icrrd
ICRRD QUALITY INDEX RESEARCH JOURNAL
INTERNATIONAL CENTER FOR RESEARCH AND RESOURCES DEVELOPMENT
article
ISSN Number: 2773-5958, https://doi.org/10.53272/icrrd, www.icrrd.com

The Validity and Reliability Constructs of The Servant Leadership, Headmaster Motivation and Innovative Teachers of Terengganu National Schools

Norazura Tahir[1], Abdullah Ibrahim[2*], Shamsida @ Suriyam Hamzah[3], Mohd Johari Jusoh[4], Zamri Chik[5]

[1 2 3 4] *Faculty of Islamic Contemporary Studies, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Terengganu, Terengganu, Malaysia*
[5]*Terengganu Strategic & Integrity Institute, No Lot Pt 2486 & Pt 3942, Jalan Kemajuan, 20300 Kuala Terengganu, Terengganu, Malaysia*

**Corresponding author; Email: abdullahibrahim@unisza.edu.my*

Received: 11 June 2025 **Accepted:** 19 September, 2025
Revision: 15 August 2025 **Published:** 01 October 2025. **Vol**-6, **Issue**-3

Cite as: Tahir *et* al. (2025). The Validity and Reliability Constructs of The Servant Leadership, Headmaster Motivation and Innovative Teachers of Terengganu National Schools. *ICRRD Journal, 6*(3), 195-216.

Abstract*:* Teachers who have been teaching for a long time will often use the same methods and they will be in their comfort zone and at this stage change is difficult to do. Servant leadership is a follower-oriented leadership style, so servant leadership is expected to increase employee satisfaction, commitment and performance (van Dierendonck, 2018). In addition, servant leaders work to meet the psychological, well-being and career development needs of followers so that followers not only show a positive attitude towards work, but are also more proactive and work more effectively (Eva, Robin, Sendjaya, van Dierendonck & Liden, 2019; Sendjaya, Sarros, & Santora, 2018; van Dierendonck, 2018). This study was conducted to develop and validate an instrument based on the EFA process for measuring the Servant Leadership (based on Valuing Individuals, Building Intellectual Stimulation, Building Communities, Showing Authenticity), Headmaster Motivation and Innovative Teachers of Terengganu National Schools. This study uses quantitative research methods based on Structural Equation Modeling (SEM) to analyze various relationships between variables in the study model. Before the data is analyzed using SEM, Exploratory Factor Analysis (EFA) is carried out to identify the appropriateness of the items used in the research instrument. This study describes in detail the procedure of conducting EFA analysis for each construct. The findings of this study show validity values based on Kaiser-Meyer-Olkin (KMO), Total Variance Explained (TVE), Factor Loading (FL) and reliability values based on Cronbach's Alpha (CA), have met all the required values.

Keywords: Exploratory Factor Analysis (EFA), Validity, Total Variance Explained, Factor Loading, Reliability.

Introduction

Education plays an important role in the economic development and development of a country. The best education system is capable of producing knowledgeable workers, capable of thinking critically and creatively and able to communicate effectively at the global level (Ministry of Education Malaysia, 2012). To improve the quality of national education so that it is in line with the needs of global education, the government continues to make improvements in the national education system such

as the implementation of the Education Development Master Plan (PIPP) 2006 - 2010 and the Malaysian Education Development Plan (PPPM) 2013-2025 (Ministry of Education Malaysia, 2012). As a major player in the field of education, the active involvement of teachers in additional work, in addition to their core duties, can improve the quality and performance of education, and make schools a better educational institution (Abu Nasra & Heilbrunn, 2016). To achieve success in change management, every organization needs effective leadership with strong soft skills competencies to mobilize teachers who are at the forefront of efforts to improve educational excellence. Therefore, school organizations need to have an effective leader so that changes implemented at the school level can be properly administered.

According to Fullan (2018), the principal is a change manager and the core of the task of leading change in schools. As a manager at the school level, the principal is the most important person who can influence the success of the school (Fullan, 2018; Hallinger, 2019). Leadership is what moves the school forward or vice versa (Shahril, 2021). What is clear is that changes are made to improve the education system at all levels and its success is closely related to the leadership of the organization (Ghitulescu, 2019; Kotter, 2018; Lunenburg, 2020). Our country's desire to achieve the status of a developed country which has caused rapid development in the field of technology and caused changes in the social dynamics of society in Malaysia, it is natural that the functions and duties of teachers need to change. Teachers must innovate to meet the needs and demands resulting from this era of globalization. Innovation means something new that is introduced such as new methods, systems, customs, and others. In other words, innovation is improving and renewing something that already exists. This is because innovation comes from the Latin word 'innovare' which means to renew or amend.

Innovative teachers have the ability to equip students with new millennium skills, such as the ability to think wisely, solve problems and have high creativity. There are many challenges faced by the younger generation, especially in this era of globalization. Teachers should be able to prepare students so that they can navigate this globalization trend. According to Hamdan and Nasrudi (2020), the globalization trend that has hit will change almost the entire way of life, both in the political, economic, social and cultural fields, so that the world has become so big that it has turned into a small village called a global village and as a result we have become a world community. This shows that students need to be able to cross a platform that allows them to 'sit as low, stand as high' with the world community. There is no denying that there are advantages, especially for students in developed countries in particular. The purpose of this research is to identify the influence of Servant Leadership (based on Valuing Individuals, Developing Individuals, Building Communities, Showing Authenticity, Providing Leadership, Sharing Leadership) and Headmaster Motivation on Innovative Teachers among teachers of Terengganu National Schools.

Explortory Factor Analysis (EFA)

EFA is conducted to identify some components that exist in the set of questionnaires that have been formed. EFA is a statistical technique that transforms a set of original construct data linearly into a set of smaller constructs that can give a comprehensive picture of all the information contained in the original construct (Duntemen, 1989). The purpose of EFA is to reduce the dimensions of the original data to several smaller components that can be interpreted more easily and meaningfully (Duntemen, 1989; Lewis-Beck, 1994 & Field, 2006). According to Tabachnick and Fidell (2007), EFA needs to go

through several stages. The first stage calculates the correlation matrix between all the factor-analyzed constructs. The next stage involves extracting some factors from the correlation matrix and determining the number of factors formed. The rotation of the factors is done to improve the interpretation so that the factors are more meaningful and can be interpreted. The final and most important stage in factor analysis is to interpret the results of the factors obtained and give an appropriate name to each factor.

This study uses items in an instrument that has been built by the researcher himself. According to Chik and Abdullah (2018), Chik, Abdullah, Ismail and Mohd Noor (2024), Awang (2012) and Hoque et al. (2017), if a researcher adapts an item that has been built by a previous researcher or builds a new item in the instrument or modifies the statement to fit the current study, then they need to re-run the EFA (Exploratory Factor Analysis) procedure. This is because the current study area may be different from previous studies, or the current study population is much different from previous studies in terms of socio-economic status, race and culture. Therefore, there may be some items that were built before, no longer suitable for the current study or there may also be a different item structure in the current study compared to the structure in the previous study. Thus, researchers need to recalculate the Internal Reliability value for the current instrument, which is the new Alpha Cronbach value (Chik et al., 2024, Awang, 2012; Hoque et al., 2017).

Findings

Exploratory Factor Analysis (EFA) for Servant Leadership Based on Valuing Individuals

The Servant Leadership based on Valuing Individuals which uses as many as five (5) items and is labeled as MI1 to MI5. Next, the use of an interval scale for the measurement of items is between one (1) to 10. Principal Component Analysis (PCA) in the EFA process using varimax rotation for the Servant Leadership based on Valuing Individuals for the measurement of five (5) items. Table 1 below shows the Bartlett's test results that are significant for P values less than 0.05 ($P < 0.05$). Next, the value for the measurement of sampling adequacy from Kaiser-Meyer-Olkin (KMO) is 0.844. The value obtained has exceeded the minimum limit value of 0.6 and the achievement of both of these tests (Bartlet's test is significant and KMO value > 0.6), showing that the data used in this study is appropriate according to the EFA procedure (Chik et al., 2024; Hoque et al., 2017; Awang, 2012).

Table 1: KMO Values and Bartlet's Test for Servant Leadership Based on Valuing Individuals

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.844
Bartlett's Test of Sphericity	Approx. Chi-Square	346.759
	df	10
	Sig.	0.000

Total Variance Explained (TVE) is important for researchers to know what percentage of the items used can measure a research construct. Reading from Table 2 below found that Servant Leadership based on Valuing Individuals measured using five (5) items in one (1) component can measure Servant

Leadership based on Valuing Individuals as much as 73.117%. This value is sufficient because it exceeds the minimum requirement of 60% (Chik et al., 2024; Hoque et al., 2017).

Table 2: Total Variance Explained for Servant Leadership Based on Valuing Individuals

Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	3.656	73.117	73.117

Thus, the researcher wants to know the selected items to measure the component. Table 3 below shows the distribution of items accepted to measure Servant Leadership based on Valuing Individuals. All items have a factor loading value exceeding the minimum limit of 0.6 and items that are less than 0.6 should be discarded because they do not contribute to the measurement of the construct (Chik et al., 2024).

Table 3: Factor Loading for One (1) Component Servant Leadership Based on Valuing Individuals

Component Matrix[a]	
Items	Component
MI1	0.720
MI2	0.868
MI3	0.877
MI4	0.915
MI5	0.882

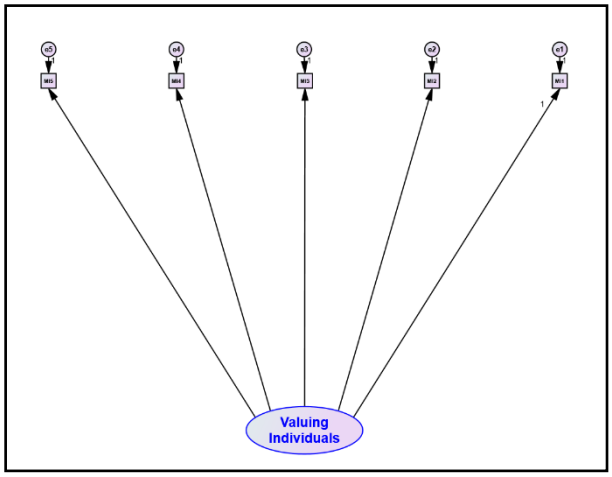

Figure 1: Position of Components and Items for Servant Leadership Based on Valuing Individuals (Before and After EFA)

Another piece of information that researchers need to report is the reliability value of the items that have been built to measure that construct. The measure of instrument reliability is estimated through Cronbach's Alpha value that exceeds the minimum limit of 0.7 to be adopted in the study. Table 4 below shows the Cronbach's Alpha value for each item in the Servant Leadership based on Valuing Individuals that exceeds 0.7 and can be used in this study (Chik et al., 2024).

Table 4: Cronbach's Alpha Value for Each Item in the Servant Leadership Based on Valuing Individuals

Component	Number of Items	Cronbach's Alpha
1	5	0.896

Exploratory Factor Analysis (EFA) for Servant Leadership Based on Developing Individuals

The Servant Leadership based on Developing Individuals which uses as many as five (5) items and is labeled as MB1 to MB5. Next, the use of an interval scale for the measurement of items is between one (1) to 10. Principal Component Analysis (PCA) in the EFA process using varimax rotation for the Servant Leadership based on Developing Individuals for the measurement of five (5) items. Table 5 below shows the Bartlett's test results that are significant for P values less than 0.05 ($P < 0.05$). Next, the value for the measurement of sampling adequacy from Kaiser-Meyer-Olkin (KMO) is 0.869. The value obtained has exceeded the minimum limit value of 0.6 and the achievement of both of these tests (Bartlet's test is significant and KMO value > 0.6), showing that the data used in this study is appropriate according to the EFA procedure (Chik et al., 2024; Hoque et al., 2017; Awang, 2012).

Table 5: KMO Values and Bartlet's Test for Servant Leadership Based on Developing Individuals

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.869
Bartlett's Test of Sphericity	Approx. Chi-Square	468.080
	df	10
	Sig.	0.000

Total Variance Explained (TVE) is important for researchers to know what percentage of the items used can measure a research construct. Reading from Table 6 below found that Servant Leadership based on Developing Individuals measured using five (5) items in one (1) component can measure Servant Leadership based on Developing Individuals as much as 81.883%. This value is sufficient because it exceeds the minimum requirement of 60% (Chik et al., 2024; Hoque et al., 2017).

Table 6: Total Variance Explained for Servant Leadership Based on Developing Individuals

Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	4.094	81.883	81.883

Thus, the researcher wants to know the selected items to measure the component. Table 7 below shows the distribution of items accepted to measure Servant Leadership based on Developing Individuals. All items have a factor loading value exceeding the minimum limit of 0.6 and items that are less than 0.6 should be discarded because they do not contribute to the measurement of the construct (Chik et al., 2024).

Table 7: Factor Loading for One (1) Component Servant Leadership Based on Developing Individuals

Component Matrix[a]	
Items	Component
MB1	0.911
MB2	0.901
MB3	0.921
MB4	0.916
MB5	0.874

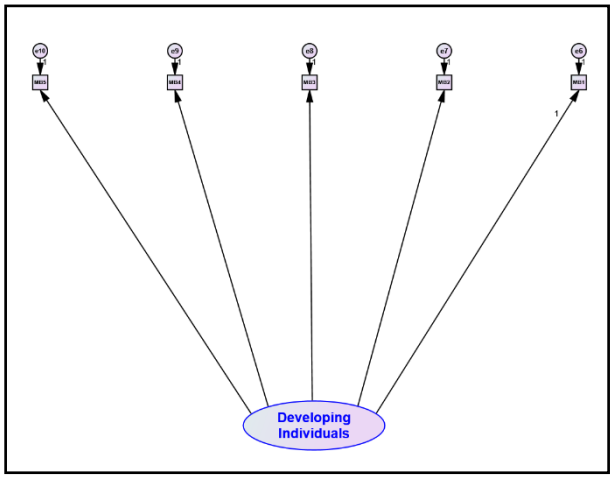

Figure 2: Position of Components and Items for Servant Leadership Based on Developing Individuals (Before and After EFA)

Another piece of information that researchers need to report is the reliability value of the items that have been built to measure that construct (Hossen & Pauzi, 2025b). The measure of instrument reliability is estimated through Cronbach's Alpha value that exceeds the minimum limit of 0.7 to be

adopted in the study. Table 8 below shows the Cronbach's Alpha value for each item in the Servant Leadership based on Developing Individuals that exceeds 0.7 and can be used in this study (Chik et al., 2024; Hoque et al., 2017).

Table 8: Cronbach's Alpha Value for Each Item in the Servant Leadership Based on Developing Individuals

Component	Number of Items	Cronbach's Alpha
1	5	0.943

Exploratory Factor Analysis (EFA) for Servant Leadership Based on Building Communities

The Servant Leadership based on Building Communities which uses as many as five (5) items and is labeled as MK1 to MK5. Next, the use of an interval scale for the measurement of items is between one (1) to 10. Principal Component Analysis (PCA) in the EFA process using varimax rotation for the Servant Leadership based on Building Communities for the measurement of five (5) items. Table 9 below shows the Bartlett's test results that are significant for P values less than 0.05 ($P < 0.05$). Next, the value for the measurement of sampling adequacy from Kaiser-Meyer-Olkin (KMO) is 0.883. The value obtained has exceeded the minimum limit value of 0.6 and the achievement of both of these tests (Bartlet's test is significant and KMO value > 0.6), showing that the data used in this study is appropriate according to the EFA procedure (Chik et al., 2024; Hoque et al., 2017; Awang, 2012).

Table 9: KMO Values and Bartlet's Test for Servant Leadership Based on Building Communities

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.883
Bartlett's Test of Sphericity	Approx. Chi-Square	425.737
	df	10
	Sig.	0.000

Total Variance Explained (TVE) is important for researchers to know what percentage of the items used can measure a research construct. Reading from Table 10 below found that Servant Leadership based on Building Communities measured using five (5) items in one (1) component can measure Servant Leadership based on Building Communities as much as 79.817%. This value is sufficient because it exceeds the minimum requirement of 60% (Chik et al., 2024; Hoque et al., 2017).

Table 10: Total Variance Explained for Servant Leadership Based on Building Communities

Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	3.991	79.817	79.817

Thus, the researcher wants to know the selected items to measure the component. Table 11 below shows the distribution of items accepted to measure Servant Leadership based on Building Communities (Alam et al., 2025). All items have a factor loading value exceeding the minimum limit of 0.6 and items that are less than 0.6 should be discarded because they do not contribute to the measurement of the construct (Chik et al., 2024).

Table 11: Factor Loading for One (1) Component Servant Leadership Based on Building Communities

Component Matrix[a]	
Items	Component
MK1	0.869
MK2	0.933
MK3	0.868
MK4	0.877
MK5	0.918

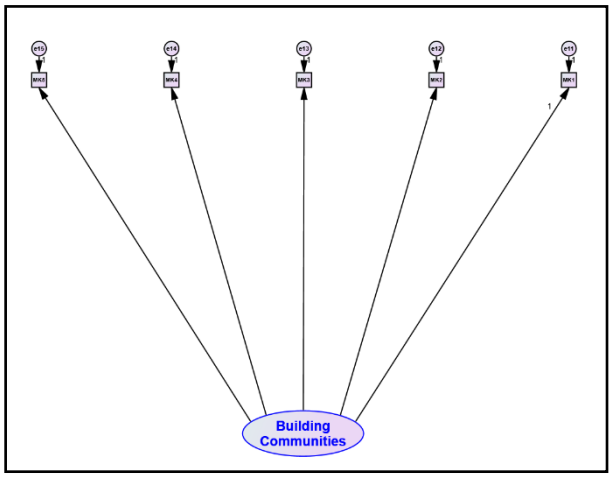

Figure 3: Position of Components and Items for Servant Leadership Based on Building Communities (Before and After EFA)

Another piece of information that researchers need to report is the reliability value of the items that have been built to measure that construct. The measure of instrument reliability is estimated through Cronbach's Alpha value that exceeds the minimum limit of 0.7 to be adopted in the study. Table 12 below shows the Cronbach's Alpha value for each item in the Servant Leadership based on Building Communities that exceeds 0.7 and can be used in this study (Chik et al., 2024).

Table 12: Cronbach's Alpha Value for Each Item in the Servant Leadership Based on Building Communities

Component	Number of Items	Cronbach's Alpha
1	5	0.935

Exploratory Factor Analysis (EFA) for Servant Leadership Based on Showing Authenticity

The Servant Leadership based on Showing Authenticity which uses as many as five (5) items and is labeled as MP1 to MP5. Next, the use of an interval scale for the measurement of items is between one (1) to 10. Principal Component Analysis (PCA) in the EFA process using varimax rotation for the Servant Leadership based on Showing Authenticity for the measurement of five (5) items. Table 13 below shows the Bartlett's test results that are significant for P values less than 0.05 ($P < 0.05$). Next, the value for the measurement of sampling adequacy from Kaiser-Meyer-Olkin (KMO) is 0.843. The value obtained has exceeded the minimum limit value of 0.6 and the achievement of both of these tests (Bartlet's test is significant and KMO value > 0.6), showing that the data used in this study is appropriate according to the EFA procedure (Chik et al., 2024; Hoque et al., 2017; Awang, 2012).

Table 13: KMO Values and Bartlet's Test for Servant Leadership Based on Showing Authenticity

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.843
Bartlett's Test of Sphericity	Approx. Chi-Square	554.393
	df	10
	Sig.	0.000

Table 14 below found that Servant Leadership based on Showing Authenticity measured using five (5) items in one (1) component can measure Servant Leadership based on Showing Authenticity as much as 84.254%. This value is sufficient because it exceeds the minimum requirement of 60% (Chik et al., 2024; Hoque et al., 2017).

Table 14: Total Variance Explained for Servant Leadership Based on Showing Authenticity

Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	4.213	84.254	84.254

Thus, the researcher wants to know the selected items to measure the component. Table 15 below shows the distribution of items accepted to measure Servant Leadership based on Showing Authenticity. All items have a factor loading value exceeding the minimum limit of 0.6 and items that

are less than 0.6 should be discarded because they do not contribute to the measurement of the construct (Chik et al., 2024).

Table 15: Factor Loading for One (1) Component Servant Leadership Based on Showing Authenticity

Component Matrix[a]	
Items	Component
MP1	0.940
MP2	0.919
MP3	0.939
MP4	0.885
MP5	0.906

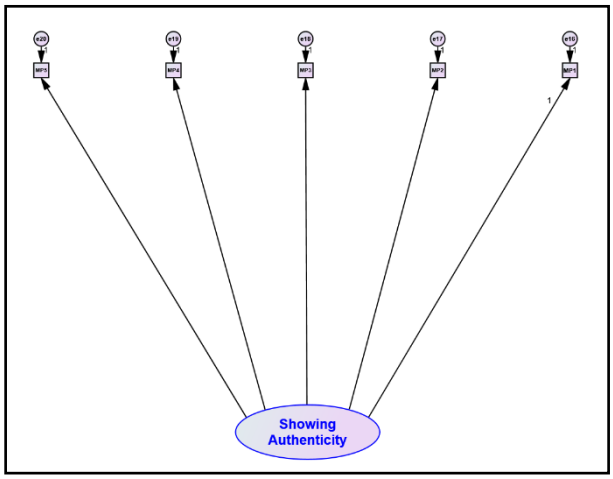

Figure 4: Position of Components and Items for Servant Leadership Based on Showing Authenticity (Before and After EFA)

Another piece of information that researchers need to report is the reliability value of the items that have been built to measure that construct. The measure of instrument reliability is estimated through Cronbach's Alpha value that exceeds the minimum limit of 0.7 to be adopted in the study. Table 16 below shows the Cronbach's Alpha value for each item in the Servant Leadership based on Showing Authenticity that exceeds 0.7 and can be used in this study (Chik et al., 2024).

Table 16: Cronbach's Alpha Value for Each Item in the Servant Leadership Based on Showing Authenticity

Component	Number of Items	Cronbach's Alpha
1	5	0.953

Exploratory Factor Analysis (EFA) for Servant Leadership Based on Providing Leadership

The Servant Leadership based on Providing Leadership which uses as many as five (5) items and is labeled as MY1 to MY5. Next, the use of an interval scale for the measurement of items is between one (1) to 10. Principal Component Analysis (PCA) in the EFA process using varimax rotation for the Servant Leadership based on Providing Leadership for the measurement of five (5) items. Table 17 below shows the Bartlett's test results that are significant for P values less than 0.05 ($P < 0.05$). Next, the value for the measurement of sampling adequacy from Kaiser-Meyer-Olkin (KMO) is 0.866. The value obtained has exceeded the minimum limit value of 0.6 and the achievement of both of these tests (Bartlet's test is significant and KMO value > 0.6), showing that the data used in this study is appropriate according to the EFA procedure (Chik et al., 2024; Hoque et al., 2017; Awang, 2012).

Table 17: KMO Values and Bartlet's Test for Servant Leadership Based on Providing Leadership

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.866
Bartlett's Test of Sphericity	Approx. Chi-Square	625.712
	df	10
	Sig.	0.000

Total Variance Explained (TVE) is important for researchers to know what percentage of the items used can measure a research construct. Reading from Table 18 below found that Servant Leadership based on Providing Leadership measured using five (5) items in one (1) component can measure Servant Leadership based on Providing Leadership as much as 86.436%. This value is sufficient because it exceeds the minimum requirement of 60% (Chik et al., 2024; Hoque et al., 2017).

Table 18: Total Variance Explained for Servant Leadership Based on Providing Leadership

Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	4.322	86.436	86.436

Thus, the researcher wants to know the selected items to measure the component. Table 19 below shows the distribution of items accepted to measure Servant Leadership based on Providing Leadership. All items have a factor loading value exceeding the minimum limit of 0.6 and items that are less than 0.6 should be discarded because they do not contribute to the measurement of the construct (Chik et al., 2024).

Table 19: Factor Loading for One (1) Component Servant Leadership Based on Providing Leadership

Component Matrix[a]	
Items	Component
MY1	0.893
MY2	0.967
MY3	0.907
MY4	0.936
MY5	0.944

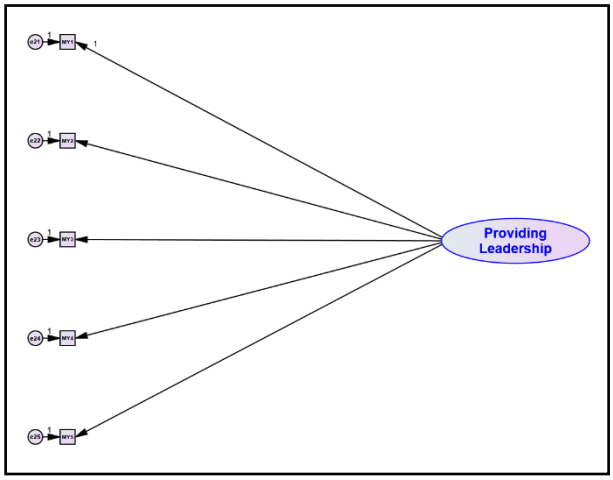

Figure 5: Position of Components and Items for Servant Leadership Based on Providing Leadership (Before and After EFA)

Another piece of information that researchers need to report is the reliability value of the items that have been built to measure that construct. The measure of instrument reliability is estimated through Cronbach's Alpha value that exceeds the minimum limit of 0.7 to be adopted in the study. Table 20 below shows the Cronbach's Alpha value for each item in the Servant Leadership based on Providing Leadership that exceeds 0.7 and can be used in this study (Chik et al., 2024; Hoque et al., 2017).

Table 20: Cronbach's Alpha Value for Each Item in Servant Leadership Based on Providing Leadership

Component	Number of Items	Cronbach's Alpha
1	5	0.960

Exploratory Factor Analysis (EFA) for Servant Leadership Based on Sharing Leadership

The Servant Leadership based on Sharing Leadership which uses as many as five (5) items and is labeled as MG1 to MG5. Next, the use of an interval scale for the measurement of items is between one (1) to 10. Principal Component Analysis (PCA) in the EFA process using varimax rotation for the

Servant Leadership based on Sharing Leadership for the measurement of five (5) items. Table 21 below shows the Bartlett's test results that are significant for P values less than 0.05 ($P < 0.05$). Next, the value for the measurement of sampling adequacy from Kaiser-Meyer-Olkin (KMO) is 0.866. The value obtained has exceeded the minimum limit value of 0.6 and the achievement of both of these tests (Bartlet's test is significant and KMO value > 0.6), showing that the data used in this study is appropriate according to the EFA procedure (Chik et al., 2024; Hoque et al., 2017; Awang, 2012).

Table 21: KMO Values and Bartlet's Test for Servant Leadership Based on Sharing Leadership

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.866
Bartlett's Test of Sphericity	Approx. Chi-Square	621.719
	df	10
	Sig.	0.000

Total Variance Explained (TVE) is important for researchers to know what percentage of the items used can measure a research construct. Reading from Table 22 below found that Servant Leadership based on Sharing Leadership measured using five (5) items in one (1) component can measure Servant Leadership based on Sharing Leadership as much as 86.288%. This value is sufficient because it exceeds the minimum requirement of 60% (Chik et al., 2024; Hoque et al., 2017).

Table 22: Total Variance Explained for Servant Leadership Based on Sharing Leadership

Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	4.314	86.288	86.288

Thus, the researcher wants to know the selected items to measure the component. Table 23 below shows the distribution of items accepted to measure Servant Leadership based on Sharing Leadership. All items have a factor loading value exceeding the minimum limit of 0.6 and items that are less than 0.6 should be discarded because they do not contribute to the measurement of the construct (Chik et al., 2024).

Table 23: Factor Loading for One (1) Component Servant Leadership Based on Sharing Leadership

Component Matrix[a]	
Items	Component
MG1	0.891
MG2	0.967

MG3	0.906
MG4	0.936
MG5	0.943

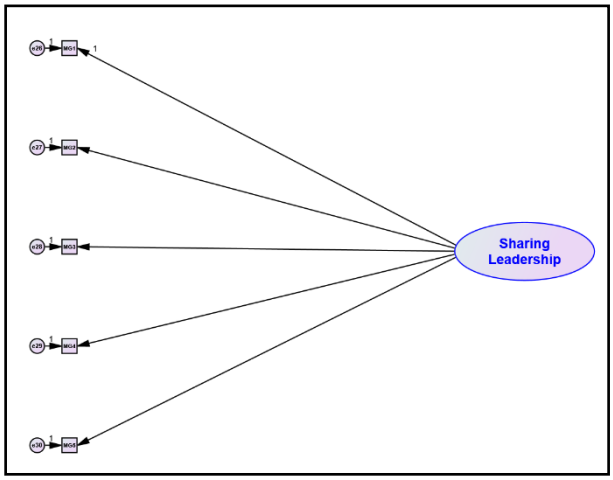

Figure 6: Position of Components and Items for Servant Leadership Based on Sharing Leadership (Before and After EFA)

The measure of instrument reliability is estimated through Cronbach's Alpha value that exceeds the minimum limit of 0.7 to be adopted in the study. Table 24 below shows the Cronbach's Alpha value for each item in the Servant Leadership based on Sharing Leadership that exceeds 0.7 and can be used in this study (Chik et al., 2024; Hoque et al., 2017).

Table 24: Cronbach's Alpha Value for Each Item in the Servant Leadership Based on Sharing Leadership

Component	Number of Items	Cronbach's Alpha
1	5	0.960

Exploratory Factor Analysis (EFA) for Headteacher Motivation

The Headteacher Motivation which uses as many as 20 items and is labeled as MD1 to MD10 and ML1 to ML10. Next, the use of an interval scale for the measurement of items is between one (1) to 10. Principal Component Analysis (PCA) in the EFA process using varimax rotation for the Headteacher Motivation for the measurement of 20 items. Table 25 below shows the Bartlett's test results that are significant for P values less than 0.05 ($P < 0.05$). Next, the value for the measurement of sampling adequacy from Kaiser-Meyer-Olkin (KMO) is 0.868. The value obtained has exceeded the minimum limit value of 0.6 and the achievement of both of these tests (Bartlet's test is significant and KMO value > 0.6), showing that the data used in this study is appropriate according to the EFA procedure (Chik et al., 2024; Hoque et al., 2017; Awang, 2012).

Table 25: KMO Values and Bartlet's Test for Headteacher Motivation

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.868
Bartlett's Test of Sphericity	Approx. Chi-Square	2551.577
	df	190
	Sig.	0.000

Total Variance Explained (TVE) is important for researchers to know what percentage of the items used can measure a research construct. Reading from Table 26 below found that Headteacher Motivation measured using 20 items in two (2) component can measure Headteacher Motivation as much as 72.531%. This value is sufficient because it exceeds the minimum requirement of 60% (Chik et al., 2024; Hoque et al., 2017).

Table 26: Total Variance Explained for Headteacher Motivation

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	8.093	44.464	44.464
2	5.413	32.067	72.531

Thus, the researcher wants to know the selected items to measure the component. Table 27 below shows the distribution of items accepted to measure Headteacher Motivation. All items have a factor loading value exceeding the minimum limit of 0.6 and items that are less than 0.6 should be discarded because they do not contribute to the measurement of the construct (Chik et al., 2024).

Table 27: Factor Loading for One (1) Component Headteacher Motivation

	Component Matrix[a]
Items	Component
MD1	0.721
MD2	0.778
MD3	0.713
MD4	0.759
MD5	0.720
MD6	0.741

MD7		0.776
MD8		0.709
MD9		0.707
MD10		0.735
ML1	0.882	
ML2	0.797	
ML3	0.897	
ML4	0.922	
ML5	0.921	
ML6	0.930	
ML7	0.890	
ML8	0.900	
ML9	0.905	
ML10	0.916	

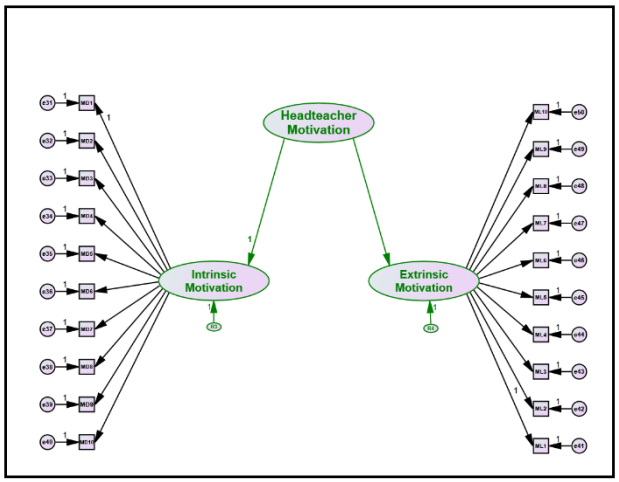

Figure 7: Position of Components and Items for Headteacher Motivation (Before and After EFA)

The measure of instrument reliability is estimated through Cronbach's Alpha value that exceeds the minimum limit of 0.7 to be adopted in the study. Table 28 below shows the Cronbach's Alpha value for each item in the Headteacher Motivation that exceeds 0.7 and can be used in this study (Chik et al., 2024; Hoque et al., 2017).

Table 28: Cronbach's Alpha Value for Each Item in the Headteacher Motivation

Component	Number of Items	Cronbach's Alpha
1	10	0.840
2	10	0.972
Total	20	0.944

Exploratory Factor Analysis (EFA) for Innovative Teachers

The Innovative Teachers which uses as many as 10 items and is labeled as GI1 to GI10. Next, the use of an interval scale for the measurement of items is between one (1) to 10. Principal Component Analysis (PCA) in the EFA process using varimax rotation for the Innovative Teachers for the measurement of 10 items. Table 29 below shows the Bartlett's test results that are significant for P values less than 0.05 ($P < 0.05$). Next, the value for the measurement of sampling adequacy from Kaiser-Meyer-Olkin (KMO) is 0.923. The value obtained has exceeded the minimum limit value of 0.6 and the achievement of both of these tests (Bartlet's test is significant and KMO value > 0.6), showing that the data used in this study is appropriate according to the EFA procedure (Chik et al., 2024; Hoque et al., 2017; Awang, 2012).

Table 29: KMO Values and Bartlet's Test for Innovative Teachers

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.923
Bartlett's Test of Sphericity	Approx. Chi-Square	1422.935
	df	45
	Sig.	0.000

Total Variance Explained (TVE) is important for researchers to know what percentage of the items used can measure a research construct. Reading from Table 30 below found that Innovative Teachers measured using 10 items in one (1) component can measure Innovative Teachers as much as 80.887%. This value is sufficient because it exceeds the minimum requirement of 60% (Chik et al., 2024; Hoque et al., 2017).

Table 30: Total Variance Explained for Innovative Teachers

Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	8.089	80.887	80.887

Thus, the researcher wants to know the selected items to measure the component. Table 31 below shows the distribution of items accepted to measure Innovative Teachers. All items have a factor loading value exceeding the minimum limit of 0.6 and items that are less than 0.6 should be discarded because they do not contribute to the measurement of the construct (Chik et al., 2024).

Table 31: Factor Loading for One (1) Component Innovative Teachers

Component Matrix[a]	
Items	Component
GI1	0.887
GI2	0.813
GI3	0.893
GI4	0.930
GI5	0.927
GI6	0.933
GI7	0.887
GI8	0.898
GI9	0.907
GI10	0.913

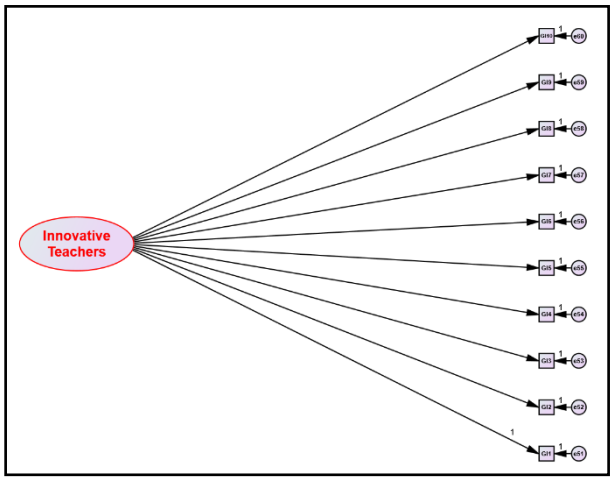

Figure 8: Position of Components and Items for Innovative Teachers (Before and After EFA)

The measure of instrument reliability is estimated through Cronbach's Alpha value that exceeds the minimum limit of 0.7 to be adopted in the study. Table 32 below shows the Cronbach's Alpha value for each item in the Innovative Teachers that exceeds 0.7 and can be used in this study (Chik et al., 2024; Hoque et al., 2017).

Table 32: Cronbach's Alpha Value for Each Item in the Innovative Teachers

Component	Number of Items	Cronbach's Alpha
1	10	0.973

Overall Results of Exploratory Factor Analysis (EFA)

Based on the results of the EFA analysis on the questionnaire items, no items were excluded. Table 33 below shows the overall latest position of the items after the EFA analysis was carried out.

Table 33: Overall EFA Analysis

No	Constructs	Validity				Reliability
		Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO>0.6)	Bartlett's Test of Sphericity (Sig.< 0.05)	Total Variance Explained (>60%)	Items Factor Loading (>0.60)	Cronbach's Alpha (>0.70)
1	Servant Leadership					
	a) Valuing Individuals	0.844	0.000	73.117%	5 item > 0.60	0.896
	b) Developing Individuals	0.869	0.000	81.883%	5 item > 0.60	0.943
	c) Building Communities	0.883	0.000	79.817%	5 item > 0.60	0.935
	d) Showing Authenticity	0.843	0.000	84.254%	5 item > 0.60	0.953
	e) Providing Leadership	0.866	0.000	86.436%	5 item > 0.60	0.960
	f) Sharing Leadership	0.866	0.000	86.288%	5 item > 0.60	0.960
2	Headteacher Motivation					0.944
	a) Intrinsic Motivation	0.868	0.000	72.531%	10 item > 0.60	0.840
	b) Extrinsic Motivation				10 item > 0.60	0.972
3	Innovative Teachers	0.923	0.000	80.887%	10 item > 0.60	0.973

Conclusion

Overall, the requirements of the items in each Servant Leadership (based on Valuing Individuals, Developing Individuals, Building Communities, Showing Authenticity, Providing Leadership, Sharing Leadership), Headmaster Motivation and Innovative Teachers of Terengganu National Schools, as a whole meet the achievement of Bartlet's Test (significant), KMO value (> 0.6), factor loading value

exceeds the minimum limit of 0.6 and Cronbach's Alpha exceeds the minimum limit of 0.7 to be used in the study. This reflects that the items are not set aside and qualified to be used in this study (Chik et al., 2024; Hoque et al., 2017). Figure 9 shows all the items in the study model after EFA.

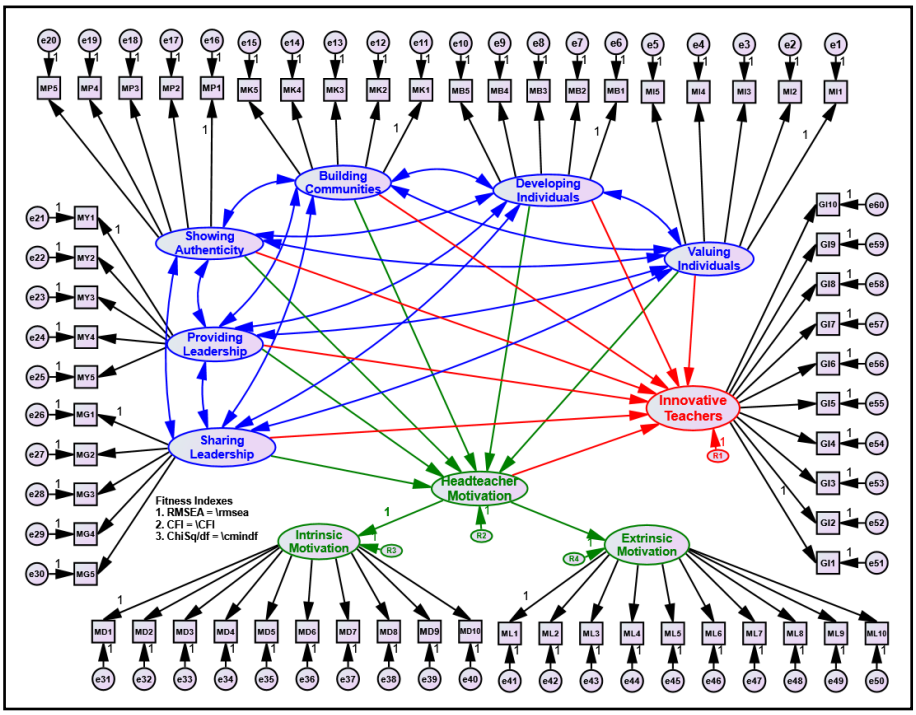

Figure 9: Overall Servant Leadership, Headmaster Motivation and Innovative Teachers

Acknowledgement

Special appreciation is owed to Universiti Sultan Zainal Abidin (UniSZA), Research Management, Innovation & Commercialization Centre (RMIC) UniSZA & Ministry of Higher Education Malaysia (MOHE).

Funding: The research did not receive financial assistance from any funding entity.

Conflicts of Interest: The author has no conflicts of interest to disclose concerning this study.

Declarations: This manuscript has not been published to any other journal or online sources.

Data Availability: The author has all the data employed in this research and is open to sharing it upon reasonable request.

References

Abu Nasra, M. and Heilbrunn, S. (2016), "Transformational leadership and organizational citizenship behavior in the Arab educational system in Israel: the impact of trust and job satisfaction", *Educational Management Administration & Leadership, Vol. 44* No. 3, pp. 380-396.

Awang, Z. (2012). *Structural equation modelling using AMOS graphic*. Penerbit Universiti Teknologi MARA.

Chik, Z., & Abdullah, A. H. (2018). Developing and validating instruments for measurement of motivation, learning styles and learning disciplines for academic achievement. *International Journal of Academic Research in Business and Social Sciences, 8* (4), 594 - 605.

Chik, Z., Abdullah, A. H., Ismail, M. S. & Mohd Noor, A. Z. (2024). Impact of Industrial Revolution 4.0 (IR4.0) Knowledge, Application Learning, University Policy, Commitment to Study and Motivation on Assimilate IR4.0 in Education. *Journal of Economics, Finance and Management Studies, 7* (4), 3884 – 3889.

Chik, Z., Abdullah, A. H., Muda, M. R., Muda, H., Hashim, A.Mohamed, M. L., Said, S. & Kamaruddin, K. (2022). Determinants of Residential Satisfaction towards Low-cost Housing in Terengganu. *Journal of Engineering Research and Education (JERE): Vol. 13*, 35-43.

Duntemen, G. H. (1989). *Principles components analysis: Quantitative applications in the social sciences*. California: Sage Publications, Inc.

Eva, N., Robin, M., Sendjaya, S., van Dierendonck, D., & Liden, R. C. (2019). Servant leadership : A systematic review and call for future research. *The Leadership Quarterly*, *30*, 111–132.

Field, A. (2006). *Discovering statistics using SPSS*. London: Sage Publications Ltd.

Fullan, M. (2018). *The New Meaning of Educational Change.* New York: Teacher College Press.

Ghitulescu, B. E. (2019). Making change happen: The impact of work context on adaptive and proactive behaviours. *Journal of Applied Behavioral Science 49*(2): 206-245.

Greenleaf, R. K. (1998). *The power of servant-leadership*. San Francisco: Berrett-Koehler.

Hallinger, P. (2019). Leadership for 21st century schools: From instructional leadership to leadership for learning. In *Proceeding 1st Regional Conference on Educational Leadership and Management.* Institut Aminuddin Baki: Kementerian Pelajaran Malaysia.

Hamdan Said & Nasrudin Talib (2020). Cabaran globalisasi ke atas warga pendidik di Malaysia. *Jurnal Pendidikan, 6* (1), 35-46.

Hoque, A. S. M. M., Awang, Z., Jusoff, K., Salleh, F., and Muda, H (2017). Social Business Efficiency: Instrument Development and Validation Procedure using Structural Equation Modelling. *International Business Management, 11*(1), 222-231.

Ismail M. S., Yaakob, R. & Chik, Z. (2025). Developing and Validating Instruments for Measuring System Economic Conventional, System Economic Islam, Marketing Digital and Perfection Gold Marketing. *ICRRD Journal, 6*(2), 142-155.

Kotter, J. P. (2018). *The Hearts of Change : Real-life Stories of How People Change Their Organizations.* Boston: Harvard Business School Press.

Lewis-Beck M. S. (1994). *Factor analysis and related techniques*. London: Sage Publication, Ltd.

Lunenburg, F. C. (2020). Force for and resistance to organizational change. *National Forum of Educational Administration and Supervision Journal 27*(4): 1-10.

Alam et al., 2025. (2025). *Online Corrective Feedback and Self-Regulated Writing: Exploring Student*

Perceptions and Challenges in Higher Education. *15*(06), 139–150. https://doi.org/https://doi.org/10.5430/wjel.v15n6p139

Hossen, M. S., & Pauzi, H. M. (2025b). Synthesis of Psychological Wellbeing of the Elderly Individuals Literature Using Bibliometric Analysis. *Pertanika Journal of Social Sciences & Humanities*, *33*(3).

Ministry of Education Malaysia (Kementerian Pendidikan Malaysia) (2012). *Pelan pembangunan pendidikan Malaysia*. Putrajaya: Kementerian Pendidikan Malaysia.

Roslee Talip, Mohd Yusof Abdullah, Baharom Mohamad, Abdul Said Ambotang, Shukri Zain & Muhamad Suhaimi Taat (2018). *Guru sebagai agen transformasi dalam inovasi kurikulum*. Universiti Malaysia Sabah.

Sendjaya, S., Sarros, J. C., & Santora, J. C. (2018). Defining and measuring servant leadership behaviour in organizations. *Journal of Management Studies*, *45* (2), 402 – 424.

Shahril @ Chairil Marzuki (2021). Ciri-ciri kepimpinan pengetua/Guru Besar yang dapat menghadapi cabaran dan harapan pada abad ke 21 ini. *Jurnal Institut Pengetua Universiti Malaya 1* (1): 7 - 17.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics (6th ed.).* Boston, MA: Pearson.

van Dierendonck, D. (2018). Servant leadership: A review and synthesis. *Journal of Management*, *37*(4), 1228–1261.

This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium upon the work for non-commercial, provided the original work is properly cited.