



Measurement of model technological literacy, financial literacy and financial risk attitude and SME performance

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ABSTRAK

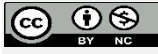
Penelitian ini bertujuan untuk memverifikasi validitas konstruk dari model pengukuran, confirmatory factor analysis (CFA) dari literasi teknologi, literasi keuangan, sikap risiko keuangan, dan kinerja UKM di Sumatera Barat, untuk menguji kesamaan pengukuran yang telah dihipotesiskan oleh model pada data yang dikumpulkan. Dalam penelitian ini, structural equation modeling (SEM) digunakan untuk menjawab pertanyaan penelitian. Berdasarkan hasil observasi terhadap 344 UKM, ditemukan bahwa model pengukuran yang dihipotesiskan telah sesuai dengan data yang ditunjukkan dengan indeks kecocokan dan loading factor yang signifikan. Variabel literasi teknologi memiliki nilai factor loading sebagai berikut (0.76), (0.72), (0.84), (0.69), (0.44), (0.73). Indikator literasi teknologi memiliki nilai lebih dari 0,3 yang mengindikasikan bahwa validitas konvergen tercapai. Masing-masing variabel literasi keuangan memiliki nilai loading factor sebagai berikut (0.85), (0.67), (0.73), (0.60), (0.76), (0.73), (0.77), (0.67), (0.73), (0.59). Indikator literasi keuangan memiliki nilai lebih dari 0,3 yang mengindikasikan bahwa validitas konvergen tercapai. Selain itu, variabel financial risk attitude memiliki nilai factor loading sebagai berikut (0.57), (0.41), (0.97), (0.60), (0.88), (0.66). Indikator sikap risiko keuangan memiliki nilai lebih dari 0,3 yang menunjukkan bahwa validitas konvergen tercapai. Dan terakhir, variabel kinerja UKM memiliki nilai factor loading sebagai berikut (0.82), (0.95), (0.66), (0.82), (0.92), (0.93). Hal ini berarti semua ukuran dapat menggambarkan kinerja perusahaan.

ABSTRACT

This study aims to verify the construct validity of the measurement model, confirmatory factor analysis (CFA) of technological literacy, financial literacy, financial risk attitude, and performance of SMEs in West Sumatra, to test the similarity of the measurements that have been hypothesized by the model on the collected data. In this study, structural equation modeling (SEM) was used to answer research questions. Based on the results of observations of 344 SMEs, it was found that the hypothesized measurement model was following the data indicated by the fit index and significant loading factor. The technological literacy variable has the following factor loading values (0.76), (0.72), (0.84), (0.69), (0.44), (0.73). The technological literacy indicator has a value of more than 0.3 which indicates that convergent validity is achieved. Each financial literacy variable has a loading factor value as follows (0.85), (0.67), (0.73), (0.60), (0.76), (0.73), (0.77), (0.67), (0.73), (0.59). The financial literacy indicator has a value of more than 0.3 which indicates that convergent validity is achieved. In addition, the financial risk attitude variable has the following factor loading values (0.57), (0.41), (0.97), (0.60), (0.88), (0.66). The financial risk attitude indicator has a value of more than 0.3 which indicates that convergent validity is achieved. And lastly, the SME

performance variable has the following factor loading values (0.82), (0.95), (0.66), (0.82), (0.92), (0.93). This means that all measures can describe the company's performance.

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INTRODUCTION

Structural Equating Modeling (SEM) is a statistical model that describes the relationship between many variables. In this process, SEM examines the structural relationships of reciprocal relationships expressed in a series of equations. The equation describes the relationship between the constructs involved in the analysis. SEM itself is known by many names such as covariance structure, latent variable analysis, and path modeling. According to Kline (2005) the basic steps of SEM are: 1) Model specification, 2) Model identification, 3) Data preparation and filtering, 4) Model estimation and 5) Model re-specification.

SEM is a model that is implemented in two stages. The CFA (confirmatory factor analysis) measurement model is one of the requirements before conducting a structural model test. This is because CFA aims to analyze how well an indicator can explain its latent variables. This study examines the construct validity of each variable, namely technological literacy, financial literacy, financial risk attitude, and SMEs' performance in .

LITERATUR REVIEW

Confirmatory Factor Analysis

According to Ghozali (2008), confirmatory factor analysis (CFA) is a multivariate analysis method used to test or confirm the hypothesized model. This hypothesized model consists of one or more latent variables, which are measured by one or more indicator variables. The latent variable itself is a variable that cannot be measured directly and must use indicators to measure it. While the indicator variables are variables that can be measured directly. The use of CFA measurements in SEM has the advantage of being able to formalize their measurement hypotheses and develop measurement instruments that have simple measurements.

Table 1. Indicator Goodness of Fit

GOF indicator	Acceptable Fit Level	Description
Chi-Square	p-value $\geq 0,05$	
GFI (Goodness of Fit index)	Value $\geq 0,90$	0 (poor fit); 1,00 (perfect fit)
RMSEA (Root Mean Square Error of Approximation)	Value $\leq 0,08$	0,08 = the model can still be accepted as a fit model
AGFI (Adjusted Goodness of Fit)	Value $\geq 0,90$	AGFI $\geq 0,90$ = model fit
TLI (Tucker-Lewis Index)	Between 0-1	TLI $\geq 0,90$ = fit
CFI (Comparative Fit Index)	Value $\geq 0,90$	CFI $\geq 0,90$ = fit

Source: (Joreskog & Sorbom, 1993; Browne & Cudeck, 1993; Schumacker & Lomax, 2010; Hooper et al., 2008).

In addition to measuring the goodness of fit (GOF), SEM can also test the validity and reliability of each variable. Construct validity in SEM is used to assess the validity of the proposed measurement theory by examining the extent to which a set of observed items reflects the theoretical latent construct (Hair, Black, Babin, Anderson, & Tatham, 1998). According to Tabachnik & Fidell (2007). Convergent validity is a general measurement in an SEM that in practice determines factor loading, variance extraction, standard factor loading, and critical ratios. If the use of standard loading factors is more than 0.3 (Tabachnik & Fidell, 2007), then the variance extracted is more than 0.5 and the construct reliability is more than 0.7 (Hair et al. 2006).

METHOD

In this study, primary data was used from questionnaires for SMEs. In determining the sample, it is determined based on purposive sampling based on the age of the business, and the business category according to Law no. 20 of 2008. Where the business categories according to Law of 20 of 2008 are as follows:

1) **Small Business**

Have a net worth of more than Rp. 50,000,000 up to Rp. 500,000,000.00 excluding land and buildings for business premises; or have annual sales of more than Rp.300,000,000 up to a maximum of Rp.2,500,000,000.00

2) **Medium Enterprise**

Have a net worth of more than Rp. 500,000,000.00 up to a maximum of Rp. 10,000,000.00 excluding land and buildings for business premises; or have annual sales of more than Rp. 2,500,000,000.00 up to a maximum of Rp.50,000,000.00.

This study uses structural equation modeling (SEM). Anderson & Gerbing (1998) stated that SEM analysis is known as a two-step approach where the measurement model on confirmation factor analysis (CFA) is carried out before the structural model measurement is carried out. To measure the value of construct validity and model fit. Therefore, this paper aims only to report on the measurement model of technological literacy, financial literacy, financial risk attitude, and SME performance.

RESULT

Confirmatory Factor Analysis

a. **CFA for Technological Literacy variables**

CFA is carried out on technological variables to know how accurately the variables can explain the existing latent variables. The following is the CFA for the technological literacy.

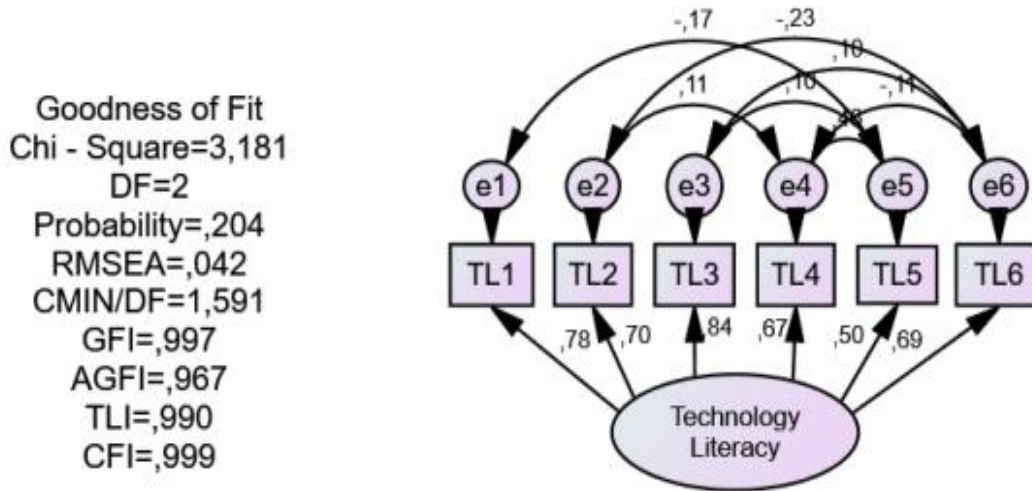


Figure 1. CFA For Technological Literacy

It can be seen in Figure 1, the measurement model test was modified with AMOS suggestions based on modification indices. The purpose of doing this is to reduce the value of the chi-square so that the model fits better from the data. The modifications made are by correlating the errors, namely e2 and e6; e4 and e5; e4 and e6. In Figure 1, the results of the measurement model show that the number of distinctive sample moments is 21 and the number of estimated parameters is 15 so that df becomes 6 (21-15). Thus this model has a positive df. The measurement model of technological literacy is over-identified so that it can be analyzed. To test the convergent validity of the measurement model, standardized factor loading (Tabachnick, 2007), critical ratio (Anderson, 1998) as quoted by Ferdinand (2006), construct reliability, and variance extracted (Hair et al, 2006). The following is a table of CFA technological literacy outputs:

Table 2. Output of CFA Technological Literacy

Latent	Indicator	SL	SMC	EV	SE	CR	P
Technology Literacy	X1.1	0,76	0,58	0,42			
	X1.2	0,72	0,51	0,49	0,067	12,637	0,00
	X1.3	0,84	0,70	0,30	0,061	15,606	0,00
	X1.4	0,69	0,48	0,52	0,069	12,286	0,00
	X1.5	0,44	0,20	0,80	0,063	7,812	0,00
	X1.6	0,73	0,53	0,47	0,06	12,592	0,00
	Σ	4,2	3,00	3,00			
Construct Reliability		0,85					
Variance Extracted		0,5					

Source: AMOS 24 Data Processing Results

The technological literacy variable indicator has the following factor loading values: X1.1 (0.76), X1.2 (0.72), X1.3 (0.84), X1.4 (0.69), X1. 5 (0.44), X1.6 (0.73). This indicates that all actions can realize technological literacy. The indicator on the technology literacy variable has shown significant results, but the indicator X1.3 (0.84) is a better latent diversification than other indicators.

In addition, the value of SL and CR on the technological literacy indicator shows the fulfillment of convergent validity (Anderson, 1998) as quoted by Ferdinand (2006) with the following values X1.2 (SL = 0.72, CR = 12.637), X1. 3 (SL = 0.84, CR = 15,606), X1.4 (SL = 0.69, CR = 12,286, X1.5 (SL = 0.44, CR = 7,812), X1.6 (SL = 0, 73, CR = 12,592) Likewise with construct reliability and variance extracted where technological literacy has achieved convergent validity because the values have reached 0.5 and 0.7 for variance extracted and construct reliability (Hair et al, 2006). construct reliability is 0.85 while the variance extracted has a value of 0.5. This indicates that technological literacy is well reflected by the indicators as proposed by the related theory. CFA technological literacy not only meets convergent validity and discriminatory validity but also meets acceptable fit as shown by the GOF values in the following table :

Table 3. Goodness of Fit of CFA Technological Literacy

Analysis	Criteria	Results	Decision
Chi Square (x ²)	≥0,05	9,435	
DF	-	6	-
Probability	≥0,05	0,151	Better Fit
RMSEA	≤0,08	0,041	Better Fit
CMIN/DF	≤2,00	1,573	Better Fit
GFI	≥0,90	0,991	Better Fit
AGFI	≥0,90	0,968	Better Fit
TLI	≥0,90	0,990	Better Fit
CFI	≥0,90	0,996	Better Fit

Source: AMOS 24 Data Processing Results

Based on the table above, it can be seen that all GOF values show good results because the values of each GOF can meet their respective criteria, so it can be stated that this measurement model is a fit.

b. CFA for Financial Literacy variables

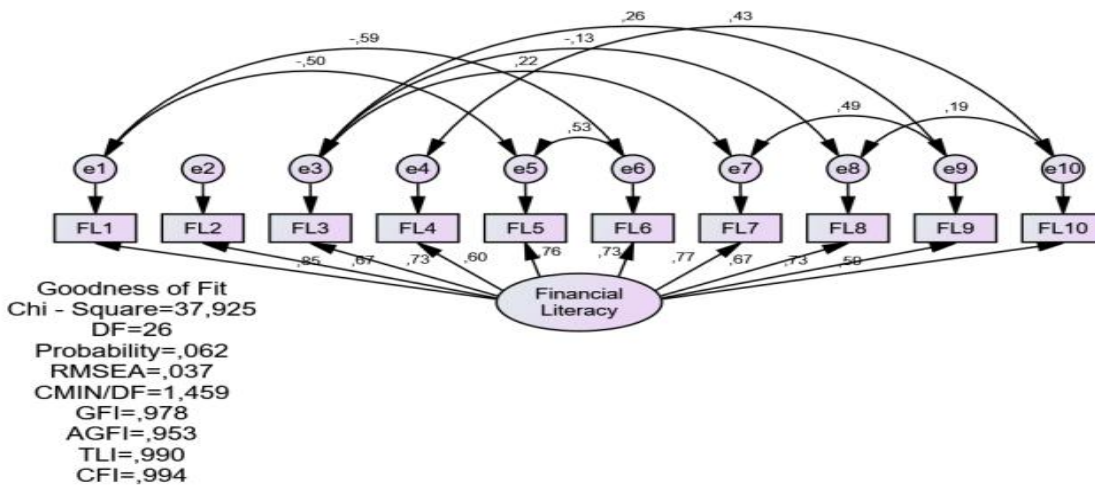


Figure 2. CFA For Financial Literacy

It can be seen in Figure 2, the measurement model test was modified with AMOS suggestions based on modification indices. The purpose of doing this is to reduce the value of the chi-square so that the model fits better from the data. The modifications made are by correlating the errors, namely e1 and e5; e1 and e6; e3 and e7; e3 and e8; e3 and e9; e4 and e10; e5 and e6; e7 and e9; e8 and e10. In Figure 2, the results of the measurement model show that the number of distinctive sample moments is 55 and the number of estimated parameters is 29 so that df becomes 26 (55-29). Thus this model has a positive df. The measurement model of financial literacy is over-identified so that it can be analyzed. To test the convergent validity of the measurement model, standardized factor loading (Tabachnick, 2007), critical ratio (Anderson, 1998) as quoted by Ferdinand (2006), construct reliability, and variance extracted (Hair et al, 2006). The following is a table of CFA financial literacy outputs:

Table 4. Output of CFA Financial Literacy

Latent	indicator	SL	SMC	EV	SE	CR	P
Financial Literacy	X2.1	0,85	0,71	0,29			
	X2.2	0,67	0,44	0,56	0,057	13,186	0,00
	X2.3	0,73	0,53	0,47	0,058	14,451	0,00
	X2.4	0,60	0,36	0,64	0,054	11,687	0,00
	X2.5	0,76	0,57	0,43	0,064	12,870	0,00
	X2.6	0,73	0,54	0,46	0,068	11,904	0,00
	X2.7	0,77	0,59	0,41	0,056	15,650	0,00
	X2.8	0,67	0,45	0,55	0,055	13,197	0,00
	X2.9	0,73	0,54	0,46	0,057	14,716	0,00
	X2.10	0,59	0,34	0,66	0,051	11,288	0,00
	Σ	7,09	5,08	4,92			
Construct Reliability		0,91					
Variance Extracted		0,51					

Source: AMOS 24 Data Processing Results

The financial literacy variable indicator has the following factor loading values: X2.1 (0.85), X2.2 (0.67), X2.3 (0.73), X2.4 (0.60), X2. 5 (0.76), X2.6 (0.73), X2.7 (0.77), X2.8 (0.67), X2.9 (0.73), X2.10 (0.59). This indicates that all actions can realize financial literacy. The indicators on the financial literacy variable have shown significant results, but the X2.1 indicator (0.85) is a better latent diversification than other indicators.

In addition, the value of SL and CR on financial literacy indicators shows the fulfillment of convergent validity (Anderson, 1998) as quoted by Ferdinand (2006) with the following values X2.2 (SL = 0.67, CR = 13.186), X2. 3 (SL = 0.73, CR = 14.451), X2.4 (SL = 0.60, CR = 11.687), X2.5 (SL = 0.76, CR = 12.870), X2.6 (SL = 0.73, CR = 11.904), X2.7 (SL = 0.77, CR = 15.650), X2.8 (SL = 0.67, CR = 13.197), X2.9 (SL = 0.73, CR = 14,716), X2.10 (SL = 0.59, CR = 11.288). Likewise with construct reliability and variance extracted where financial literacy has reached convergent validity because the values have reached 0.5 and 0.7 for variance extracted and construct reliability (Hair et al, 2006). financial literacy has a construct reliability value of 0.91 while the variance extracted has a value of 0.51. This indicates that financial literacy is well reflected by the indicators as stated by the related theory.

CFA financial literacy not only fulfills convergent validity and discriminate validity but also fulfills an acceptable fit as shown by the GOF values in the following table:

Table 5. Goodness of Fit of CFA Financial Literacy

Analysis	Criteria	Results	Decision
Chi Square (χ^2)	$\geq 0,05$	37,925	
DF	-	26	-
Probability	$\geq 0,05$	0,062	Better Fit
RMSEA	$\leq 0,08$	0,037	Better Fit
CMIN/DF	$\leq 2,00$	1,459	Better Fit
GFI	$\geq 0,90$	0,978	Better Fit
AGFI	$\geq 0,90$	0,953	Better Fit
TLI	$\geq 0,90$	0,990	Better Fit
CFI	$\geq 0,90$	0,994	Better Fit

Source: AMOS 24 Data Processing Results

The results of the assessment of all GOFs showed good results and met their respective criteria, so it can be stated that this measurement model is a fit.

c. CFA for Financial Risk Attitude variables

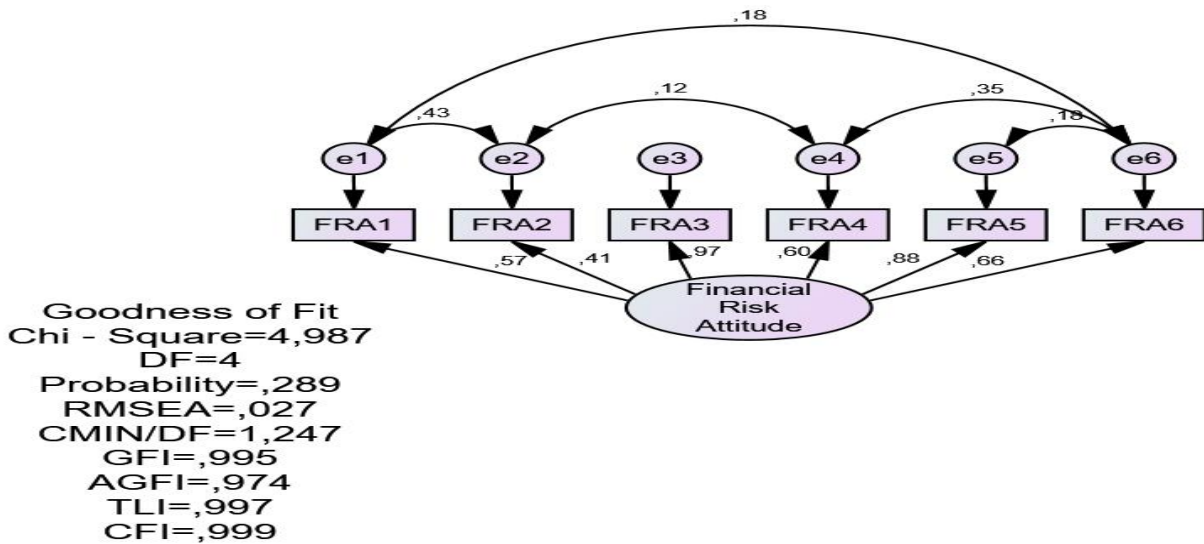


Figure 3. CFA For Financial Risk Attitude

It can be seen in Figure 3, the measurement model test was modified with AMOS suggestions based on modification indices. The purpose of doing this is to reduce the value of the chi-square so that the model fits better from the data. The modifications made are by correlating the errors, namely e1 and e2; e1 and e6; e2 and e4; e4 and e6; e5 and e6.

In Figure 3, the measurement model results show that the number of distinctive sample moments is 21 and the number of parameters estimated is 17, so that df becomes 4 (21-17). Thus this model has a positive df. The measurement model of financial literacy is over-identified so that it can be analyzed. To test the convergent validity of the measurement model, standardized factor loading (Tabachnick, 2007),

critical ratio (Anderson, 1998) as quoted by Ferdinand (2006), construct reliability, and variance extracted (Hair et al, 2006). The following is the output table for the CFA financial risk attitude:

Table 6. Output of CFA Financial Risk Attitude

Latent	Indicator	SL	SMC	EV	SE	CR	P
Financial Risk Attitude	X3.1	0,57	0,33	0,67			
	X3.2	0,41	0,17	0,83	0,079	8,65	0,00
	X3.3	0,97	0,93	0,07	0,162	11,793	0,00
	X3.4	0,60	0,36	0,64	0,109	9,131	0,00
	X3.5	0,88	0,78	0,22	0,149	11,719	0,00
	X3.6	0,66	0,43	0,57	0,101	10,689	0,00
	Σ	4,09	3	3			
	Construct Reliability	0,85					
	Variance Extracted	0,5					

Source: AMOS 24 Data Processing Results

The financial risk attitude variable indicator has the following factor loading values: X3.1 (0.57), X3.2 (0.41), X3.3 (0.97), X3.4 (0.60), X3.5 (0.88), X3.6 (0.66). This indicates that all actions can create a financial risk attitude. The indicators on the financial risk attitude variable have shown significant results, but the X3.3 (0.97) indicator is a better latent diversification than other indicators.

In addition, the value of SL and CR on the financial risk attitude indicator shows the fulfillment of convergent validity (Anderson, 1998) as quoted by Ferdinand (2006) with the following values X3.2 (SL = 0.41, CR = 8.65), X3.3 (SL = 0.97, CR = 11.793), X3.4 (SL = 0.60, CR = 9.131), X3.5 (SL = 0.88, CR = 11.719), X3.6 (SL = 0.66, CR = 10.689). Likewise with construct reliability and variance extracted where the financial risk attitude has reached convergent validity because the values have reached 0.5 and 0.7 for variance extracted and construct reliability (Hair et al, 2006). Financial risk attitude has a construct reliability value of 0.85 while the variance extracted has a value of 0.51. This indicates that the financial risk attitude is well reflected by the indicators as proposed by the related theory.

CFA financial risk attitude not only fulfills convergent validity and discriminant validity but also meets acceptable fit as shown by GOF values in the following table:

Table 7. Goodness of Fit of CFA Financial Risk attitude

Analysis	Criteria	Results	Decision
Chi Square (χ^2)	$\geq 0,05$	4,987	
DF	-	4	-
Probability	$\geq 0,05$	0,289	Better Fit
RMSEA	$\leq 0,08$	0,027	Better Fit
CMIN/DF	$\leq 2,00$	1,247	Better Fit
GFI	$\geq 0,90$	0,995	Better Fit
AGFI	$\geq 0,90$	0,974	Better Fit
TLI	$\geq 0,90$	0,997	Better Fit
CFI	$\geq 0,90$	0,999	Better Fit

Source: AMOS 24 Data Processing Results

Based on the table above, it can be seen that all GOF values showed good results because each GOF value met the criteria, so it can be stated that this measurement model is a fit.

d. CFA for Performance variables

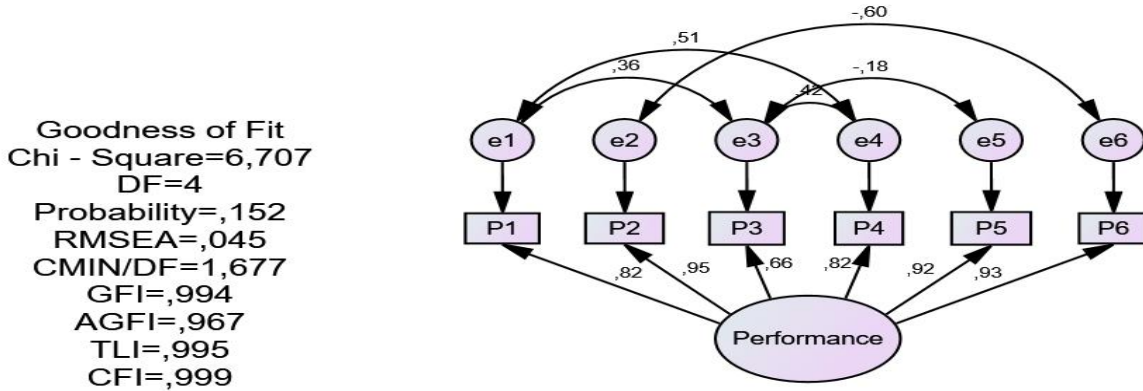


Figure 4. CFA For Performance

It can be seen in Figure 4, the measurement model test was modified with AMOS suggestions based on modification indices. The purpose of doing this is to reduce the value of the chi-square so that the model fits better from the data. The modifications made are by correlating the errors, namely e1 and e3; e1 and e4; e2 and e6; e3 and e4; e3 and e5.

Figure 4 shows the results of the measurement model showing that the number of distinctive sample moments is 21 and the number of parameters estimated is 17 so that df becomes 4 (21-17). Thus this model has a positive df. The measurement model of financial literacy is over-identified so that it can be analyzed. To test the convergent validity of the measurement model, standardized factor loading (Tabachnick, 2007), critical ratio (Anderson, 1998) as quoted by Ferdinand (2006), construct reliability, and variance extracted (Hair et al, 2006). The following is a table of CFA performance outputs:

Table 8. Output of CFA Performance

Latent	Indicator	SL	SMC	EV	SE	C.R	P
Performance	Y1.1	0,82	0,67	0,33			
	Y1.2	0,95	0,91	0,09	0,07	22,244	0,00
	Y1.3	0,66	0,44	0,56	0,045	16,588	0,00
	Y1.4	0,82	0,67	0,33	0,043	26,316	0,00
	Y1.5	0,92	0,85	0,15	0,073	22,053	0,00
	Y1.6	0,93	0,87	0,13	0,072	21,456	0,00
	Σ	5,10	4,40	1,60			
Construct Reliability		0,94					
Variance Extracted		0,73					

Source: AMOS 24 Data Processing Results

The performance variable indicator has the following factor loading values: Y1.1 (0.82), Y1.2 (0.95), Y1.3 (0.66), Y1.4 (0.82), Y1.5 (0.92), Y1.6 (0.93). This indicates that all actions can realize performance.

Indicators on the performance variable have shown significant results, but the Y1.2 (0.95) indicator is a better latent diversification than other indicators.

In addition, the value of SL and CR on the performance indicators shows the fulfillment of convergent validity (Anderson, 1998) as quoted by Ferdinand (2006) with the following values Y1.2 (SL = 0.95, CR = 22.244), Y1.3 (SL = 0.66, CR = 16.588), Y1.4 (SL = 0.82, CR = 26.316), Y1.5 (SL = 0.92, CR = 22.053), Y1.6 (SL = 0, 93, CR = 21,456). Likewise with construct reliability and variance extracted where performance has reached convergent validity because the values have reached 0.5 and 0.7 for variance extracted and construct reliability (Hair et al, 2006). Financial risk attitude has a construct reliability value of 0.94 while the variance extracted has a value of 0.73. This indicates that the performance is well reflected by the indicators as proposed by the related theory.

Table 9. Goodness o Fit of CFA Performance

Analysis	Criteria	Results	Decision
Chi Square (χ^2)	$\geq 0,05$	6,707	
DF	-	4	-
Probability	$\geq 0,05$	0,152	Better Fit
RMSEA	$\leq 0,08$	0,045	Better Fit
CMIN/DF	$\leq 2,00$	1,677	Better Fit
GFI	$\geq 0,90$	0,994	Better Fit
AGFI	$\geq 0,90$	0,967	Better Fit
TLI	$\geq 0,90$	0,995	Better Fit
CFI	$\geq 0,90$	0,999	Better Fit

Source: AMOS 24 Data Processing Results

It can be seen above that all GOF values have shown a good assessment and can meet the criteria for each of the requirements, it can be said that this measurement model is a fit.

CONCLUSIONS AND RECOMMENDATIONS

In this study, the hypothesis model is acceptable, which means that the measurement model is under the data collected on SMEs in West Sumatra. All indicators on each variable are significant and the standard loading of each indicator is more than 0.3 which indicates that each indicator can represent its latent construct. The X1.3 indicator is the most important indicator for the presentation of technological literacy, this is because X1.3 has a higher factor loading than the others. Meanwhile, the X2.1 indicator has a higher factor loading, which is closely related to financial literacy. The financial risk attitude variable can be explained by the X3.3 indicator because the indicator has a factor loading value that is greater than the other indicators. The performance variable can be represented by the Y1.2 indicator which also has a higher factor loading value than other indicators.

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