Nigeria Government's Expenditure on Economic and Social Service Development: A Canonical Correlation Analysis Approach

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Authors' contributions

This work was carried out in collaboration between both authors. Author ROA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author SOA managed the analyses and literature search of the study. Both authors read and approved the final manuscript.

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ABSTRACT

The study examine the effect of Government's expenditure on economic and social services development in Nigeria over the period of 1961 to 2018. The study used Canonical Correlation Analysis, the test carried out include; Structure Vector for Economic and social Service and Redundancy Index. The result reveals that strong positive relationship exists between national recurrent expenditure and economic service and Social service. The study also discover that Nigeria Government placed more emphasis on other economic services like; Oil and gas, trade, infrastructure and manufacturing, followed by Transport and Communication, Construction, and Agriculture being the least. In the case of the Social service, it was discovered that Nigeria Government placed more emphasis on other social services like; food subsidies, police, fire services, housing, community management, policy research, information and labour, followed by Health, and Education being the least. Based on the findings, the study recommends that, all tiers of government and policy makers should implement policies that will aid improvement in Transportation and Communication, Construction, Agriculture, Health and Education.

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1. INTRODUCTION

The relationship between Government and economic and social service development has continued to generate series of debate among scholars. Human Development is defined by the [1], as "the priority of human well-being, and aimed at ensuring and enlarging human choices which lead to equality of opportunities for all people in society and empowerment of people so that they participate in - and benefit from - the development process."

Education and health are crucial in human and economic development as these vital sectors could support the production and as well motivate the highly needed manpower which could aids the country's economic growth and development [2].

The provision of social and community service by the Government is aimed at Human Development and also the provision of economic service is aimed at Economic Development. Yildirim [3] was of the opinion that economic development improves the quality of life, which generally calls for higher incomes. But it involves much more, it encompasses, as ends in itself, better education, higher standard of health and nutrition, a cleaner environment, more equality of opportunity, greater individual freedom and a richer cultural life. Nelson et al. [4] were of the opinion that Nigeria, whether Nigeria Government spend on social and community services, it still remains a debate as the effort put in by previous and present administrations have not yielded positive evidence, the nation's economy is in recession, rated high in poverty, high level of unemployment and unfavorable exchange rate situation. It is believed that as a country develops economically, it is able to provide more for the basic needs of its citizens such as education, healthcare and a better quality of life. However, a casual observation suggest that the relationship between economic development and human development may be endogenous, that is, just as it is natural to expect economic Development to affect human development, we should be able to observe various aspects of Human Development shaping the course of development in many developing countries. In fact, many developing countries such as India and Turkey performed better in measure of economic development due to their high level of educated citizens. For example,

government expenditure on health and education raises the productivity of labour and increase the growth of national output [5]. [6] investigated the impact of government expenditure on economic growth in Nepal. The empirical result shows that there is positive correlation between the dependent variable economic growth and the predictors like agricultural, non-agricultural, industry and service sector. Similarly, expenditure on infrastructure such as roads, communications, power, etc, reduces production costs, increases private sector investment and profitability of firms, thus fostering economic growth, as such, human development leads to economic development due to the increase in the labour force, which in turn increases the revenue of government which helps in the economic development process and also the Human Development process [7,8]. From 1961 to 1970, government expenditure was a little stable, but from 1970 to date, government expenditure has continued to rise due to the huge receipts from production and sales of crude oil, and the increased demand for public (utilities) goods like roads, communication, power, education and health. Besides, there is increasing need to provide both internal and external security for the people and the nation [9,10]. Available statistics show that total government expenditure (capital and recurrent) and its components have continued to rise in the last for decades [11]. For instance, in [12], government total recurrent expenditure increased from N716.00 million in 1970 to N4, 805.20 million in 1980 and further to N36, 219.60 million in 1990. Recurrent expenditure was N461, 600.00 million and N2,131,900.00 million in 2000 and 2009, respectively. In the same manner, composition of government recurrent expenditure shows that expenditure on defense, internal security, education, health, agriculture, construction and transport and communication increased during the period under review. Moreover, government capital expenditure rose from N187.80 million in 1970 to N10, 163.40 million in 1980 and further to N24, 048.60 million in 1990. The value of capital expenditure stood at N239, 450.90 million and N1152, 796.60 million in 2000 and 2009, respectively. Furthermore, the various components of capital expenditure (that is, defense, agriculture, transport and communication, education and health) also show a rising trend between 1970 and 2009. Unfortunately, rising government expenditure has

not translated to meaningful growth and development, as Nigeria ranks as the poorest countries in the world [13]. In addition, many Nigerians have continued to wallow in abject poverty, while more than 50 percent live on less than US$2 per day. Couple with this, is dilapidated infrastructure (especially roads and power supply) that has led to the collapse of many industries, including high level of unemployment. Moreover, macroeconomic indicators like balance of payments, import obligations, inflation rate, exchange rate, and national savings reveal that Nigeria has not fared well in the last couple of years. World Poverty Clock [13].

The main objective of this study is to employ Canonical Correlation to investigate the effect and relationship between Nigeria Government's expenditure and economic and social services over the period of fifty-five (55) years (i.e. 1961 – 2016). The rest of paper is organized as follows: Section 2 presented the theoretical background of the study. Section 3 reviews the literature on Government expenditure and its effect on economic and social services. In Section 4, focused was on the methodology employed in the study. Section 5 presents the data analysis and results from canonical correlation analysis. Finally, Section 6 discussed findings and concludes.

2. THEORETICAL BACKGROUND

Expenditure patterns of the government usually are categorized into recurrent and capital expenditures, according to the flowchart of government block by Mordi et al. [14]. The former corresponded to government's purchase of current goods and services (labour, consumables, wages and salaries, etc.), while the latter would ideally include not merely investments in infrastructure (roads, schools, hospitals, etc) but also all other expenditures that might contribute to development. In other words, while the recurrent expenditure refers to financial outlays necessary for the day-to-day running of government businesses, the capital expenditure refers to investment outlets that increase the assets of the state. These categorization, however, were not mutually exclusive but were indeed inter-linked. For instance, while capital expenditure gave rise to recurrent expenditure in most cases through the operational and maintenance costs of completed capital projects, the amount available for investment was a function of not only the size of revenue but also the amount

that goes annually into the running of government [15,16].

Nigeria Government have being contributing toward the growth of the economy through budgetary allocation for decades. The common consensus among scholars is that public sector expenditure has been identified as an important instrument which the government uses to influence the performance of the economy, [17, 18,19]. The channel through which public authorities satisfy the collective want of the people can be classified under public sector expenditure. Salawu [20] observed that public expenditure is the expenses incurred by the government for the maintenance of itself, the economy and the society at large. Public expenditure is an important mechanism which the government uses to pilot significant effects on the general growth of the economy. Anyanwu [21] observed that public expenditure is simply government spending from revenue derived from taxes and other sources. Again, the study articulated that public expenditure is centered on expenses contracted on government own maintenance for the growth and stability of the general economy. Another study by Anyanwu [21] noted that public expenditure is that part of fiscal tools that embraces and puts to use judiciously, all revenue generated from all sources, for the growth and installed system in the economy.

3. LITERATURE REVIEW

There are vast literatures on the effect and relationships between Government expenditure on economic and social services growth. Some of the past literatures on Government expenditure on economic and social growth include.

Mehrara et al. [22] examine the causal link between government expenditure and economic growth in Iran from 1970 to 2010 using Gregory-Hansen cointegration test, error correction model and Granger causality test. Finding reveals a strong unidirectional link from GDP to recurrent expenditure in Iran. But there is no evidence that recurrent expenditure promotes long-term economic growth. Similarly, results from [8] in a study that investigates the relationship between government expenditure and economic growth in Saudi Arabia from 1964 to 1995 using VAR-based Granger causality and an adopted production function model shows that government spending exercise a positive and significant impact on

economic growth and development of Saudi's economy. Though, economic growth is found to granger cause public spending within the sample period, hence providing more support for Wagner's hypothesis within the study period. Jayadevan [23] identified the factors that influence percentage contribution of sectors to gross domestic product (GDP) for a group of 32 Asian countries for two cross-section points 1994-96 and 2014-16. It employed the use of a canonical correlation analysis for 32 Asian countries, the analysis showed that the structural changes in sectoral GDP composition in the selected Asian countries were significantly determined by the factors like employee productivity, employment growth in services sector, rising life expectancy, growth of value added in manufacturing and gross capital formation. Olakalns [24] examined the trend of government expenditure in the United Kingdom and found some in stances where the ratio of government expenditure to GDP displayed structural break. Iheanacho [25] examined the long and short run relationship between public expenditure and economic growth in Nigeria over the period of 1986-2014, using Johansen co-integration and error correction approach. The result shows that, recurrent expenditure is the major driver of economic growth in Nigeria. Ram [26] studied the linkage between government expenditure and economic growth for a group of 115 countries during the period 1960-1980 by adopting a two-sector production function and estimated growth model using both cross-section and time series data. The study reveals a positive influence of government expenditure on economic growth in most of the selected countries under the study. Çetintaş and Bağdigen [27] evaluated the causal link between expenditure and growth in Turkish economy for the period of 1965 to 2000 by employing Granger causality test and cointegration technique. The study found no co-integration between GDP and public expenditure. Meaning that, long-run relationship between government expenditure and GDP for the Turkish economy does not exist. On the basis of Granger causality tests, the result shows that neither growth in income does have any effect on government size nor does public expenditure have any effect on economic growth. Fajingbesi and Odusola [28] empirically investigated the relationship between government expenditure and economic growth in Nigeria over the period 1970 to 1995. Kotásková et al. [29] introduced a unique insight along with contemporary evidence about the relationship

between education and economic growth in India from 1975 to 2016 by focusing on primary, secondary and tertiary levels of education. The findings of the work show that there is compelling evidence proving a positive connection between education levels and economic growth in India which might influence governmental actions and shape the future of India. [6] investigate the impact of government expenditure on economic growth in Nepal. The empirical result shows that there is positive correlation between the dependent variable economic growth and the predictors like agricultural, non-agricultural, industry and service sector. The econometric results indicated that real government capital expenditure has a significant positive influence on real output. However, the results showed that real government recurrent expenditure affects economic growth only by little. Ogiogio [30] revealed a long-term relationship between government expenditure and economic growth over the period 1970 to 1990 in Nigeria. Moreover, their findings showed that recurrent expenditure exerts more influence than capital expenditure on growth. Ighodaro and Okiakhi [31] used time series data for the period 1961 to 2007 and applied Co-integration Test and Granger Causality test to examine the relationship between government expenditure and economic growth in Nigeria. The results revealed negative impact of government expenditure on economic growth in Nigeria. Okoro [32] investigated the impact of public expenditure on economic growth in Nigeria (1981-2011). The study concluded that Government capital spending in industries and agriculture "if properly managed" will raise the nation's production capacity and employment, which in turn will increase economic growth in Nigeria. Chude and Chude [33] while studying the impact of government expenditure on economic growth in Nigeria (1977-2012) found that total government expenditure on education has significant effect on Gross Domestic Product (GDP). Ebiringa and Charlse [34] examined the impact of sectorial expenditure on the economic growth of Nigeria from 1977 to 2011. Their analysis viewed that government expenditure should spend more on health sector, education, Telecommunication and security since they are significant and have positive impact on the economic growth of the nation. Barro [35] observed that empirical evidence on the relationship between government spending and economic growth is diverse, mostly on cross section studies that include a sample of both advanced and developing countries. Loizides

and Vamvoukas [36] employed a bivariate and trivariate error correction model as well as a Granger causality test to examine the relationship between government expenditure and economic growth, using annual data from 1948 to 1995 for Greece, United Kingdom and Ireland. The study shows that government expenditure granger causes economic growth in two countries. The finding was true for Ireland and the United Kingdom, both in the short and long run, while Greece is supportive of the Wagner hypothesis that, increased output causes growth in public expenditure. The results also indicated that economic growth granger causes public expenditure in Greece and the United Kingdom, when inflation is included. Okere et al. [37] examined the relationship between expenditure and economic growth in Nigeria. The Granger Causality and error correction model (ECM) technique are used. The result for stationarity shows that the series are integrated at first difference. Johansen Co-integration test was also employed and the result reveals the existence of long-run relationship among the variables. The result of Granger Causality revealed bi-directional causality between economic growth and government expenditure on administration and between economic growth and government expenditure on economic services. There is also a unidirectional causality between economic growth and Community Services. Obi et al. [38] studied government education spending and education outcome in Nigeria. Applying the Augmented Dickey Fuller (ADF) unit root test and Ordinary Least Square (OLS) technique, the study found that public education spending positively and significantly affect education outcome in Nigeria. Public health expenditure and urban population growth also positively affects education outcome. Based on the findings, the study recommends among other things, that government should spend more on education which needs to be targeted for the desired effects to be realized. Ojewumi [39] studied the effect of government funding on the growth of education in Nigeria. It divided government funding on education into recurrent and capital funding and applied the ordinary least square in checking the link between school enrolment and educational spending and found that impact of both capital and recurrent expenditure on educational growth were negative in Nigeria for the period under study, therefore, the authors recommended that the government should check corruption in the education sector to ensure that funds meant for education

especially capital expenditure in the sector are judiciously appropriated. Nwodo and Ukaegbu [2] was armed with the need for optimum balance in Nigerian government expenditures on social sector of the economy and the need to find out economically why the effect of the increasing government expenditures is not reflecting on the economic development of Nigeria in comparison with other economies with even less social spending, the study applied the Autoregressive Distributive Lag model (ARDL) and the study found that though the interaction term is highly significant, it is negative, even, in the midst of positive individual effect of education expenditure and health expenditure on economic growth in Nigeria. Nelson, Udoffia and Godson [40] examined effect of government social expenditure on economic growth in Nigeria from 1981 to 2016. The study used three explanatory variables (education expenditure, health expenditure and community and social services expenditure) and one explained variable (agriculture output). Test carried out include unit root test, co-integration test, causality test and ordinary least square. The study revealed that, there is positive significant relationship between health expenditure and agriculture output in Nigeria, there is negative and insignificant relationship between education expenditure and agriculture output in Nigeria, there is positive and significant relationship between community and social services expenditure and agriculture output in Nigeria.

It is in view of the reviewed literature that this study intends to examine conceptually the relationship and effects of government expenditure on economic and social services growth of Nigeria for the period fifty-five (55) years.

4. MATERIALS AND METHODS

4.1 Source of Data

The annual Nigeria Federal Government's recurrent expenditure in Billion Naira From 1961 to 2016 on education, health, agriculture, construction, transport, communication and other economic services collected from the [12] was used in this study.

4.2 Research Design

This study is designed to investigate the relationship and effect of government expenditure on social and economic services in Nigeria, for empirical investigation of the

interrelationship among public social and economic expenditure, canonical correlation analysis, and structure vector was employed. The reason for choosing these tests is to find out the interrelationship between variables and to examine the long run relation. The variables used in the study are; Government's expenditure as, health expenditure, education expenditure, other social and community expenditures; (i.e. food subsidies, police, fire services, housing, community management, policy research, information and labour), agriculture, Transport, and other economic services (i.e. Oil and gas, trade, infrastructure and manufacturing) in Nigeria. The study also used redundancy index to access the degree to which the canonical variates of both set can explain the standardized variability.

4.3 Canonical Correlation Analysis

CCA is a multivariate statistical model designed to identify patterns in complex data sets. It allows to study the interrelationships between independent and dependent sets (vectors) of variables. It is used to identify and measure the associations among two sets of variables. Canonical correlation is appropriate in the same situations where multiple regression would be, but where are there are multiple intercorrelated outcome variables. Multivariate statistical procedures can aid in bridging the gap between the theoretical and practical world of behavioral sciences, providing relevant information that cannot be obtained through the use of univariate models [41]. The use of multivariate procedures also limits the probability of committing Type I (experiment wise) errors, that is, the likelihood of finding false statistically significant results [42,41]. The risk of committing Type I errors considerably grows when too many statistical tests are performed on the same variables in a dataset. Furthermore, of biological significance, most human behavior research typically investigates variables that possibly have multiple causes and effects. Therefore, using statistical techniques that are able to handle multiple independent and dependent variables seems appropriate.

4.4 Assumptions of Canonical Correlation

The assumptions of canonical correlation are;

(i) Linearity; linear relationship is assumed for all variables in each set and also between sets.

(ii) Normality; assume that the variables are normally distributed but does not require that it must be strictly normal i.e the normality assumption is not strict for canonical correlation analysis.
(iii) Multicollinearity; assume that there is no perfect multicollinearity in the set of each group.
(iv) Homoskedasticity; $var(\varepsilon) = E[\varepsilon_i - E(\varepsilon_i)]^2 = E(\varepsilon_i)^2 = \sigma_\varepsilon^2 =$ constant for all pair of variables within and between set.

4.4.1 Model specification of canonical correlation

The study shall use seven explanatory variables; four economic services, namely; Agriculture (Agric.), construction (contr.), transport (trans.) and other economic services (OES) and three social services, namely; education (educ), health (hea.) and (OSS). Government Expenditure (Expen.), all the variables will be used in their lag form. The mathematical function of the relationship is as follows:

$$Expen. = f(Agric, Const., trans, OES) \qquad (1)$$

$$Expen. = f(Educ, Heal., , OSS) \qquad (2)$$

These above functions are transformed into the following explicit econometric models.

$$Expen. = \beta_0 + \beta_1 Agric. + \beta_2 Const. + \beta_3 trans. + \beta_4 OES + \varepsilon \qquad (3)$$

$$Expen. = \beta_0 + \beta_1 Educ. + \beta_2 Heal. + \beta_3 OSS + \varepsilon \qquad (4)$$

The functional model above is further transformed into logarithms for standardization as this may minimize the differences in the magnitudes of different variables.

The lag form model is as follows:

$$LExpen. = \beta_0 + \beta_1 LAgric. + \beta_2 LConst. + \beta_3 Ltrans. + \beta_4 LOES + \varepsilon \qquad (5)$$

$$LExpen. = \beta_0 + \beta_1 LEduc. + \beta_2 LHeal. + \beta LO_3 SS + \varepsilon \qquad (6)$$

Where;

β_0, = intercept (constant), = $\beta_1 - \beta_4$ = coefficients to be estimated, Expen. = Government expenditure (total for expenditure on

economic and social growth), Agric. = expenditure on education, Const. = expenditure on construction, Trans. = expenditure on transport, OES = expenditure on other economic services, Educ. = expenditure on education, Heal = Expenditure on health, OSS = expenditure on other social services, ε = error term, L = logarithms and f - Functional notation.

4.5 The Structure Vector

The structure vector is the vector of the correlation between each variable of a set and any one of the canonical variate of the set. The square of the elements of these vectors indicate the proportion of variance of each X or Y variable explained or accounted for by the canonical variate x_j or y_j. The ith individual's value on the jth canonical variates of the sets of Xs and Ys as:

$$x_{ij} = c_{j1}z_{x_1 i} + \cdots + c_{jp}z_{x_p i} = c_{j1}z_{x_1 i} + \cdots + c_{jp}z_{x_p i}$$

and $\qquad y_{ij} = d_{j1}z_{y_1 i} + \cdots + d_{jq}z_{y_q i} \qquad (7)$

where;

x_{ij} and y_{ij} denote the standardized form of $z_{x_{ij}}$ and $z_{y_{ij}}$ respectively, the $z_{x_j i}$s and $z_{y_j i}$s are the standardized forms of the individual's values on the Xs and Ys respectively. The s_{x_j} is defined as the vector of the correlations between the Xs and x_j. The structure vector for the set of Xs is written as;

$$s_{Xj} = \frac{1}{n}\sum_{i=1}^{n} z_{x_i}x_{ij} \qquad (8)$$

Where, z_{x_i} is the vector of standardized X values for individual i and x_{ij} is value of the jth canonical variate for individual i. Using the matrix notation, the above expressions for x_{ij} and y_{ij} may be written

$$x_{ij} = c'_j z_{x_i} \text{ and } y_{ij} = d'_j z_{x_i} \qquad (9)$$

Now substituting for x_{ij} in equation (9), we have;

$$s_{Xj} = \frac{1}{n}\sum_{i=1}^{n} z_{x_i} c'_j z_{x_i} \qquad (10)$$

Because;

$c'_j z_{x_i} = z'_j c_i$, substituting yields $s_{Xj} = \frac{1}{n}\sum_{i=1}^{n} z_{x_i} z'_j c_i = R_{xx}c_j \qquad (11)$

Similarly,

Y variable is $\ s_{Xj} = R_{yy}d_j \qquad (12)$

4.6 Redundancy Index

This is the degree to which the canonical variates of both the set X variables and the set Y variables can explain the standardized variability in the set X or set Y. For the first canonical variate, the redundancy index can calculated using the formula:

$$R_{dX_1} = \frac{s'_{X_1}s_{X_1}}{p}R^2_{c_1} \text{ for set X and } R_{dY_1} = \frac{s'_{Y_1}s_{Y_1}}{q}R^2_{c_1} \text{ for set Y} \qquad (13)$$

5. DATA ANALYSIS AND RESULTS

5.1 Correlations Matrix between All Components

The correlations between the components presented in Table 5.1 shows that strong positive relationship exist between national recurrent expenditure and economic service and Social services.

5.2 Eigenvalues and Canonical Correlations

The eigenvalues and canonical correlations table indicates that; the first eigenvalue, $\lambda_1 = 19.2624$, has a corresponding canonical correlation $R_{c_1} = .97501$, the second eigenvalue, $\lambda_2 = .43586$, has a corresponding canonical correlation $R_{c_2} = .55096$ and the third eigenvalue, $\lambda_3 = .12755$, has a corresponding canonical correlation $R_{c_3} = .33634$. Canonical correlation of $R_{c_1} = .97501$ implies that there is a strong positive relationship between the Economic service and the Social service. Also the proportion of the variation accounted for by the canonical variates of both the Economic and Social service is 95%. The Pct shows the proportion of explained variance in the canonical variates attributed to a given canonical correlation. The result indicated that; 97.16% of the variation in the first canonical variate was accounted for, 2.20% of the variation in the second canonical variate was accounted for in the second canonical correlation and 0.64% of the variation in the third canonical variate was accounted for by the third canonical correlation.

5.3 Test of Significance for Canonical Correlation

The hypothesis to be tested is;

$H_0: \rho_{c_k} = \rho_{c_{k+1}} = \cdots = \rho_{c_r} = 0$ v.s $H_1: \rho_{c_k} \neq 0$ for at least one k.

The decision rule is; reject H_0 if p-value $\leq \alpha = 0.05$. Since all the p-values are less than the level of significance, there is a significant relationship between the economic and social service of the Government recurrent expenditure.

5.4 Canonical Coefficient for Economic and Social Services

Table 5.4 presents canonical coefficient for economic and social Services, the result indicates, a unit increase in the expenditure on health will leads to -0.00001 unit decrease in the first of the social service in the first canonical, similarly, a unit increase in the expenditure on construction will leads to -0.00001 unit decrease in the first canonical variate of the economic service.

5.5 Standardized Canonical Coefficient for Economic and Social Services

Table 5.5 presents the standardized canonical coefficients, i.e. if the variables are rescaled to have a mean of zero and a standard deviation of 1, the coefficients generating the canonical variates would indicate how a unit standard deviation increase will change the variate. The relative size of these standardized canonical coefficient indicate the emphasis accorded to each variable in a set compared with other variables in canonical correlation table The result shows that; an increase of one standard deviation in Agriculture would lead to -0.06877 standard deviation decrease in the first variate of the economic service. R_{c_1}, between z_{x_1} and z_{y_1}, is the largest correlation between any pair of canonical variate and it is based on the sample data. Therefore the standardized canonical coefficient y_1 of $-.52706 z_{y_4}$ was accorded the highest emphasis, which implies that the highest government's expenditure was on the other economic services provided to the nation, followed by transport and communication with $-.36210 z_{y_3}$, then construction with $-.09743 z_{y_2}$, and finally, agriculture with $-.06877 z_{y_1}$.

For social service; an increase of one standard deviation in Health will lead to 0.06276 standard deviation decrease in the first variate of the social service. Therefore the standardized canonical coefficient X_1 of $-.80667 z_{x_3}$ implies that the highest Government's expenditure on other social services, followed by health with $-.28484 z_{x_2}$ and finally education with $0.06276 z_{x_1}$.

5.6 Structure Vector for Economic Service and Social Services

Table 5.6 presents the structure vector for economic services which is the amount of variation accounted for at the first, second and third canonical variate in the Agriculture is 67%, 74%, and 4% respectively, in Construction is 96%, 18% and 22% respectively, in Transport and communication is 96%, 5% and 11% respectively and in Other economic service is 97%, 17% and 3% respectively.

For social services; the amount of the variation accounted for education are; 88%, 45% and 11% at the first, second and third canonical variate respectively, 90%, 36% and 27% for health and 99%, 91% and 8% for other social services.

The amount of the variation accounted for the first, second and third canonical variate in the education is 77%, 21% and 1% respectively, while in Health is 80%, 13% and 7% respectively and in Other social service is 98%, 00% and 00% respectively.

5.7 Redundancy Index for Economic and Social Service

Table 5.7 presents the degree to which the canonical variates of both the dependent variables Economic Service and covariates Social Service can explain the standardized variability in the dependent variables. The result shows the 80.91%, 15.32% and 1.58% of the variation in the social variable was accounted for by the first, second and the third canonical variables of the economic variables and also 85.44%, 11.51% and 3.04% of the variation in the economic variable was accounted for by the first, second and third canonical variables of the economic variables respectively.

Similarly; For the social services; the result shows the 81.23%, 3.49% and 0.34% of the variation in the social variable was accounted for by the first, second and the third canonical

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Table 5.1. Correlations matrix between all components

Components	Edu.	Health	OSS	Agric.	Constr.	Trans.	OES
Edu.	1						
Health	0.984	1					
OSS	0.824	0.833	1				
Agric.	0.765	0.735	0.610	1			
Constr.	0.878	0.892	0.910	0.789	1		
Trans.	0.837	0.840	0.933	0.674	0.917	1	
OES	0.795	0.818	0.947	0.533	0.898	0.883	1

Table 5.2. Eigenvalues and canonical correlations

Root No.	Eigenvalue	Pct.	Cumulative Pct.	Canonical Corr.	Square Correlation
1	19.26240	97.15818	97.15818	0 .97501	0.95065
2	0.43586	2.19844	99.35662	0.55096	0.30355
3	0.12755	.64338	100.	0.33634	0.11312

Table 5.3. Test of significance for canonical correlation

Multivariate tests of significance: S = 3, M = 0, N = 20					
Test Name	Value	Approx.	Hypoth. DF	Error DF	Sig. of F
Pillais	1.36733	9.21223	12.00	132.00	0.000
Hotellings	19.82581	6718747	12.00	122.00	0.000
Wilks	0.03048	25.44730	12.00	111.41	0.000
Roys	0.95065				

Table 5.4. Canonical coefficient for economic and social services

Coviates	Economic services			Coviates	Social services		
	1	2	3		1	2	3
Agriculture	-.00001	.0001	-.00009	Education	.00000	.00009	-.00011
Construction	-.00001	-.00002	.00023	Health	-.00001	-.00008	.00022
Transport	-.00002	-.00001	-.00012	Other Soc.	-.00004	-.00007	-.00005
Other econ.	-.00002	-.00002	-.00005				

Table 5.5. Standardized canonical coefficient for economic and social services

Coviates	Economic services			Coviates	Social services		
	1	2	3		1	2	3
Agriculture	-.06877	1.33768	-1.2267	Education	.06276	3.40452	-4.36646
Construction	-.09743	-.30088	4.10784	Health	-.28484	-1.89034	5.34098
Transport	-.36210	-.17760	-1.8078	Other Soc.	-.80667	-1.32086	-.93679
Other econ.	-.52706	-.45097	-1.4084				

Table 5.6. Structure vector for economic service and social services

Coviates	Economic services			Coviates	Social services		
	1	2	3		1	2	3
Agriculture	-.67056	.74034	.04468	Education	-.88193	.45720	.11478
Construction	-.95712	.18644	.21771	Health	-.89504	.35785	.26615
Transport	-.96334	.05032	-.11375	Other Soc.	-.99223	-.09079	-.08505
Other econ.	-.97107	-.16563	.03208				

Table 5.7. Redundancy index for economic and social service

Canonical variance	Economic services			Social services		
	1	2	3	1	2	3
Pct. Variance dep	80.9185	15.3207	1.58412	81.2303	3.49422	.34407
Cumulative pct Dep	80.9185	96.2392	97.8233	81.2303	84.7246	85.0686
Pct Variance Covariate.	76.9249	4.65063	0.17920	85.4474	11.5111	3.04154
Cumulative Pct COV	76.9249	81.5756	81.7548	85.4474	96.9585	100.000

variables of the social variables respectively and also 85.44%, 11.51% and 3.04% of the variation in the economic variable was accounted for by the first, second and third canonical variables of the social variables respectively.

6. DISCUSSION AND CONCLUSION

This study investigated the relationship as well as the effect of Nigeria Government's expenditure on economic and social services over the period of fifty-five (55) years (i.e. 1961 to 2016) using Canonical Correlation Analysis. The results from all the tests show that there exist a strong positive significant relationship between the economics and social service and Nigeria Government recurrent expenditure.

It was also discovered that; Nigeria was retrogressing economically and socially because government placed more emphasis on other sectors that do not add much to the economic and social sectors of the country, the finding discovered that; the highest government's expenditure was on other economic services like; Oil and gas, trade, infrastructure and manufacturing and other social services like; food subsidies, police, fire services, housing, community management, policy research, information and labour while Agriculture was the least in Government's expenditure for economics service and education was the least under social service, this findings were in agreement with [33,34].

Base on the findings in this study it is recommended that; all tiers of Government and policy makers should place more emphasis on education, Health and most importantly; Agriculture because it will lead to increase in food production, raw materials for exportation, provision of more nutrition to its citizens, source of employment and will also serve as a source of foreign exchange.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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