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POOLED CONFIRMATORY FACTOR ANALYSIS (PCFA) USING STRUCTURAL EQUATION MODELING ON VOLUNTEERISM PROGRAM: A STEP BY STEP APPROACH

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ABSTRACT

Confirmatory Factor Analysis (CFA) has been enjoyed for most of researchers nowadays to evaluate the fitness of measurement model using structural equation modeling. In this work paper, five variables namely Motivation, Benefits, Barrier, Challenge, and Government Support will be implement in this research of volunteerism program to carry out the Confirmatory Factor Analysis (CFA). On the use of CFA will ascertain the scholar endeavours to enhance the capability of latent measurement model to be more effective and precise for drawing the conclusion besides to avoid the violate of regression assumption. Of the introduction to Cronbach Alpha, Composite Reliability, Convergent and Discriminant Validity in particular analysis are much efficient as a proof for the scholars to apply the outcome analysis for the subsequent steps. In doing so, the findings appear are more coincides of the purpose of case study. Deductively, CFA is a basis tools to provide a best fit of measurement model whereby deteriorates the error of measurement model from to be harm. The limitation of particular analysis using individual measurement is incapable to execute the CFA once consist below than four manifest variables. The introduction to pool CFA is indeed as a solution of scholars to achieve the required level of assess measurement model.

Keywords: Confirmatory factor analysis, Voluteerism program, Cronbach alpha, Composite reliability, Convergent and discriminant validity, Pool CFA, Structural equation modeling.

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Contribution/ Originality

This work paper is fitting to present the readers at the beginning level to practice the Pooled Confirmatory Factor Analysis (PCFA) in their empirical research. In particular, the readers is served on the strength and importance of this method applied rather than formal CFA. Moreover, the interpretation for each output and step by step approach is explained on the use of modest language without the principle of mathematical theory in order to let the scholars comprehend the method applied.

1. INTRODUCTION

On the use of Confirmatory Factor Analysis (CFA) using structural equation modelling has been enjoyed for most of researchers and scholars to help their research achieved the purpose of empirical study. This application is a tool to evaluate the fitness of latent measurement model. In such things, this application will help the scholars to prevent from obtaining wrong estimation once we want to predict the strength, significant, importance and the purpose of these variables included in a model besides avoiding the violate the assumption of regression assumption in statistical analysis. So, no doubt this application has been infamous tools to provide a better understanding to the objective prior in the research paper. Moreover, CFA does not stipulate to statistical areas but also implement in many areas of science such as social science, psychology, marketing, economics, econometrics, business, and something else that closely related to the analytical skills.

In the nature of social science, this paper applies volunteerism program as a research subject to be tested for CFA analysis so that the author manage to identify the fitness of measurement model with the ease of fitness measurement model proposed. In particular, this paper has five variables namely Motivation, Government Support, Barrier, Benefits and Challenges that will be undergoing in such application to enhance the fitness and capabilities of measurement model. The compensation of latent measurement model in structural equation modeling is the researchers manage to calculate the estimation of many manifest variables (indicators) applied rather than depend on the integrating mean to solve the problem. In statistical assumption, the mean of error should be zero which is totally rejected the computing of mean to help their research.

On the use of CFA analysis, these aforementioned variables should be begin through the unidimensionality procedures to delete items below than 0.60. According to Wan Mohamad (2013), any items are below than 0.60 should be deleted first whereby this values is indicate have less contribute on the research subject. The values appear on the next of arrow near the enclosed of rectangular shape are reflected of latent measurement model. Once specification is complete, fitness indexes should be considered. On the use of assessments of fitness indexes such as Root Mean Square Error Approximation (RMSEA), Baseline Comparison, and Incremental fit is deemed as the measurement fitness to measure the level of fitness model. All of these variables included are taken based on the previous research to determine the causal effect of exogenous and endogenous constructs. However, the purpose of this paper work is to evaluate the fitness of measurement model using structural equaion modeling. According to Dingle (1995); (Dingle, 2009), these five variables are essential to be used for volunteerism program as a research subject since they are the primary factors.

2. CONFIRMATORY FACTOR ANALYSIS

Confirmatory Factor Analysis (CFA) is a special form of factor analysis. It is employed to test whether the measures of a constructs are consistent with the researcher's understanding of the nature of the construct. The CFA procedure replaced the older methods to determine construct reliability and validity. There are two methods of running the CFA for the measurement model namely the CFA for individual model and the CFA for pooled measurement model (Zainudin, 2012).

First of all, the researcher performs CFA for each construct to asses the unidimensionality, validity and reliability of its measurement model. Next, the author needs to perform CFA for four latent exogenous (independent) constructs (Government Support, Benefits, Barrier, and Challenge) simultaneously to examine whether these four constructs are correlated. If so, then the multicollinearity problem is said to be exist. The discriminant validity failed if the correlation between exogenous constructs is higher than 0.85 (bivariate correlation). High correlation indicates the four constructs are redundant. In order to solve the constructs redundancy, the author needs to combine the four constructs to become one construct and re-do the CFA. Another solution is to drop one of these four redundant constructs before modeling the structural model. In this case, this chapter has provided for five constructs for CFA procedure, assessing the individual measurement model. The first part is to specify the latent measurement model for each construct that represent for each exogenous and endogenous variables to conduct the assessment of unidimensionality procedure. Unidimensionality is a first step prior in structural equation modeling to drop indicators whereby below than 0.60. Usually, the threshold value of 0.60 is being used in the nature of social science to identify the significant of indicators that represent for each item consisted in questionnaire developed. Indeed, some of the researchers intend to use 0.50, 0.70 or others for their empirical research since it depends on their purpose research. In other words, on the use of 0.60 is not a compulsory but as a guide for researchers and scholars to carry out their research. In this instance, the removing of indicators should be made once at a time to prevent of missing the optimum result in the research even the findings reveal more than one indicators which having below than 0.60. Most of the researchers will drop any indicators below than 0.60 at a same time but this procedure is totally wrong that will be violate the assumption of analysis. For sure, this work paper uses a step by step approach to gain the best findings regarding the employing of confirmatory factor analysis.

There are several steps that should be emphasized once execute the CFA analysis on the reflective measurement model using structural equation modeling.

1. Obtain the factor loading for all items in a measurement model
2. Delete items with factor loadings less than 0.60 (Choose the lowest factor loading to delete first)
3. Delete one item at a time
4. Re-specify and run a new model after item is deleted (repeat step 2 and 3)
5. Obtain the fitness Indexes- to assess how well the data at hands fits the model

6. If the fitness index is not satisfied, look at Modification Index (MI) (use this step once we have achieved the unidimensionality procedure (Upper than 0.6) but the requirement meet is fixed failed)
7. High value of MI (above 15 or 10) indicate the correlated error between items (The correlated errors indicate a pair of items is redundant of each other)

Unfortunately, this method has one limitation that often a matter for most of the researchers nowadays. Individual measurement model cannot be proceed once the latent measurement model has less than four indicators due to the identification issues. In the case where below than four items in a model, the degrees of freedom df=0 and the probability cannot be computed since the model in "just- identified" and all the values obtaines are not meaningful. Thus, in the case where measurement models have a few items each, Pooled Confirmatory Factor Analysis (PCFA) is suggested (Zainudin, 2012).

3. FITNESS OF MEASUREMENT MODEL

Previously, the author had explained the purpose of implement fitness in measurement model. In structural equation modeling, there are a series of goodness of fit indexes that reflects the fitness of the model to the data at hands. At the moment, there is no agreement among the researchers and scholars which fitness indexes should be reported since they have an abundance of fitness in structural equation modeling. Wan Mohamad (2013) and Holmes-Smith (2006) recommend the use of at least three fit indexes by inclucing at least one index from each category of model fit. The three fitness categories are absolute fit, incremental fits, and parsimonious fit.

The researchers could choose at least one fitness indexes from each category to report depending on which literature referred. Absolute fit is to be said have had three types indexes namely Discrepancy Chi-Square (Chisq), Root Mean Square Error Approximation (RMSEA), and Goodness of Fit Index (GFI). In the accordance of Wheaton *et al.* (1977), dicrepancy chi-square are very sensitive to the sample size and the level of acceptance once higher than 0.05. Browne and Cudeck (1993) recommend the use of RMSEA should be accept in the range of 0.05 to 1.00, in particular, the lower value is said to be a good level. Jareskog and Stirborn (1984) suggest the value should be higher than 0.90 to be a good fit at the data hands.Incremental fits have four types indexes namely Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Tucker Lewis Index (TLI), and Normed Fit Index (NFI). Tanaka and Huba (1985), Bentler (1990), Bentler and Bonnet (1980), and Bollen (1989) stating all the indexes should be above 0.90 to be a good fit. The poor fit whereby below than 0.90 should be addressed issue to enhance the fitness of measurement model before proceed the structural model. Marsh and Hocevar (1985) present the only one of parsimonous fit is represented by Chisquare over degree of freedom whereby should be below than 5.0 to be acceptance in fitness of measurement model.

4. POOLED CONFIRMATORY FACTOR ANALYSIS

Recently, the more efficient and highly suggested method for assessing the measurement model was proposed. This method combines all latent constructs in one measurement model and perform the CFA at once. The item deletion process and model re-specification are made as usual.

This method is more preffered since it could address the issue of identification problem. Once the CFA procedure for every measurement model is completed, the researchers need to compute other remaining measures which indicate the validity and reliability of the measurement model and summarize them in a table. As has been discussed earlier, the requirement for unidimensionality, validity, and reliability needs to be addressed prior to modeling the structural model.

5. UNIDIMENSIONALITY

Unidimensionality is achieved when the measuring items have acceptable factor lodings for the respective latent construct. In order to ensure unidimensionality of easurement model, any item with a low factor loading should be dropped. The deletion should be made one item at a time with the lowest factor loadings to be deleted first. After an item is deleted, the researchers need to re-specify and run the new measurement model. The process continues until the unidimensionality requirement is achieved (Zainudin, 2012)

6. VALIDITY

Validity is the ability of instruments to measure what it supposed to be measured for a construct. Two types of validity are required for each measurement model are:

Convergent validity. This validity is achieved when all items in a measuremnet model are statistically significant. The convergent validity could also be verified through Average Variance Extracted (AVE). The value of AVE should be greater than 0.50 in order to achieve convergent validity. Discriminant validity. This validity is achieved when the measurement model is free from redundant items. AMOS will identify the pair of redundant items in the model and reported in the Modification Index (MI). In the normal practices, the researchers would delete one of the items and re-specify the model. However, the certain cases the researchers could set the correlated pair as "free parameter estimates". Another requirement for discriminant validity is the correlation between each pair of latent exogenous constructs should be less tahn 0.85.

7. RELIABILITY

Reliability is the extent of how reliable is the said measurement model in measuring the intended latent construct. The assessment of the reliability of a measurement model could be made using the following criteria.

a. Internal reliability. This achieved when the Cronbach Alpha value is greater than 0.70 or higher (Nunnally, 1978)
b. Construct Reliability. The measure of reliability and internal consistency of the measured variables representing the latent construct. A value of CR > 0.60 is required in order to achieve construct reliability (Nunnally and Bernstein, 1994)
c. Average variance extracted. The average percentage of variation explained by the items in a construct. An AVE > 0.50 is required (Fornell and Larcker, 1981).

$AVE = \sum K2 / n$

$CR = (\sum K)2 / [\sum K)2 + (\sum 1\text{-}K2)]$

K= Factor laoding for every item

N= Number of items in a model

8. VOLUNTEERISM PROGRAM

As aforementioned, volunteerism program has five variables namely Motivation, Government Support, Benefits, Barrier and Challenges that will be conducted for CFA analysis. These five variables consists of 53 items that has been developed for the specific population using questionnaire. Means that, the respondents should answer all of the questionnaire regarding their performance and importance of this program. This questionnaire is using continuous scale since the likert scale from 1(Strongly Disagree) to 5 (Strongly Agree) is performed. On the use of CFA analysis will ascertain the researchers to determine whether the questionnaire developed is performed well or not for the respondents. If not, some of the questions will be removed and the remaining question will be proceeded for the subsequent analysis. In other words, the removal questions may not appropriate for the case study.

9. FINDINGS

Table 1 presents the two types of latent measurement model which is the original model and new model. Original model is a first model once execute the analysis using the full maximum likelihood estimators. New model is a last model once the authors drop insgnificant values besides achieved the required level of assess fitness measurement model. As we can see, all of the latent measurement models would be specified to a new model in which has a significant fewer manifest variables (indicators) compare to original. This is because the unidimensionality procedure has been applied to remove the indicators that have a low factor laodings. Besides, the assessment of fitness should be considered as the requirement of measurement model to gain the best fit.

By inspecting through of these measurement models, one of measurement model namely Barrier is perceived odd since the fitness indexes are not performed well. This is because the latent measurement model has less than four indicators. Thus, the probability cannot be computed and of course the indexes will become zero. In that case, most of the researchers frightened to apply this method since this limitation makes the difficulties of them to carry out their research. Hence, the PCFA is suggested to settle this matter. PCFA is allowing all the measurement model to be tested in a same situation. Thus, the fewer of indicators in CFA analysis can be handled. Moreover, this method also permits the discriminant validity and convergent validity to be performed. This is because the correlation between each construct is managed and at the same time can prevent the researchers to spend their analysis on CFA. In PCFA, unidimensionality must be considered to remove the meaningless indicators and of course the required level for measurement should be addressed too.Once complete the unidimensionality procedure, the reliability and validity should be outlined to determine their reliable and validity in the empirical study. These requirement are important to guide the researchers identify their strength of measurement analysis before proceed the subsequent analysis.

Table-1.

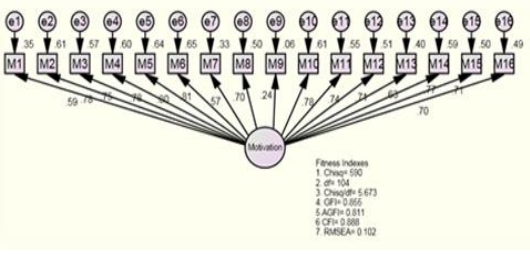
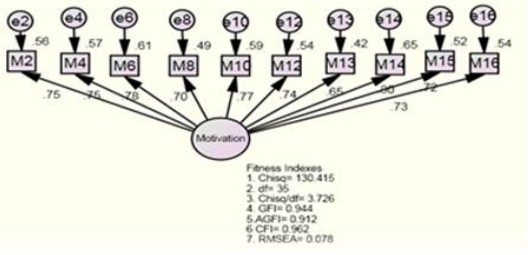
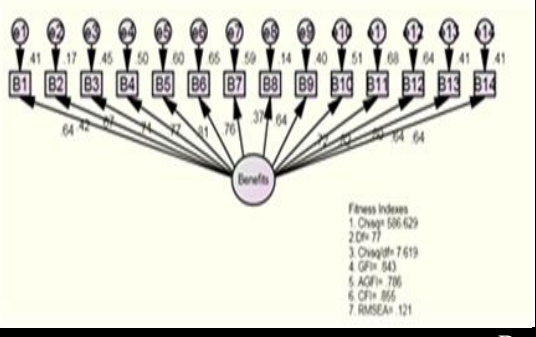
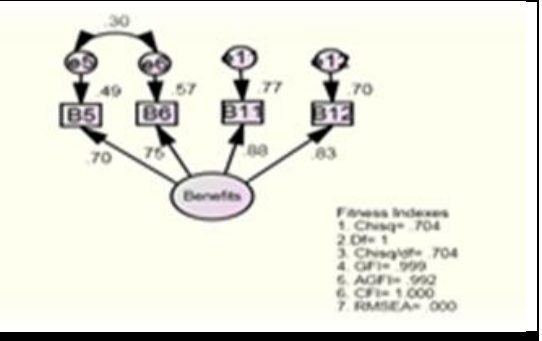
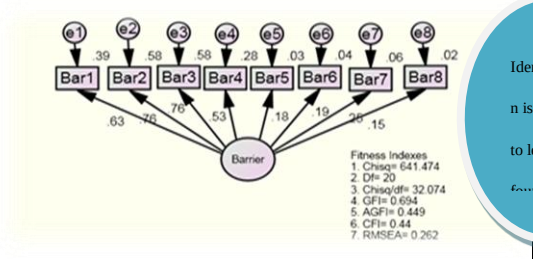
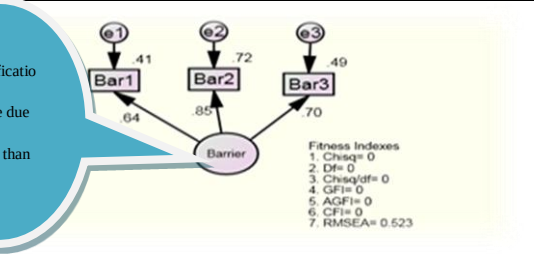
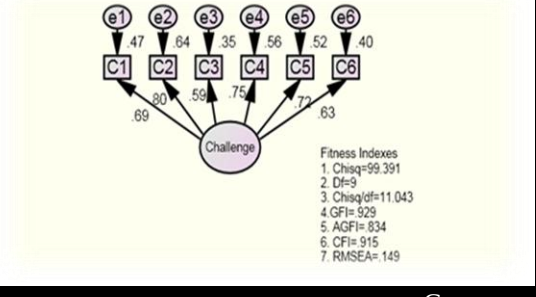
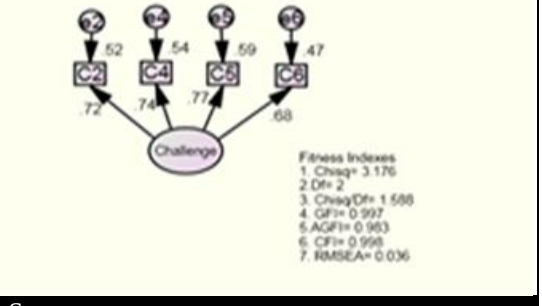
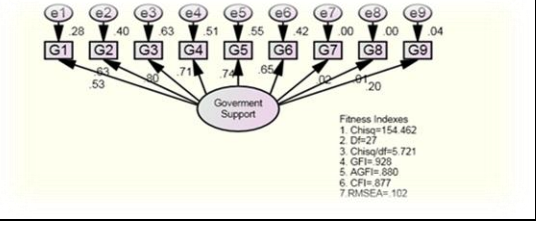
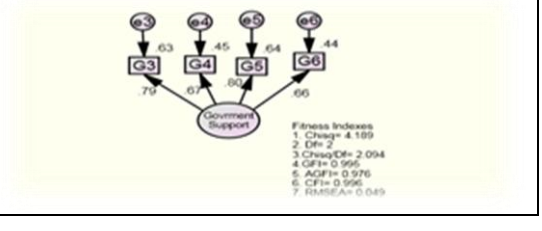
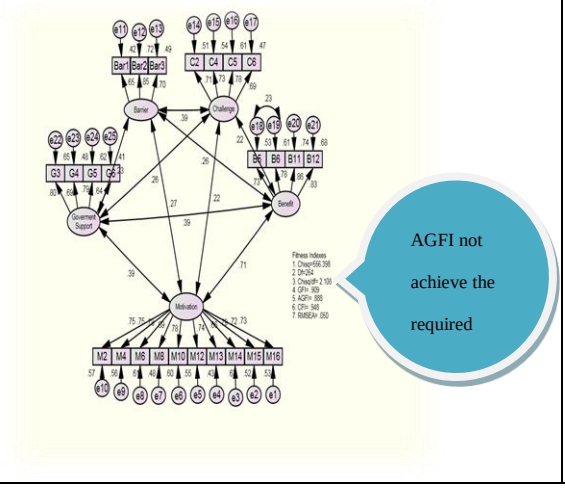
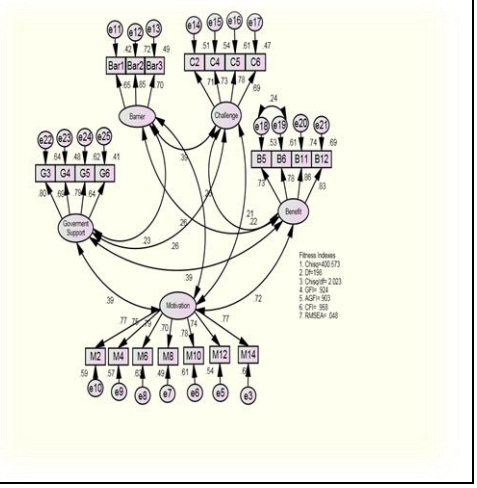
Original Model	New Model
Motivation	
	
Benefit	
	
Barrier	
	
Challenge	
	
Government Support	
	

Table-2.

Original Model	New Model
	

This method combines all measurement models together and CFA procedure is performed on all construct at once. The item deletion process and new measurement model is run as usual. This method also emphasized the fitness index and all the requirement should be achieved. This method is more preffered since it could settle the issue of model identification problem due have less than four indicator or items for each construct. Moreover, discriminant validity also could be conducted since this method used to determine the correlation latent construct. If the correlation between exogenous construct is above 0.85, means that te redundant items is exist

Discriminant validity is the degree to which the operational definition is able to discriminate between the target construct and closely related (but conceptually distinct) variables. Whereas convergent validity hopes for high positive correlations between the operational definition and related variables, discriminant validity hopes for correlations between operational definitions and distinct variables that are close to zero. Discriminant validity can measure by using the correlation of latent construct with square root of AVE. Thus, correlation among exogenous constructs should be less than 0.85 in order to achieve the required level.

Table-3. Fitness of Measurement Model

Name of Category	Name of Index	Index Value	Comments
Absolute fit	RMSEA	0.048	The required level is achieved
	GFI	0.924	The required level is achieved
Incremental Fit	CFI	0.958	The required level is achieved
	AGFI	0.903	The required level is achieved
Parsimonious fit	Chisq/df	2.023	The required level is achieved

Should be achieved before proceed the convergent and discriminant validity

Table-4. Reporting Findings

Exogenous	Endogenous	(Below 0.85) Correlation	Square Root Average Variance Extracted (AVE)	(Above 0.50) Average Variance Extracted (AVE)	(Above 0.70) Cronbach Alpha	(Above 0.60) Composite Reliability (CR)
Government Support	Barrier	0.230	0.734	0.539	0.818	0.823
	Benefits	0.385				
	Challenge	0.262				
	Motivation	0.387				
Barrier	Motivation	0.262	0.736	0.542	0.771	0.778
Benefits	Motivation	0.719	0.800	0.639	0.881	0.876
Challenge	Motivation	0.207	0.730	0.532	0.818	0.820
	Motivation	-	0.758	0.575	0.903	0.904

Table-5. Discriminant Validity

Construct	Benefit	Motivation	Barrier	Challenge	Government
Benefit	0.800				
Motivation	0.719	0.758			
Barrier	0.265	0.262	0.736		
Challenge	0.222	0.207	0.388	0.730	
Government	0.385	0.387	0.230	0.262	0.734

Bold value is the squre root of Average Variance

The square root AVE should be higher than the values in its row and column

Table-6. Remaining Questions After Achieved the Required Level

Variables	Statement	Factor Loadings	Cronbach Alpha
Motivation	I want to work with people.	0.75	.915
	It fulfills my moral principles.	0.75	.914
	I want to help community.	0.78	.913
	I want to occupy my free time.	0.70	.917
	Volunteering is good for my professional development.	0.77	.913
	I believe my skills can be useful to the community.	0.74	.914
	I enjoy the volunteer activities	0.80	.911
Benefits	Volunteering activities can build self-esteem of a person.	0.70	.861
	Volunteering activities offer real experience to those involved.	0.75	.845
	Involvement in volunteering activities can make someone mature.	0.80	.835
	The involvement of a person in volunteering activities can build up their leadership qualities.	0.83	.846
Barrier	I interest to give my commitment on education	0.64	.746
	I interest to give my commitment on my family	0.85	.624
	I interest to give my commitment on my friends only	0.70	.705
Challenge	Reduces personal time with family.	0.72	.772
	Juggling priorities.	0.74	.769
	Finding time.	0.77	.758
	Having to break volunteer commitments due to more pressing work/family needs.	0.68	.786
Government	Personal appreciation letter preferred recognition for volunteering.	0.79	.746
	Information about volunteerism via communication	0.67	.793
	Appropriate memento (T-shirt, Hat, Plaque,etc.) preferred recognition for volunteering	0.80	.744
	Public verbal recognition, preferred recognition for volunteering	0.66	.800

Table 6 presented the remaining questionnaire with factor laodings and Cronbach Alpha once undergoes the unidimensionality procedure. Moreover, the reliability and validity (Convergent and Discriminant validity) should be performed well as the required level acceptance. There are 22 items that have been performed well due to this particular analysis.

10. CONCLUSION AND RECOMMENDATION

The conclusion should be made based on our findings revealed. In this case, the study of volunteerism program as a research subject apply CFA analysis to evaluate the fitness of measurement model using structural equation modeling with Amos 18.0. Previously, the questionnaire developed have 53 items based on literature review presented. Nevertheless, the number of items consisting has been changed once undergoes CFA analysis. The CFA analysis is powerful to detect the appropriate questions on the specific direction of these factors. All the requirement should be achieved according to the proposing scales. Thus, the newly questions are accepted for 22 items only and can be accepted for the future research. Of depending on the CFA analysis, this study state the limitation of this particular analysis due to the identification issues. Thus, the proposed method namely Pooled CFA (PCFA) is no doubt to ease the scholar to carry out their research besides prone them to better undestanding on the meant of emprical study.

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REFERENCES

Bentler, P.M., 1990. Comparative fit indexes in structural models. Psychological Bulletin, 107(2): 238.

Bentler, P.M. and D.C. Bonnet, 1980. Significance tests and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88(3): 588-606.

Bollen, K.A., 1989. Structural equations with latent variables. New York: Wiley.

Browne, M.W. and R. Cudeck, 1993. Alternative ways of assessing model fit. Sage Focus Editions, 154: 136-136.

Dingle, T., 1995. People and places in post-war Melbourne. In: G.Davison, T.Dingle, and S.O'Hanlon, eds. The Cream Brick.

Dingle, T., 2009. Macrobertson's chocolate factory: From industry to industrial chic. Urban Policy and Research.

Fornell, C. and D.F. Larcker, 1981. Structural equation models with unobservable variables and measurement error: Algebra and statistics. Journal of Marketing Research: 382-388.

Holmes-Smith, P., 2006. School socio-economic density and its effect on school performance. MCEETYA.

Jareskog, K.G. and D. Stirborn, 1984. LISREL VI analysis of linear structural re1ation.ship.r by the method of maximum likelihood. Mooresville. Indiana: Scientific Software. Inc. pp: 404-416.

Marsh, H.W. and D. Hocevar, 1985. Application of confirmatory factor analysis to the study of self-concept: First-and higher order factor models and their invariance across groups. Psychological Bulletin, 97(3): 562.

Nunnally, J.C., 1978. Psychometric theory. 2nd Edn., New York: McGraw-Hill.

Nunnally, J.C. and I.H. Bernstein, 1994. Psychometric theory. New York: McGraw-Hill.

Tanaka, J.S. and G.J. Huba, 1985. A fit index for covariance structure models under arbitrary GLS estimation. British Journal of Mathematical and Statistical Psychology, 38(2): 197-201.

Wan Mohamad, A.B.W.A., 2013. Moderator-mediator on motivation using structural equation modeling. 108-109.

Wheaton, B., B. Muthen, D.F. Alwin and G. Summers, 1977. Assessing reliability and stability in panel models. Sociological Methodology, 8(1): 84-136.

Zainudin, A., 2012. Structural equation modeling using amos graphic. Shah Alam: Universiti Teknologi Mara Publication Centre (UPENA).

BIBLIOGRAPHY

Bollen, K.A., 1990. Overall fit in covariance structure models: Two types of sample size effects. Psychological Bulletin, 107(2): 256-259.

Brackney, W.H., 1997. Christian volunterism: Theology and praxis. Michigan: Eerdmans Publishing Co. In Press.

Cronbach, L.J., 1951. Coefficient alpha and the internal structure of tests. Psychometrika, 16(3): 297-334.

Dingle, T., 1984. The victorians: Settling. Sydney: Fairfax, Syme and Weldon.

Farrell, J.M., M.E. Johnston and G.D. Twynam, 1998. Volunteer motivation, satisfaction, and management at an elite sporting competition. Journal of Sport Management, 12(4): 288-300.

Gerbing, D.W. and J.C. Anderson, 1984. On the meaning of within-factor correlated measurement errors. Journal of Consumer Research, 11(June): 572-580.

Hu, L.T. and P.M. Bentler, 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling, 6(1): 1-55.

Jöreskog, K. and J.S. Long, 1993. Introduction, in Testing Structural Equation Models, Kenneth A. Bollen and J. Scott Long, Eds. Newbury Park, CA: Sage.

Jöreskog, K. and D. Sörbom, 1993. LISREL 8: Structural equation modeling with the SIMPLIS command language. Chicago, IL: Scientific Software International Inc.

Jöreskog, K. and D. Sörbom, 1996. LISREL 8: User's reference guide. Chicago, IL: Scientific Software International Inc.

Kenny, D.A. and D.B. McCoach, 2003. Effect of the number of variables on measures of fit instructural equation modeling. Structural Equation Modeling, 10(3): 333-351.

Wan Mohamad, A.B.W.A. and A. Sabri, 2013. Modelling the multimediator on motivation among youth in higher education institution towards volunteerism program mathematical theory and modeling (MTM), 3(7): 7.

Wan Mohamad, A.B.W.A. and A. Sabri, 2013. Modelling-the-multigroup-moderator-mediator-on-motivation-among-youth-in-higher education institution towards volunteerism program. International Journal of Scientific & Engineering Research (IJSER), 4(7): 5.

Wan Mohamad, A.B.W.A. and A. Sabri, 2013. Modelling a high reliability and validity by using confirmatory factor analysis on five latent construct: Volunteerism program. International Research Journal Advanced Engineer and Scientific Technology (IRJAEST), 1(1): 7.

Zainudin, A., 2010. Research methodology for business and social science. Shah Alam: Universiti Teknologi Mara Publication Centre (UPENA).