEM is suitable method the can be used. In contrast, PSL-SEM will become appropriate method when the objective of the research is about prediction and theory development. These statements are relevant to their own objective.

Furthermore, in structural equation modeling has two components called inner model and outer model. Inner model in PLS-SEM is referred relationship (path) between latent constructs thus only one direction allow between latent constructs. Therefore, latent constructs which there is not structured path pointed at them are called exogenous. While, endogenous referred to latent target construct are explained by other constructs in structural model based on structural model relationship.

The second component is outer model about measurement model also known as confirmatory factor analysis. Measurement model explained about the relationship between each latent construct and their indicator variable. There are two measurement models which are formative and reflective as presented at Figure 1. A single arrow pointed from latent construct outward to the indicator variable assign as reflective indicator. While outer loading is represent the associated coefficient for these relationships. To compare with formative indicator its shows a single arrow pointed toward latent

construct inward from the indicator variable and the associated coefficient for these relationships are labeled as outer weight. Figure 1 is the example of measurement model of reflective indicator and formative indicator that is adapted from Edwards and Bagozzi (2000).
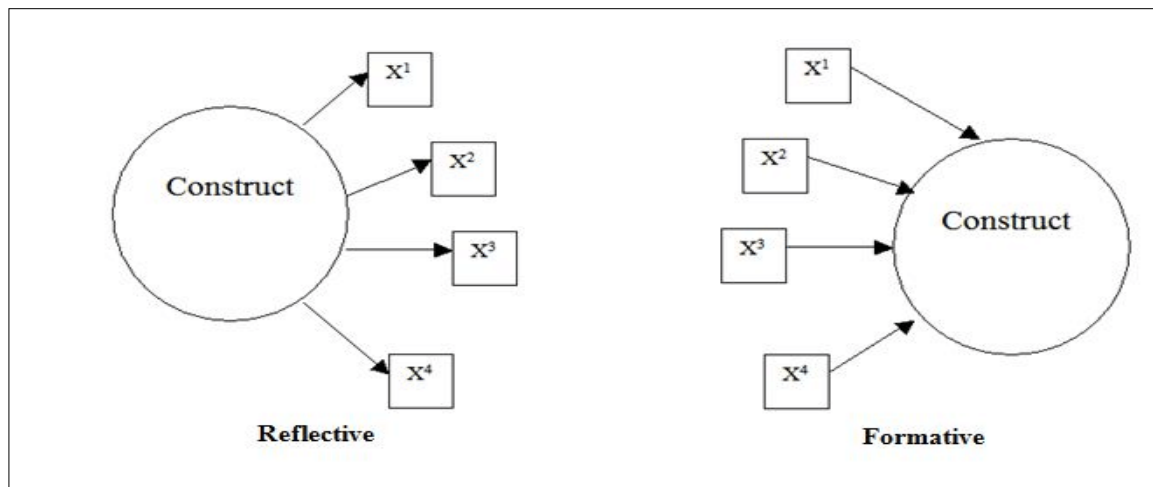

Figure 1: Measurement Model of Reflective Indicator and Formative Indicator

According to Borsboom et al. (2004) and Rossiter (2002) said that the reflective model is the standard consideration of measurement in psychology like an example for this model is "I would like to eat", "I would like nasi ayam" and "I can cook". Hence, in reflective model should have high intercorrelations measure in factor loading, Cronbach's alpha, average variance extracted (AVE), internal consistency and composite reliability Trochim (2007). Besides, measurement error for reflective model can be determines and omit by using factor analysis for each indicator compare to formative model.

Literature Review

Previous Studies on Likert Scale

According to previous study of The Likert scale analysis using parametric based Structural Equation Modelling (SEM) done by Awang, Afthanorhan and Mamat (2016) showed that their aim is to determine between 5 Likert point scale and 10 Likert point scale which one is most acceptable by using same sample size. The conclusion that can be made from the study is 10 Likert point scale is effective under parametric based SEM. Additional, to determine the construct validity are more applicable for measurement and structural model with 10 Likert point scale compare to 5 Likert point scale. Moreover, by applying partial least square modelling Sarstedt, Ringle, Smith, Reams and Hair (2014) had been evaluated the research to illustrate the effect of family power, family culture, family experience, strategic information sharing, relationship value and innovation towards family influence measured using 11 Likert point scale.

Hallak et al. (2018) stated the analysis used in the study was Partial Least Square-Structural Equation Modelling (PLS-SEM). The sample taken into the study was 187 restaurants and the data was collected by using telephone interviews and this study was using 7 Likert point scale. The values of Cronbach's alpha, composite reliability and discriminant validity (Average variance extracted) for every instruments are 0.604, 0.713 and 0.48 respectively for resilience. For creative self-efficacy, innovation and performance, the values for Cronbach's alpha are 0.708, 0.752 and 0.888 respectively. The values of composite reliability are 0.839, 0.837 and 0.915 for creative self-efficacy, innovation and innovation respectively. The discriminant value is 0.63 for creative self-efficacy, 0.52 for innovation and lastly 0.64 for innovation.

Zin et al. (2018) were studied about the importance of the performance of matrix analysis (IPMA) of intellectual capital and Islamic work ethic in Malaysian SMES. Zin et al. (2018) mentioned the