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Testing Construct Validity Using Confirmatory Factor Analysis

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Abstract: ***The current study aimed to Testing a Construct Validity Using Confirmatory factor analysis. To achieve this aim, the researcher used confirmatory factor analysis (AMOS) Version 23. The study population represents the Employees in the banks of Libya the findings of the study verified the construct validity of the model as a reliable scale.***

Keywords: Quick decision making, Accuracy of Financial Statements, Technical environment, Risk protection, Efficiency of the accounting system

1. Introduction

Many scientific studies are featured by the fact that "numerous variables are used to characterize objects" (Rietveld & Van Hout 1993: 251). Examples are studies in which questionnaires are used that consist of a lot of questions (variables), and studies in which mental ability is tested via several subtests, like verbal skills tests, logical reasoning ability tests, etcetera (Darlington 2004). Because of these big numbers of variables that are into play, the study can become rather complicated. Besides, it could well be that some of the variables measure different aspects of a same underlying variable. For situations such as these, (exploratory factor analysis has been invented Factor analysis attempts to bring intercorrelated variables together under more general, underlying variables. More specifically, the goal of factor analysis is to reduce "the dimensionality of the original space and to give an interpretation to the new space, spanned by a reduced number of new dimensions which are supposed to underlie the old ones" (Rietveld & Van Hout 1993: 254), or to explain the variance in the observed variables in terms of underlying latent factors" (Habing 2003: 2) Thus, factor analysis offers not only the possibility of gaining a clear view of the data but also the possibility of using the output in subsequent analyses (Field 2000; Rietveld & Van Hout 1993). In this paper, an example will be given of the use of factor analysis using program Version (23).

2. Method

2.1. Data Collection and Sampling Design

A questionnaire was used to acquire empirical data related to each of the study variables. The questionnaire was distributed to Employees in banks of Libya. Total of (500) questionnaires were distributed. (383) questionnaires were returned, of which (373) were valid, which represents 75% response rate. The data was collected over a period of time from (September to November 2016).

2.2. The Modified Model

The fit of the measurement model was assessed using the following statistics and indices: Chi-square, the ratio of the Chi-square to the degrees of freedom (DF), Goodness-of-fit index (CFI), Root-mean-square residual and Root Mean Squared Error (RMSEA). Chi-square/df values less than or equals 3 indicates a good model fit, and between 2.0 and 5.0 is acceptable level (Hair, et al., 2010; Schumacker and Lomax, 2004). CFI values should be greater than 0.9 (Wang and Wang, 2012; Hair, et al., 2010). RMSEA values less than 0.10 indicate good fit (Devaraj, et al., 2002). The goodness of fit indices of the measurement model is presented in (table 3); according to these results we can infer that the measurement model was reasonably fitted to the data set.

3. Results

3.1. Construct Validity of the Quick decision making model

The results of the goodness-of-fit of the final revised of the training model showed that normal chi- square (CMIN/DF) was (3.335) the CFI was (0.980) and RMSEA was (0.079). Figure (1) shows the adequacy of the final revised of the Quick decision making model.

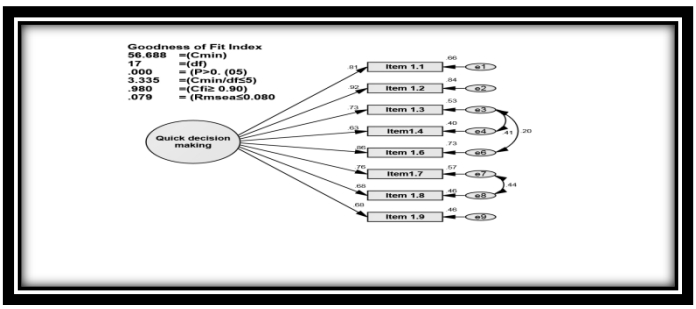

Figure 1: Construct Validity of the Quick decision making model with eight- items

In addition to, the lodging for the parameters variable ranged from 0.63 to 0.92, with all parameters was above 0.5 (≥0.5). The AVE reading was 0.58 where the value was greater than 0.5 (≥0.5) Fornel and Larker (1981).

Consequently, all results fulfilled the AVE, discriminant validity of the model. In general, the measurement of the Quick decision making model was fit and fulfilled the construct as depicted in the table (1).

Table 1: Construct Validity of the Quick decision making model

Items	Estimate	S. E.	C. R.	P	Loading	SMC	AVE
1.1	0.9445	0.0443	21.33	***	0.81	0.66	0.58
1.2	1.000	-	-	-	0.92	0.84	-
1.3	0.8023	0.0465	17.2495	***	0.73	0.53	-
1.4	0.7085	0.0503	14.0983	***	0.63	0.40	-
1.6	0.9198	0.0387	23.7439	***	0.86	0.73	-
1.7	0.8162	0.0435	18.7713	***	0.76	0.57	-
1.8	0.7399	0.0475	15.5699	***	0.68	0.46	-
1.9	0.6657	0.0422	15.7753	***	0.68	0.46	-

S.E. Standard Error, **C.R**.: Critical Ratio, **P**: Probability, **SMC**: Squared Multiple Correlations. **AVE**: Average Variance Extracted

3.2. Construct Validity of the Accuracy of Financial Statements model

Figure (2) show us the model fit of the final revised of the Accuracy of Financial Statements model was that normal chi- square (CMIN/DF) was (3.067) the CFI was too high (0.991) and RMSEA was (0.074). Figure (2) shows the adequacy of the final revised of the Accuracy of Financial Statements model.

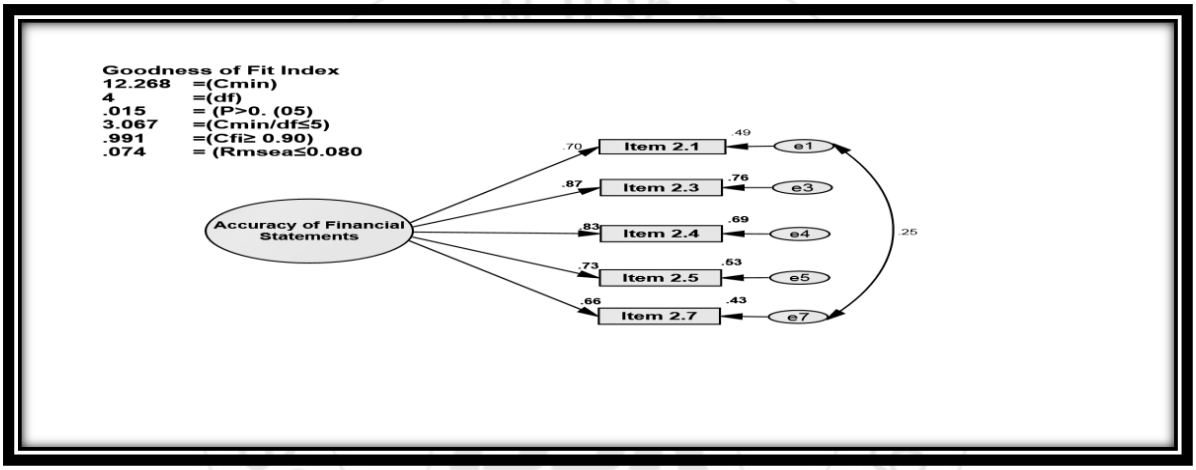

Figure 2: Construct Validity of the Accuracy of Financial Statements model with five- Items

As seen by the results in Figure (2) and table (2) the lodging for the parameters variable ranged from 0.66 to 0.87, with all parameters was above 0.5 (≥0.5).

The AVE reading was 0.58 where the value was greater than 0.5 (≥0.5) Fornel and Larker (1981). Consequently, all results fulfilled the AVE, discriminant validity of the model. In general, the measurement model of the Accuracy of Financial Statements model was fit and fulfilled the construct as depicted in the table (2).

Table 2: Construct Validity of the Accuracy of Financial Statements model

Items	Estimate	S. E.	C. R.	P	Loading	SMC	AVE
2.1	0.8181	0.0554	14.759	***	0.70	0.49	0.58
2.3	1.000	-	-	-	0.87	0.76	-
2.4	0.9757	0.0526	18.552	***	0.83	0.69	-
2.5	0.8468	0.0542	15.637	***	0.73	0.53	-
2.7	0.7491	0.0551	13.606	***	0.66	0.43	-

S.E. Standard Error, **C.R**.: Critical Ratio, **P**: Probability, **SMC**: Squared Multiple Correlations. **AVE**: Average Variance Extracted

3.3. Construct Validity and Reliability of the Technical environment model:

The results of the goodness-of-fit of the final revised of the Technical environment model showed that normal chi-square (CMIN/DF) was (2.893) the CFI was (0.989) and RMSEA was (0.071). Figure (3) shows the adequacy of the final revised of the Technical environment model.

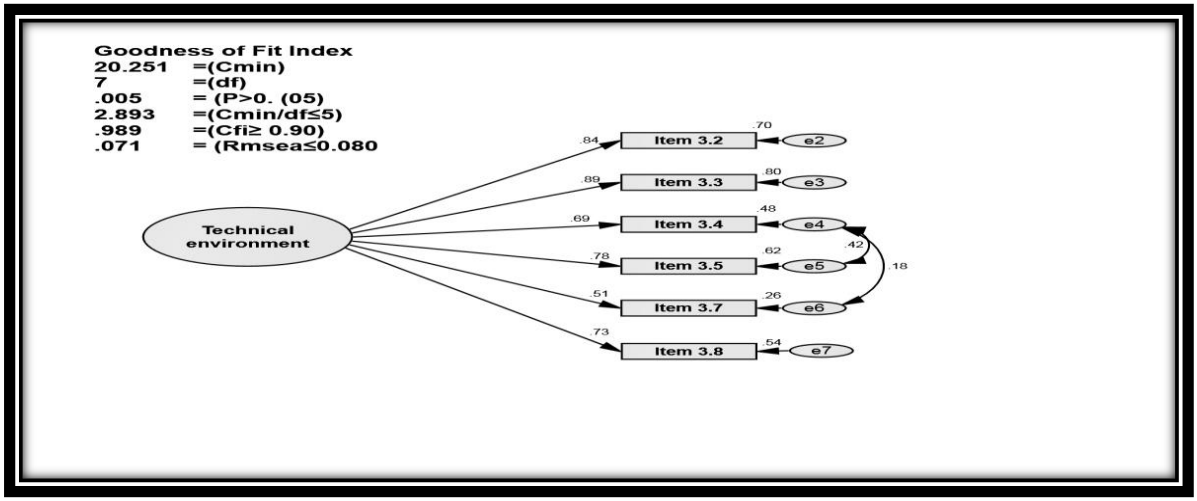

Figure 3: Construct Validity of the Technical environment model with six- Items

In the current study, the lodging for the parameters variable ranged from 0. 51 to 0.89, with all parameters were above 0.5 (≥0.5). In addition, the AVE reading was 0.57 where the value was greater than 0.5 (≥0.5). Consequently, all results fulfilled the AVE, discriminant validity of the model. In general, the measurement model of the Technical environment model was fit and fulfilled the construct as depicted in Table (3).

Table 3: Construct Validity of the Technical environment model

Items	Estimate	S. E.	C. R.	P	Loading	SMC	AVE
3.2	0.923	0.045	20.5177	***	0.84	0.70	0.57
3.3	1.000	-	-	-	0.89	0.80	-
3.4	0.7645	0.0505	15.1479	***	0.69	0.48	-
3.5	0.9063	0.049	18.5019	***	0.78	0.62	-
3.7	0.599	0.0587	10.196	***	0.51	0.26	-
3.8	0.8122	0.0487	16.6909	***	0.73	0.54	-

S.E. Standard Error, **C.R**.: Critical Ratio, **P**: Probability, **SMC**: Squared Multiple Correlations. **AVE**: Average Variance Extracted

3.4. Construct Validity and Reliability of the Risk protection model:

In this model, the goodness-of-fit of the final revised of the Risk protection was great, showed that normal chi- square (CMIN/DF) was (2.840) the CFI was (0.989) and RMSEA was (0.070). Figure (4) shows the adequacy of the final revised of the Risk protection model.

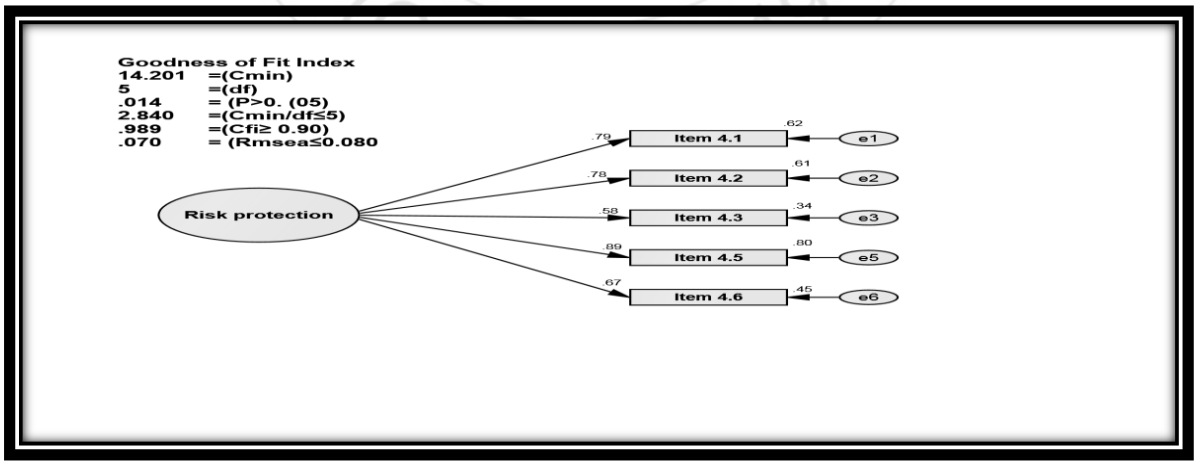

Figure 4: Construct Validity of the Risk protection model with five- Items

The lodging for the parameters variable ranged from 0.58 to 0.89, with all parameters was above 0.5 (≥0.5). In addition, the AVE reading was 0.56where the value was greater than 0.5 (≥0.5). Consequently, all results fulfilled the AVE, discriminant validity of the model. In general, the measurement model of the Risk protection model was fit and fulfilled the construct as depicted in Table (4).

Table 4: Construct Validity of the Risk protection model

Items	Estimate	S. E.	C. R.	P	Loading	SMC	AVE
4.1	0.8867	0.0488	18.1814	***	0.79	0.62	0.56
4.2	0.8367	0.0467	17.9272	***	0.78	0.61	-
4.3	0.6708	0.0563	11.9079	***	0.58	0.34	-
4.5	1.000	-	-	-	0.89	0.80	-
4.6	0.7359	0.0509	14.4552	***	0.67	0.45	-

S.E. Standard Error, **C.R**.: Critical Ratio, **P**: Probability, **SMC**: Squared Multiple Correlations. **AVE**: Average Variance Extracted

3.5. Construct Validity of the Efficiency of the accounting system model:

In the present study, the goodness-of-fit of the final revised of the Efficiency of the accounting system model showed that normal chi- square (CMIN/DF) was (2.536) the CFI was (0.994) and RMSEA was(0.064). Figure (5) shows the adequacy of the final revised of the Efficiency of the accounting system.

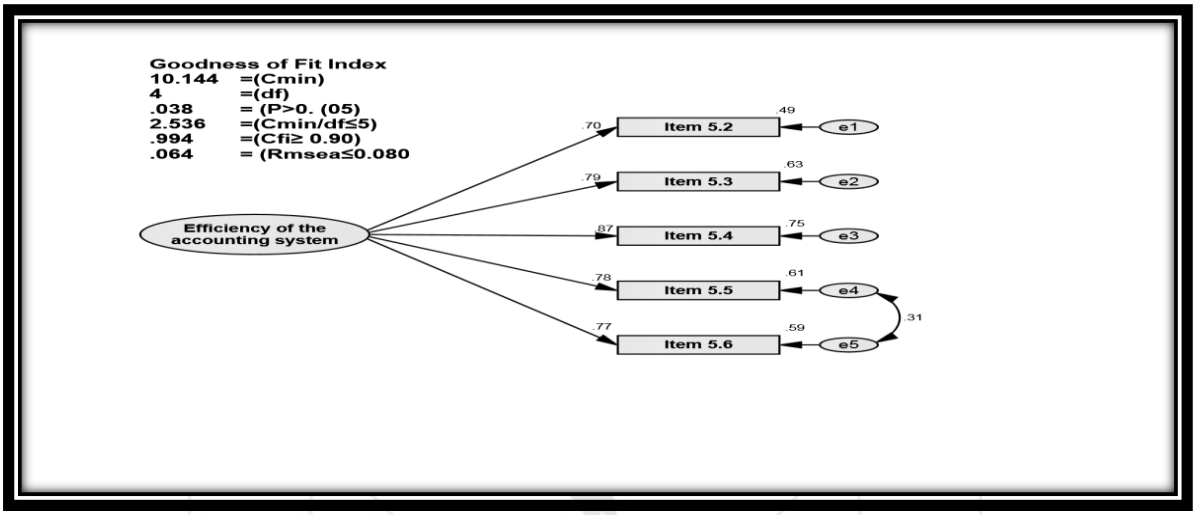

Figure 5: Construct Validity of the Efficiency of the accounting system model with five- Items

Beside construct validity and Reliability, the table (5) showed the lodging for the parameters variable ranged from 0.70 to 0.87, with all parameters were above 0.5 (≥0.5).. In addition, the AVE readings were 0.61 where the value was greater than 0.5 (<0.5). In general, the measurement model of the Efficiency of the accounting system was fit and fulfilled the construct as depicted in Table (5).

Table 5: Construct Validity of the Efficiency of the accounting system model

Items	Estimate	S. E.	C. R.	P	Loading	SMC	AVE
5.2	0.8019	0.0539	14.8801	***	0.70	0.49	0.61
5.3	0.9263	0.0523	17.7221	***	0.79	0.63	-
5.4	1.000	-	-	-	0.87	0.75	-
5.5	0.9392	0.055	17.0615	***	0.78	0.61	-
5.6	0.9365	0.0563	16.629	***	0.77	0.59	-

S.E. Standard Error, **C.R**.: Critical Ratio, **P**: Probability, **SMC**: Squared Multiple Correlations. **AVE**: Average Variance Extracted

4. Conclusion

This paper achieved the main goal of the study which was to Analysis Construct Validity through the use CFA as a means to structural equation modeling (SEM-AMOS). This was proposed and developed based on the identified measurement items of the main five factors (Quick decision making, Accuracy of Financial Statements, Technical environment, Risk protection, and Efficiency of the accounting) in previous studies (Field 2000; Rietveld & Van Hout 1993Habing 2003, Rietveld & Van Hout 1993). The models achieved the required convergent the for each variable was reliable measure validity or the AVE, among its five factors which even exceeded (0.50). A result that was in agreement or consistent with Fornell – Larcker (1981) Criterion.

References

[1] Caroline Njambi. (2014). Factors Influencing Employee Motivation and ITS Impact on Employee Performance: A case of Amref Health Africa in Kenya: A Research Project Report Submitted to Chandaria School of Business in Partial Fulfillment of the Requirement for the Degree of Masters in Business Administration (MBA).

[2] Chng, Hee & et al. (2014). Factors Affect Employee Performance in Hotel Industry, University Tunku Abdul Rahman, Faculty of Business and Finance Department of Business.
[3] Darlington, R.B. (2004). Factor Analysis. Website: http://comp9.psych.cornell.edu/Darlington/factor.htm (accessed 10 May 2004; publication year not clear, therefore the date of access between brackets).
[4] Devaraj, S., M. Fan, R. Kohli (2002), "Antecedents of B2C Channel Satisfaction and Preference: Validating e-Commerce Metrics," Information Systems Research, 13(3), 316-333.
[5] Fornell, C., Larcker, D.F., (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research 18 (1), 39-50.
[6] Hair, J., Black, W, Babin, B. and Anderson, R. (2010). Multivariate data analysis: A global perspective. 7th edition, Pearson Education, Inc. Saddle River, New Jersey.
[7] Habing, B. (2003). Exploratory Factor Analysis Website: http://www.stat.sc.edu/~habing/courses/530EFA.pdf (accessed 10 May 2004).
[8] Johnson, B. & Christensen, L. (2012). Educational research. Quantitative, qualitative, and mixed approaches (4th Ed.). California: Sage Publication Inc.
[9] Neelam, Israr& et al. (2014). The Impact of Training and Development on Employees Performance and Productivity: A case study of United Bank Limited Peshawar City, KPK, Pakistan: International Journal of Academic Research in Business and Social Sciences April 2014, Vol. 4, No. 4.
[10] Pimtong Tavitiyaman. (1996). the effect of Management Commitment to Service Quality on Employees' Job Satisfaction and Prosaically Service Behaviors: Thammasat University, Bangkok, Thailand, Faculty of the Graduate College of the Oklahoma State University.
[11] Ronah Tugume Arinanye. (2015). Organizational Factors Affecting Employee Performance at the College of Ccoputing and Information Sciences (CoCIS), Makerere University, Kampala – Uganda.
[12] Rietveld, T. & Van Hout, R. (1993). Statistical Techniques for the Study of Language and Language Behaviour. Berlin – New York: Mouton de Gruyter.
[13] Sekaran, U., and Bougie R. (2010). Research methods for business: A skill building approach. 5th Edition, Wiley, and Sons. ISBN-10: 0470744790.
[14] Streiner, D. L. (2003). Being inconsistent about consistency: When coefficient alpha does and doesn't matter. Journal of Personality Assessment, 80(3), 217-222.
[15] Wang, Z., Wang, N. (2012). Knowledge sharing, innovation and firm performance. Expert Systems with Applications, 39, 8899 – 8908