ANALYSING THE FACTORS CONTRIBUTING TO THE ECONOMIC GROWTH OF NIGERIA WITH FACTOR ANALYSIS TECHNIQUE

Pwasong, A.D.[1]*, Bwirdimma, G.D.[2], Ujah, A.H.[3], Mammuan, A.T.[4]

[1]Department of Mathematics, University of Jos, Jos, Nigeria.
[2]Department of Mathematics, Federal College of Education Pankshin.
[3]Department of Mathematics, University of Jos, Jos, Nigeria.
[4]Department of Computer Science, University of Jos, Jos, Nigeria.

***Correspondence:** pwasona@unijos.edu.ng
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ABSTRACT

Multivariate Factor Analysis technique plays an important role in many economic fields. In this study, multivariate factor analysis is employed to analyze the factors contributing to the economic development of Nigeria based on economic activities by employment. The data used in this study is from the National Bureau of Statistics *(NBS)*. In performing the multivariate statistical factor analysis method, the Statistical Package for the Social Sciences *(SPSS)* software is employed for the analysis. The variables (i.e. the economic activities) are fourteen in number such that the number of extracted factors is equal to the number of the observed variables and the only factor that was retained is the first factor since it is the only one with eigen value greater than one (1), i.e. 12.615 representing about 90.108% of the total variance that can be explained. The extraction method employed here is the principal component analysis *(PCA)* method and the rotation method is varimax with Kaiser Normalization. The results revealed that twelve out of the fourteen economic activities considered in this study has a strong positive relationship to the retained factor except for manufacturing industries as well as production and distribution of electricity and water. This trend by implication means that Nigerians are not really satisfied with what is going on in the manufacturing industries as well as what is going on in the production and distribution of electricity as well as the water sector in terms of job creation and quality of services being rendered. Also, a multiple linear regression model was fitted to the data and the *ANOVA* result generated from the model indicate that total employment by economic activities with respect to *GDP* has significant effect on the growth of the economy.

Keywords: Factor Analysis, Communality, Econometrics, Regression, Varimax Rotation, Economic Activities

INTRODUCTION

Factor Analysis is a statistical multivariate technique that endeavors to discover factors that elucidate the pattern of correlation within a set of observed variables. Factor Analysis is largely employed for data reduction or structure detection. The purpose of data reduction is to eliminate redundant (highly correlated) variables from the data dossier, while structure detection is to examine the underlying relationships between the variables. (Aleng, Ahmad, Halim and Zakaria, 2016). Factor analysis can be best described as a tool to help identify the underlying factors (also referred to as unobservable factors) that might explain the dimension associated in large data variability. A factor analysis is a multivariate statistical technique used to identify a relatively small number of underlying dimensions or factors, which can be used to represent the relationships among interrelated variables. The emphasis in factor analysis is the identification of underlying "factors" that might explain the dimension with data variability. It can also be said to be a method for investigating whether a number of variables of interest $Y_1, Y_2, \ldots, Y_l$ are linearly related to a smaller number of unobservable factors F_1, $F_2, \ldots, F_k$.

Economic development is the increase of capacities that contribute to the advancement of society through the realization of individuals', firms', and communities' potential. Economic development is a sustained increase in prosperity and quality of life realized through innovation, lowered transaction costs, and the utilization of capabilities towards the responsible production and diffusion of goods and services. Economic development requires effective institution grounded in norms of openness, tolerance for risk, appreciation for diversity, and confidence in the realization of mutual gain for public and private sector. Economic development is essential to creating the conditions for economic growth and ensuring our economic future (Feldman, Michael and Lahanan, 2015). The ultimate goal of economic development is to create economic prosperity and high quality of life, while the intermediate goal is to increase innovation or to reduce barriers to entrepreneurship and private sector investment which constitute the means to the ultimate end of creating this prosperity.

Adelakun (2011) asserts that Nigeria as a country is immensely endowed with both natural and human resources. The pool of resources from one end to the other is unquantifiable to such an extent that, given a dynamic leadership, economic prosperity would have been achieved in the late part of the 20th century. The primary focus of Nigeria has been finding a way to accelerate the growth rate of national income and to engage in structural transformation of her subsistence and resource based economy to a production and consumption based economy in order to break the cycle of poverty, low productivity and stagnation. In spite of all these abundant resources, Nigeria has failed to realize her full development potential with the top most priority currently given to sustainable human capital development or people oriented development by many countries and multilateral organizations, e.g. United Nation Development Programme (UNDP). A review of the Nigerian economy has become quite appropriate as a way of understanding more comprehensively her human capital development.

Akande (2014) states that one of the nagging problems of Nigeria as a country is the inability of the government to diversify the economy in such a way that all the economic sectors (including public and private sectors) are well functioning and the issues of job creations are made sacrosanct. The government should be able to determine which of the economic sector provides or creates more employment opportunities to the generality of the people and what can be done for the improvement of the other sectors.

Yong and Pearce (2013) asserts that the purpose of employing factor analysis technique is to summarize data such that the relationships and patterns in the data can be easily interpreted and understood. It is normally used to regroup variables into a limited set of clusters on shared variance. Hence, it helps to isolate constructs and concepts in information used in many fields such as behavioral and social science, medicine, economics and geography with the aid of technological advancement in computer technology. Also, factor analysis uses mathematical procedures for the simplification of interrelated measures to discover patterns in a set of variables (Child, 2006).

According to Viktorija, Igor and Janez (2013), within contemporary psychology and kinesiology, factor analysis methods have proved useful in all structures where numerous correlated variables occur simultaneously in a research and where the aim is to determine the fundamental sources of covariance among the data. Observation of these interrelated phenomena is particularly important in various fields of psychology, sociology, pedagogy and medicine, pharmacy as well as other sciences.

Khamsiah (2016) in a study conducted to discover the input that will help in the strategic management of an educational institution. He employed factor analysis technique to focus on information of the factors affecting students' choice of a higher educational institution. For private educational institutions, the input also aids them in strategic marketing to gain competitive advantage. Specifically, the study was done to discover the most important underlying factor that affects students' choice of an educational institution and also to show what aspects of the institutional factor are considered by students when they make their choices of educational institutions. The factor analysis technique was able to reduce all the 51 items of students' responses to six (6) significant factors. The overall findings revealed that students chose more institutional factors than other factors. Based on this finding, a one factor solution was discovered to the study of students' choice, which is the factor of the "institution" with the highest factor loadings. No other studies had covered comprehensively all the items from the literature review (social, economic, physical, institutional and environmental, academic, marketing and administrative items) regarding students' choice of tertiary education.

In a study by Manish, Fusao, Masaru, Takafumi, Yasuyuki, Masaaki and Kaoru (2018) where they analyzed significant preoperative risk factors in elderly patients with skull base meningioma using factor analysis technique. They explained that elderly patients are particularly at risk for severe morbidity following surgery. Among the various risk factors, age and skull base location of meningioma are known to be poor prognostic factors in meningioma surgery. Furthermore, Manish and his friends concluded that careful preoperative assessment based on the frailty concept was essential for better outcome in elderly patients with skull base meningioma. The BMI is appropriate as a quantitative factor for measure of frailty, particularly in elderly individuals with skull base meningioma. Additional prospective randomized controlled trials are necessary to validate frailty as a preoperative risk factor. Not only patient selection but also surgical timing was an important factor.

Cook, Eignor, Steinberg, Yasuyo and Clinic (2006) employed factor analysis to investigate the impact of accommodations on the scores of students with disabilities on a reading comprehension assessment administered with the Gates-MacGinitie Reading Test (GMRT) on the underlying constructs measured by the comprehension subtest. The study evaluated the factor structures for the Level 4 comprehension subtest given to a sample of New Jersey fourth-grade students with and without reading-based learning disabilities. Both exploratory and confirmatory factor analyses were used to determine whether or not the GMRT comprehension subtest measures the same underlying constructs when administered with and without a read-aloud test change. The results of the analyses indicated factorial invariance held when the comprehension subtest was administered to groups of students without disabilities who took the test under standard conditions and with a read-aloud test change and for groups of students with reading-based learning disabilities who also took the test under standard conditions and with a read-aloud test change.

This paper proposes to analyze the factors that contribute to the economic development of Nigeria using a multivariate factor analysis technique. The application of the methodology is achieved by identifying the factors that contribute to the economic development of Nigeria and the impact of the identified factors on the economic development of Nigeria. The study demonstrates how factor analysis is employed in economic development studies through the identification of underlying or unobservable factors related to the economic activities under consideration in the study. The remainder of this article is structured as follows. Also, this section is devoted to reviewing literature with specific respect to the application of factor analysis technique to different fields of endeavor. Materials and Methods section explains the factor analysis methodology. In the Data analysis, Results and Discussions section, the article discusses the empirical results obtained from the analysis of factors that contribute to the economic development of Nigeria (2003-2009) using multivariate factor analysis technique which consist of Agriculture (including hunting and fishing); Mining and Quarrying; Manufacturing Industries; Production and Distribution of Electricity and water; Building and Construction; Education; Health and Social Work; Public Administration; Hotels and Restaurants; Finance Intermediation; Repairs of Auto and Domestic Art; Real Estate, Renting and Business Activities; Transportation, Storage and Communication. Subsequently, the last section of this article is the Recommendations and Conclusions section.

MATERIALS AND METHODS

This section explains the methodology employed in this study. These include the statistical model for the multivariate factor analysis technique and the steps in conducting factor analysis. Also, the econometric analysis of the data using a multiple linear regression model is highlighted in this section.

Statistical Model for Factor Analysis

In the classical factor analysis, the statistical model is explained in the statement that follows. Let p denote the number of variables $X_1, X_2, \ldots, X_p$ and m denote the number of underlying factors $(F_1, F_2, \ldots, F_m)$. X_i is the variable represented in latent factors. Hence, the model assumes that there are m underlying factors whereby each observed variable is a linear function of these factors together with a residual variate. This model intends to reproduce the maximum correlation and it is given by:

$$X_i = \beta_{i0} + \beta_{i1}F_1 + \beta_{i2}F_2 + \cdots + \beta_{im}F_m + e_i \quad (1)$$

where $i = 1, 2, \ldots, p$. The factor loadings are $\beta_{i1}, \beta_{i2}, \ldots, \beta_{im}$, which denotes that β_{i1} is the factor loading of ith variable on the first factor and so on. The specific or unique variance is denoted by e_i. The factor loadings can be estimated and the expectations tested by regressing each X_i against the factors. Such an approach, however, is not feasible because the factors cannot be observed; an entirely new strategy is required. The simplest model of factor analysis is based on two assumptions. In this study, these assumptions are first of all described and their implications examined. The assumptions are given in the statements that follow.

i. The error terms e_i are independent of one another such that E[e_i] = 0 and Var[e_i] = σ_i^2
ii. The unobservable factors F_i are independent of one another and of the error terms, such that E[F_m] = 0 and Var[F_m] = 1 . In more advanced models of factor analysis, the conditions that the factors are independent of one another can be relaxed. As for the factor means and variance, the assumption is that the factors are standardized. It is an assumption made for mathematical convenience; since the factors are not observable, it is appropriate to think of them as measured in standardized form. The variance of X_i is calculated by equation (2).

$$\text{Var}[X_i] = \text{Var}(\beta_{i0}) + \beta_{i1}^2\text{Var}(F_1) + \beta_{i2}^2\text{Var}(F_2) + \ldots + \beta_{im}^2\text{Var}(F_{im}) + (1^2)\,\text{Var}(e_i) \quad (2)$$

From equation (2), equation (3) follows below

$$Var[X_i] = \underbrace{\beta_{i1}^2 + \beta_{i2}^2 + \ldots + \beta_{im}^2}_{communality} + \underbrace{\sigma_i^2}_{specific\ variance} \quad (3)$$

The first part on the right hand side of equation (3), i.e. the *communality* of the variable, is the part that is explained by the common factors, $F_1\ to\ F_{im}$. The second, i.e. the *specific variance*, is the part of the variance of X_i that is not accounted by the common factors. The covariance of any two variables, $X_i\ and\ X_j$, may be calculated as follows:

$$X_i = \beta_{i0} + \beta_{i1}F_1 + \beta_{i2}F_2 + \cdots + \beta_{im}F_m + (1)e_i + (0)\,e_j \quad (4)$$

$$X_j = \beta_{j0} + \beta_{j1}F_1 + \beta_{j2}F_2 + \cdots + \beta_{jm}F_m + (0)e_i + (1)\,e_j \quad (5)$$

$$Cov(X_i X_j) = \beta_{i1}\beta_{j1}(F_1) + \beta_{i2}\beta_{j2}(F_2) + \cdots + \beta_{im}\beta_{jm}Var(F_m) + (1)(0)Var(e_i) + (0)(1)Var(e_i) \quad (6)$$

From equation (6), equation (7) is obtain and is given below

$$Cov(X_i, X_j) = \beta_{i1}\beta_{j1} + \beta_{i2}\beta_{j2} + \ldots + \beta_{im}\beta_{jm} \quad (7)$$

The observed variance covariance matrix follows in equation (8) below

$$\sum = \begin{pmatrix} S_1^2 & S_{12} & \cdots & S_{1i} \\ S_{21} & S_2^2 & \cdots & S_{2i} \\ \vdots & \vdots & \cdots & \vdots \\ S_{m1} & S_{m2} & \cdots & S_{mi}^2 \end{pmatrix}$$

Thus, S_1^2 is the observed variance of X_1, S_{12} the observed covariance of X_1 and X_2 and so on. It is understood that $S_{12} = S_{21}$, $S_{13} = S_{31}$, and so on; the matrix, in order words, it is symmetric in the sense that the entry in row 1 and column 2 is the same as that entry in row 2 and column 1 and so on. Table 1 shows the arrangement of all the variances and covariances in tabular form. The variances of the *X* variables are placed in the diagonal cells of the table and the covariances off the diagonal. These are extracts from (Tryfos, 1997).

Table 1: Theoretical Variance Covariance Matrix

	Variable			
Variable	**X1**	**X2**	…	**Xi**
X1	$\beta_{11}^2 + \beta_{12}^2 + \sigma_1^2$	$\beta_{21}\beta_{11} + \beta_{22}\beta_{12}$	$\cdots$	$\beta_{i1}\beta_{j1} + \beta_{i2}\beta_{j2}$
X2	$\beta_{11}\beta_{21} + \beta_{12}\beta_{22}$	$\beta_{21}^2 + \beta_{22}^2 + \sigma_2^2$	$\cdots$	$\beta_{2j}\beta_{i1} + \beta_{22}\beta_{i2}$
$\vdots$	$\vdots$	$\vdots$	$\cdots$	$\vdots$
Xi	$\beta_{11}\beta_{i1} + \beta_{12}\beta_{i2}$	$\beta_{2j}\beta_{i1} + \beta_{22}\beta_{i2}$	$\cdots$	$\beta_{i1}^2 + \beta_{i2}^2 + \sigma_3^2$

In this study, the principal component method is used to determine a first set of loadings. The method seeks values of the loadings that bring the estimate of the total communality as close as possible to the total of the observed variances. The covariances are ignored. However, the principal component method for factor analysis. Among others are the principal factor (also called principal axis) and maximum likelihood methods (Johnson and Wichern, 1992 & Rencher,1995). The principal component method determines the values of β_{im}^2 which make the total communality (T_t), approximate as closely as possible the sum of the observed variances (T_o). The estimate of the specific variance of X_i and σ_i^2 is the difference between the observed variance and the estimated communality of X_i. Equation (9) below explains in detail the estimated specific variance as:

Estimated specific variance = observed variance – estimated communality (9)
Table 2 shows elements of the factor model on which the principal component method concentrates.

Table 2: Elements of the Principal Component Method *(PCA*)

Variable (X_i)	**Observed** (S_i^2)	**Communality(** $\beta_{i1}^2+\beta_{i2}^2+\cdots+\beta_{im}^2$ **)**
X_1	S_1^2	$\beta_{11}^2+\beta_{12}^2+\cdots+\beta_{1m}^2$
X_2	S_2^2	$\beta_{21}^2+\beta_{22}^2+\cdots+\beta_{2m}^2$
$\vdots$	$\vdots$	$\vdots$
X_p	S_p^2	$\beta_{p1}^2+\beta_{p2}^2+\cdots+\beta_{pm}^2$
Total	T_0	T_1

Having the total communality approximate as closely as possible to the sum of the observed variances (in effect, attaching the same weight to each variable) makes sense when the X_i variables are measured in the same unit. When this is not so, however, it is clear that the principal component method will favor the variables with large variances at the expense of those with small ones. For this reason, it is customary to standardize the variables before subjecting them to the principal component method so that all have mean zero and variance equal to one. This is achieved by subtracting from each observation (X_{ij}) the mean of the variable (X_i) and dividing the result by the standard deviation (S_i) of the variable to obtain the standardized observation:

$$X'_{ij}=\frac{x_{ij}-\bar{X}_i}{s_i} \quad (10)$$

The covariance of X_1 and X_2 is given by:

$$S_{12}=\frac{1}{n}\sum X_1X_2-\overline{X}_1\overline{X}_2 \quad (11)$$

The correlation of X_1 and X_2 is:

$$r_{12}=\frac{s_{12}}{s_1s_2} \quad (12)$$

The covariance of X'_1 and X'_2 is given by:

$$S'_{12}=\frac{1}{n}\sum X'_1X'_2-\bar{X}'_1\bar{X}'_2 \quad (13)$$

Generally, Cov (X'_i,X'_j) = Cor (X_i,X_j) (14)

Equation (14) revealed that the covariances of the standardized variables are equal to the correlation coefficients of the original variables. The correlation matrix is as shown in equation (15) below:

$$\Re=\begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1j} \\ r_{21} & r_{22} & \cdots & r_{2j} \\ \vdots & \vdots & \cdots & \vdots \\ r_{31} & r_{32} & \cdots & r_{ij} \end{bmatrix} \quad (15)$$

Where $r_{11}=r_{22}=r_{33}\ldots r_{ij}=1$ (the correlation of each variable by itself) and $r_{12}=r_{21}, r_{13}=r_{31},\ldots r_{ij}=r_{ji}$ and so on. These are extracts from (Johnson and Wichern,1992 &Rencher,1995).

Steps in Conducting Factor Analysis

There are four basic steps that have to be considered for a factor analysis experiment. They include the following:

i. Data collection and generation of correlation matrix: The data collected may be primary or secondary and it will be used as an input for factor analysis.
ii. Extraction of initial factor solution: From the principal factor analysis, the number of factors that need to be extracted can be found out. Kaiser and the scree plot test help with this factor extraction.
iii. Rotation and interpretation: After factor extraction, the analysis would be run and the factors would be inspected from different angles to see if the inference from all of them points to one output. If the rotation outputs vary, then it means that the final factors are not consistent for all scenarios.
iv. Construction of scales or factor scores to use in further analysis: The actual values of individual cases (observations) for the factors can be

estimated. These factor scores are particularly useful in making decision or whether to perform further analysis involving the identified factors (Archana, 2004).

A Multiple Linear Regression Model for Econometrics Analysis

Econometrics deals with the quantities of economic connections. It is an amalgamation of statistics, economics and mathematical economics with an objective to offer numerical standards to the parameters of economic connections. The interactions of economic concepts are typically stated in mathematical forms and joint with experiential economics. The econometrics approaches are employed to acquire the values of parameters which are basically the coefficients of the mathematical form of the economic affiliations. The statistical techniques which support in elucidating the economic phenomenon are considered as econometric techniques (Gujrati, 2003).

In statistics, we reflect the problem of regression when the study variable hinge on more than one independent variables, called a multiple linear regression model. The multiple linear regression model simplifies the simple linear regression in two ways. It allows the mean $E(y)$ to hinge on more than one independent variables and to possess shapes other than straight lines, even though it does not permit for random shapes. In this study, the multiple linear regression employed is given by equation (15) below.

$$y = \beta_0 + X_1\beta_1 + X_2\beta_2 + \ldots + X_k\beta_k + \varepsilon \qquad (15)$$

In equation (15), y denotes the dependent (or *GDP*) variable which is linearly related to k independent (economic activities) variables $X_1, X_2, \ldots, X_k$ through the parameters $\beta_1, \beta_2, \ldots, \beta_k$ as defined and presented in Table 3. To determine whether the economic activities has any significant effect on the growth of the economic through the years considered in this study, the following hypothesis is given in order to make this decision. $H_0 : \beta_1 = \beta_2 = \ldots = \beta_k = 0$ against the alternative hypothesis $H_1 : \beta_j \neq 0$ for at least one $j = 1,2,\ldots,k$

This hypothesis determines if there is a linear relationship between the dependent variable y (GDP) and any of the set of explanatory variables $X_1, X_2, \ldots, X_k$ $(economic\ activities)$.

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Data Analysis, Results and Discussions

This section deals with the empirical analysis of factors that contribute to the economic development of Nigeria (2003-2009) using multivariate factor analysis technique. This will cover the method of data collection, method of data analysis and interpretation of results as well as statistical software used for the data analysis.

Preparing Data for Factor Analysis

Any multivariate information or data for analysis using multivariate factor analysis technique has to be in a certain format and it should have certain characteristics in order to use it as an input into the actor analysis model. Some of the characteristics the multivariate data should possessed include:

(i) The data should not possess variables that are believed to be non-related to each other
(ii) The data should possess a minimum of three observed variables for the analysis
(iii) The number of observations should be sufficient to guarantee a reliable estimation of the correlation between the variables.

According to Sapnas and Zeller (2002), even 50 cases may be adequate for factor analysis. Hatcher (1994) recommended that the number of subjects should be the larger of 5 times the number of variables or 100. Even more subjects are needed when communalities are low and/or few variables load on each factor (Garson, 2008).

The factors that contribute to the economic development of Nigeria (2003-2009) have been stated already in section 1. The data used in the study with respect to the factors that contribute to the economic development of Nigeria was collected from the National Bureau of Statistics in Nigeria based on total employment by economic activities and are presented in Table 3. In the Table 3, $x_1 =$ Agriculture, Hunting, Forestry & Fishing, $x_1 =$Mining & Quarrying, $x_1 =$

Manufacturing Industries, , x_1 =Electricity & water, , x_1 =Building & Construction, , x_1 = Repairs of Auto & Domestic Art, , x_1 = Hotels & Restaurants, x_1 = Transport, Storage & Communication, , x_1 =Finance Intermediation (including Insurance), , x_1 = Real Estate, Renting & Business Activities, , x_1 =Public Administration, , x_1 = Education, , x_1 =Health & Social work, x_1 =Others and , y = Gross Domestic Product (GDP) in naira.

Table 3: Multivariate Data for Analysis on Total Employment by Economic Activities (2003-2009)

Description of Economic Indices	2003	2004	2005	2006	2007	2008	2009
x_1	27,840,000	28,516,208	28,633,653	28,936,534	29,049,058	29,484,557	29,664,365
x_2	66,150	67,325	69,001	72,962	81,045	81,002	81,705
x_3	820,000	838,517	907,877	859,990	821,256	799,215	735,345
x_4	410,000	422,960	426,642	451,132	389,016	367,207	343,161
x_5	260,000	267,879	273,049	288,723	329,583	356,407	359,502
x_6	93,060	97,037	103,847	109,808	140,478	151,203	152,516
x_7	86,940	89,488	96,370	101,901	129,672	145,803	163,410
x_8	400,000	412,202	415,988	439,866	807,615	885,617	904,202
x_9	270,000	275,854	280,948	297,074	302,568	307,806	310,479
x_{10}	58,590	59,983	60,182	63,636	81,045	97,202	108,940
x_{11}	4,900,000	5,052,427	5,067,423	5,158,298	5,338,164	5,572,905	5,588,623
x_{12}	8,430,000	8,783,530	9,473,306	10,017,082	10,443,999	11,955,826	12,217,622
x_{13}	280,000	291,431	296,375	313,387	307,971	329,406	332,267
x_{14}	2,885,260	2,949,598	2,998,702	3,170,830	3,279,621	3,466,866	3,507,868
y	8,742,646, 645,900	11,673,602, 238,000	14,735,323, 931,000	18,709,576, 651,000	20,874,172, 356,000	24,552,776, 283,000	25,102,776, 283,000

In performing the multivariate statistical factor analysis, The Statistical Package for the Social Sciences *(SPSS)* software is employed. The Flow Chart that depicts the steps taken in *SPSS* analysis is shown in Figure 1.

Table 4 shows the initial communalities which are the estimates of the variance in each variable accounted for by all components or factors. For principal components extraction, this is always equal to 1 for correlation analysis. Extraction communalities are estimates of the variance in each variable accounted for by all the factors or components in the factor solution. Manufacturing industries as well as electricity and water are the variables with least extraction communalities. Also, on fitting the multiple linear regression equation to the data in Table 3 using *SPSS* software, we obtain the estimated regression model of equation (16) below.

$$\left\| \hat{y} = -3.062E+14+11171108.87\hat{\beta}_1 + 0.189\hat{\beta}_2 +,\cdots,+0.15\hat{\beta}_{14} \right\| \quad (16)$$

The analysis of variance (*ANOVA*).table generated from the estimated regression model of equation (16) using *SPSS* is presented in Table 8. The *ANOVA* results indicate that the *p*-value = 0.00 is less than the 5% level of significant. This trend implies that we reject the null hypothesis and infer that total employment by economic activities with respect to the *GDP* considered in this study from the year 2003 to 2009 has a significant effect on the growth of the economy.

Table 4: Communalities

Description of factors	**Initial**	**Extraction**
Agriculture Hunting Forestry and Fishing	1.000	0.874
Mining and Quarrying	1.000	0.928
Manufacturing Industries	1.000	0.545
Electricity and Water	1.000	0.707
Building and Construction	1.000	0.993
Repairs and Domestic Art	1.000	0.976
Hotels and Restaurants	1.000	0.986
Transport Storage and Communication	1.000	0.941
Finance	1.000	0.898
Real Estate Renting Business Activities	1.000	0.962
Public Administration	1.000	0.983
Education	1.000	0.962
Health and Social Work	1.000	0.880
Others	1.000	0.981

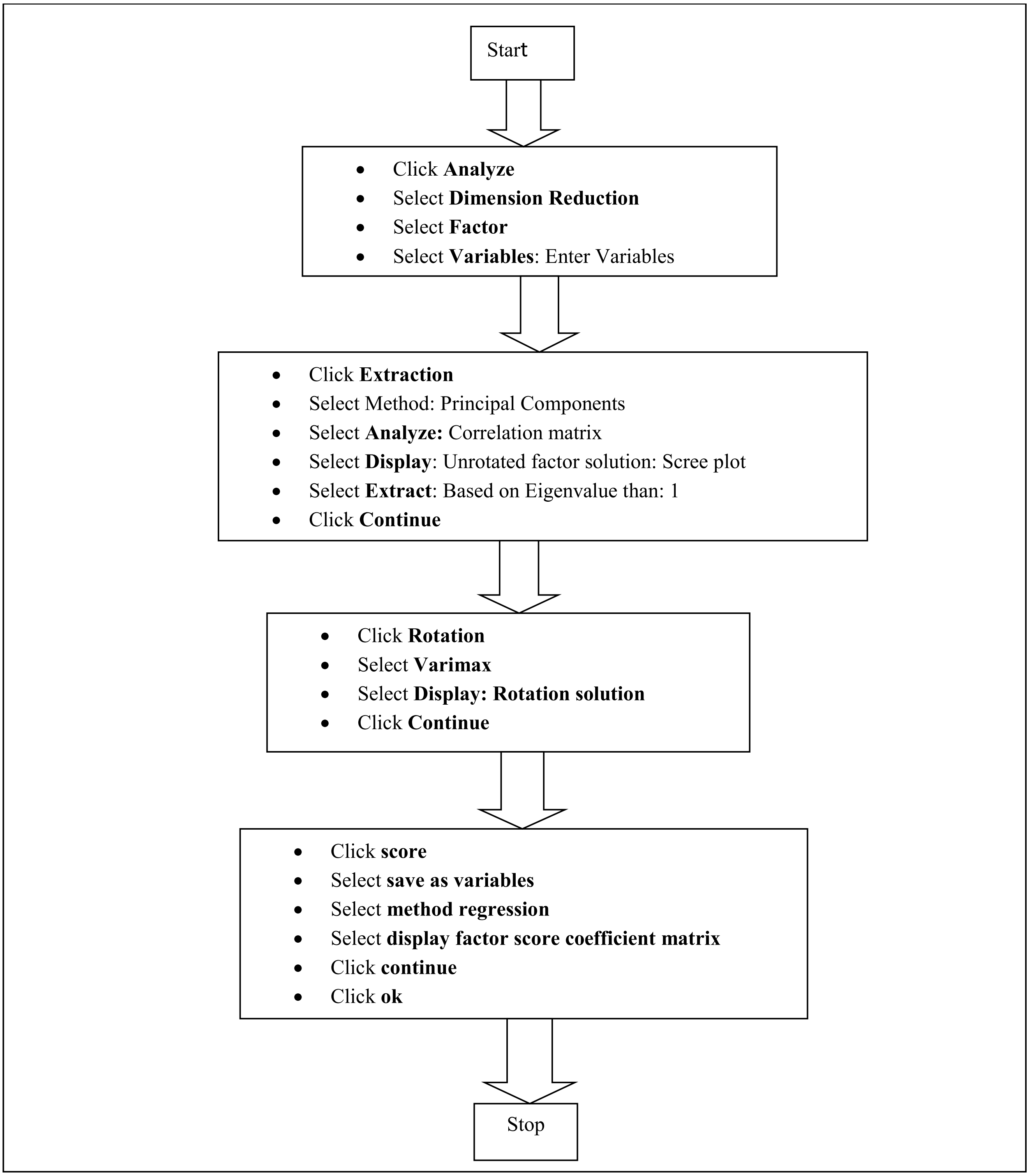

Figure 1: Chart Showing Steps in Factor Analysis using SPSS

Table 5 shows the total number of the extracted factors (i.e. the unobservable factors or components), which are fourteen (14) in number. Since the variables (i.e. the economic activities) are fourteen in number, then the number of extracted factors must be equal to the number of the observed variables; but the only factor that will be retained is the first factor since it is the only one with eigen value greater than one (1), i.e. 12.615 representing about 90.108% of the total variance that can be explained.

Let this factor arbitrarily be called "Satisfaction of Nigerians" denoted as "F_1". This is an exploratory factor analysis (i.e. a factor analysis where the researcher does not know or have any idea or knowledge in advance as to the number of factors to be retained until the analysis is performed or run). Naming of factors is more of an "art" as there are no rules for naming factors, except to give names that best represent the variables within the factors (Yong and Pearce, 2013).

Table 5: Total Variance Explained

Component	**Initial Eigen Total**	**Values % of Variance**	**Cumulative %**	**Extraction Total**	**Sums of Squared % of Variance**	**Loadings Cumulative %**
1	12.615	90.108	90.108	12.615	90.108	90.108
2	0.937	6.695	96.804			
3	0.243	1.1737	98.540			
4	0.149	1.061	99.602			
5	0.035	0.249	99.851			
6	0.021	0.149	100.000			
7	2.995E-015	2.139E-015	100.000			
8	2.019E-015	1.442E-015	100.000			
9	1.767E-016	1.262E-015	100.000			
10	6.055E-017	4.345E-016	100.000			
11	-6.4499E-017	-4.607E-016	100.000			
12	-2.190E-016	-1.564E-015	100.000			
13	-4.419E-016	-3.156E-015	100.000			
14	-6.986E-016	-4.990E-0159	100.000			

Figure 2 below is a scree plot which also confirms that it is only one factor or component that has eigen value greater than one (1). Hence, it is the only component that will be retained.

Table 6 shows the factor loadings or degree of relationship among the variables (the economic activities), which can be denoted as ($X_1, X_2 \ldots X_{14}$) to that of the unobservable factor or component (which is just one), referred to as Satisfaction of Nigerians denoted as "F_1". All the variables are strongly and positively related with the unobservable factor except for Manufacturing Industries, Production and Distribution of Electricity and Water. Also, from Table 6, component 1 means only one unobservable factor, (F_1). The extraction method employed here is the principal component analysis method.

Table 6: Component/Factor Matrix

	Component
Description of factors	1
Agriculture Hunting Forestry and Fishing	0.935
Mining and Quarrying	0.963
Manufacturing Industries	-0.738
Electricity and Water	-0.841
Building and Construction	0.996
Repairs and Domestic Art	0.988
Hotels and Restaurants	0.993
Transport Storage and Communication	0.970
Finance	0.948
Real Estate Renting Business Activities	0.981
Public Administration	0.991
Education	0.981
Health and Social Work	0.938
Others	0.990

Table 7 shows the factor loadings /correlations for a rotated factor solution. The extraction method employed here is the principal component analysis method and the rotation method is varimax with Kaiser Normalization.

Table 7: Component Coefficient Matrix

	Component
Description of factors	1
Agriculture Hunting Forestry and Fishing	0.074
Mining and Quarrying	0.076
Manufacturing Industries	-0.059
Electricity and Water	-0.067
Building and Construction	0.079
Repairs and Domestic Art	0.078
Hotels and Restaurants	0.079
Transport Storage and Communication	0.077
Finance	0.075
Real Estate Renting Business Activities	0.078
Public Administration	0.079
Education	0.078
Health and Social Work	0.074
Others	0.079

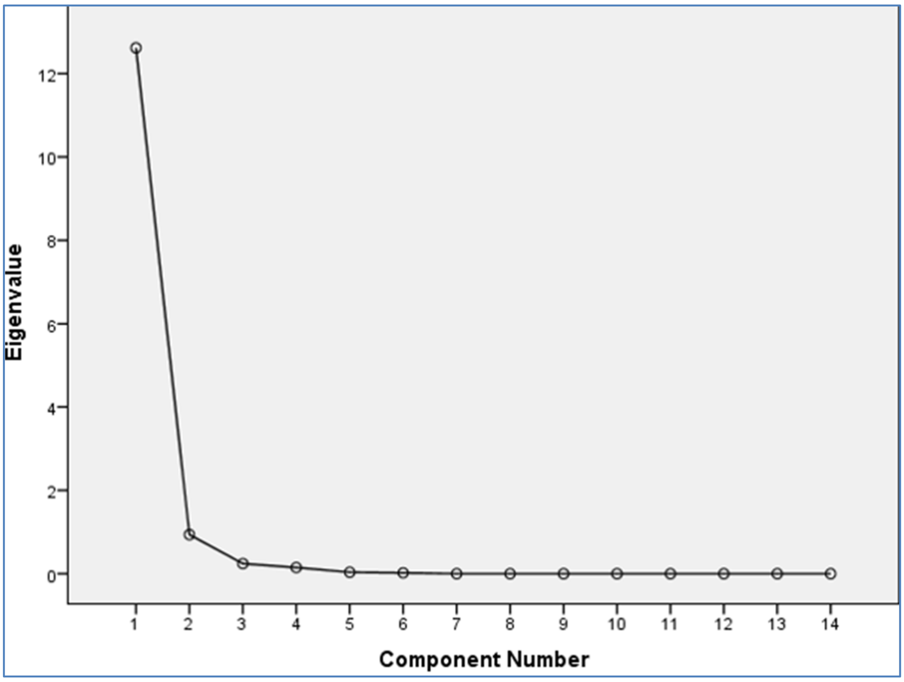

Figure 2: Scree Plot

Table 8: ANOVA Results Generated from the Estimated Regression Equation (16)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35495500972350470000000000.000	1	35495500972350470000000000.000	79.241	.000[b]
	Residual	22397303214286363000000000.000	5	4479460642857272500000000.000		
	Total	37735231293779110000000000.000	6			

a. Dependent Variable: y
b. Predictors: (Constant), x1

From the foregoing results, it can be seen from Table 3 that out of the fourteen (14) unobservable factors (i.e. F_1, $F_2 . . . F_{14}$) that were extracted, it was only one factor (arbitrarily referred to as "Satisfaction of Nigerians") that was retained because it has eigen value greater than one (1), i.e., 12.616. The foregoing assertion is supported by the scree plot in Figure 2 and total variance of 90.108 that can be explained. Table 6 shows the factor loadings i.e. how each variable (economic activity) is related to the retained factor. It is seen that twelve (12) out of the fourteen (14) economic activities considered in this study has a strong positive relationship to the retained factor except for manufacturing industries as well as production and distribution of electricity and water. This trend by implication means that Nigerians are not really satisfied with what is going on in the manufacturing industries as well as what is going on in the production and distribution of electricity and water sector in terms of job creation and quality of services being rendered.

Conclusion and Recommendations

Based on the analyses and results obtained in this study, the following recommendations are given to be taken into consideration by the people and government of Nigeria.

i. Both the private sector and government should consider the matter of job creation earnestly in order to moderate the high rate of unemployment in the country.
ii. Agriculture which embraces, forestry, hunting and fishing should be improved, subsidized and sustained by the people and government since

activities in the agricultural sector is believed to be what most Nigerians practice for a living.

iii. Building and construction as an economic activity should also be made more efficient or robust since it has the highest loading on the common factor. This by implication means that most Nigerians are satisfied with the building and construction sector of the economy.

iv. Proper attention should be given to other economic activities such as solid mineral exploration, cottage industries as well as craft works. This is to enhance vast employment opportunities. The government should play a vital role here by creating an enabling environment that will enable these economic activities to thrive. This trend will go a long way in facilitating the creation of jobs thereby reducing poverty.

v. Attention should be given to the manufacturing industries, production and distribution of electricity as well as water sectors of the economy, since they have the lowest loadings.

This study analyzed the factors that contribute to the economic development of Nigeria by with respect taking into consideration the number of employments in each of the economic sector over the period of seven years (2003-2009) using factor analysis methodology. In this study, with respect to all the other economic activities, one can observe that building and construction is the only economic activity with the highest loading (0.996), or most related with the common factor and this means that Nigerians are satisfied with the building and construction sector of the economy both in terms of job creation and quality of services being rendered.

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