DETERMINANTS ANALYSIS OF FOREIGN DIRECT INVESTMENTIN NIGERIA: PRINCIPAL COMPONENT APPROACH

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ABSTRACT

This study examined determinant of foreign direct investment in Nigeria, using principal component analysis approach.A total number of twenty variables were identified in the study and secondary data were collected for each variable over a period 45 years spanning from 1970 to 2014 as sourced from Statistical Bulletin of the Central bank of Nigeria, Annual Abstract of National Bureau of Statistics, as well as World bank data base.The study employed principal component analysis, and found that variables includinglending rate, inflation rate, term of trade, real gross capital formation, domestic investment, growth rate of gross domestic product and trade openness are keydeterminants of foreign direct investment in Nigeria.Hence ensuring adequate inflow of foreign direct investment in Nigeria requires that government should focus policy simulations on stabilization of price level, cost of capital, trade transactions within and outside the country, optimum factor utilization that can engender higher productivity and place the country on a better vantage position for international dealings

Keyword: *Principal Component Analysis, Foreign direct investment, Determinants, Nigeria*

INTRODUCTION

Litany of assertions on the factors provoking Foreign Direct Investments, suggest that there is no consensus of opinion on the determinants of Foreign Direct Investment in emerging economies, Nigeria included. Akinlo (2004) and Shiro (2010) found that FDI has

not contributed much to growth and development in Nigeria. Another contradictory position to these is that Kumar and Pradham (2002) who argue that FDI has contributed to growth. Ayorinde (2002) contended that FDI contributed positively to growth but fail to augment human capital development Moreover a very scarce amount of work has been committed on the determinant of Foreign Direct Investment inflow in the manufacturing sector in Nigeria economy. Omojolaibi et al (2009) and Dinda (2009) found FDI to be positively related to trade openness and significant in explaining output growth in Nigeria.

Conversely, Ayanwale (2007) found that openness to trade and available human capital are not FDI inducing in Nigeria.Notably the economic contribution of FDI remains contentious in empirical studies, while many studies observed positive impact of Foreign Direct Investment on economic growth, othersrelayed thatthere is negative relationship between inflow of foreign direct investment and performance of an economy. More importantly the question of what determines the inflow of foreign direct investment in a country especially developing countries has continue to gain empirical attention in recent yearsKeke et al. (2003). The effect of FDI specific variables, such as GDP, exchange rate, exchange rate volatility, lending rate, wage in manufacturing, labour productivity, real export, real import, openness to trade on FDI inflow has not received much attention in literature, as most studies (see Ayanwale, 2007; Chete, 1998;Omojolaibi*et al* 2009; Dinda, 2009)on foreign direct investment failed to consider the peculiarity of the country, type of industries involved, environmental and socioeconomic factors as well as macroeconomic determinants in details.

More importantly, very little effort has been devoted to the determinants of FDI in manufacturing sector in Nigeria. The need for this study, thus, stems from the fact that only few studies, to our knowledge, have been conducted to analyze the determinants of FDI that capture most of these variables.Without mincing word the pattern of inflow, and its likely impact on growth and development, it becomes crucial to analyze determinants that could explain the pattern observed in the report, but even this requires careful study to isolate the vital from the irrelevant to the determinants responsible for the inflow of FDI into the county. Thus this study specifically set out to ascertain the key determinants of foreign direct investment in Nigeria, using principal component analysis.

LITERATURE REVIEW:

Foreign direct investment:

Foreign Direct Investment has been defined in various ways owing to the presence ofmany authorities such as International Monetary Fund (IMF), Organization for Economic Corporation and Development (OECD), and United Nations Conference on Trade and Development (UNCTAD) (Singh, 2005). International Bank for Reconstruction and Development (IBRD), The OECD (2001) maintained that Foreign Direct Investment reflects the objective of obtaining a lasting interest by a resident entity in one economy (direct investor) in an entity resident in an economy other than that of the investor (direct investment enterprise). The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence on the management of the enterprise. This definition is also adopted by the International Monetary Fund (IMF).The New York Times (1996) reiterated that Foreign Direct Investment (FDI) is a component of a country's national financial accounts. The "Paper" also explained further that Foreign Direct Investment is an investment of foreign assets into domestic structure, organizations and equipment. It does not include investment into the stock markets. Lipsey and Chrystal (1995) defined FDI, as an investment allows foreign owners have control over the behavior of firms in which the investment is made; FDI gives owners control over the decisions of producers located in a particular country. Lipsey and Chrystal (1995) presented three main motives for FDI and these include the need to extend production facilities internationally, globalize production and competition and move some production to profitable levels.The United Nation Conferenceon Trade and Development UNCTAD(1998)alsoindicatedthevarious economic determinants of Foreign Direct Investments and are presented in figure 1:

Figure 1:*Conceptual Framework on determinants of FDI Inflow*
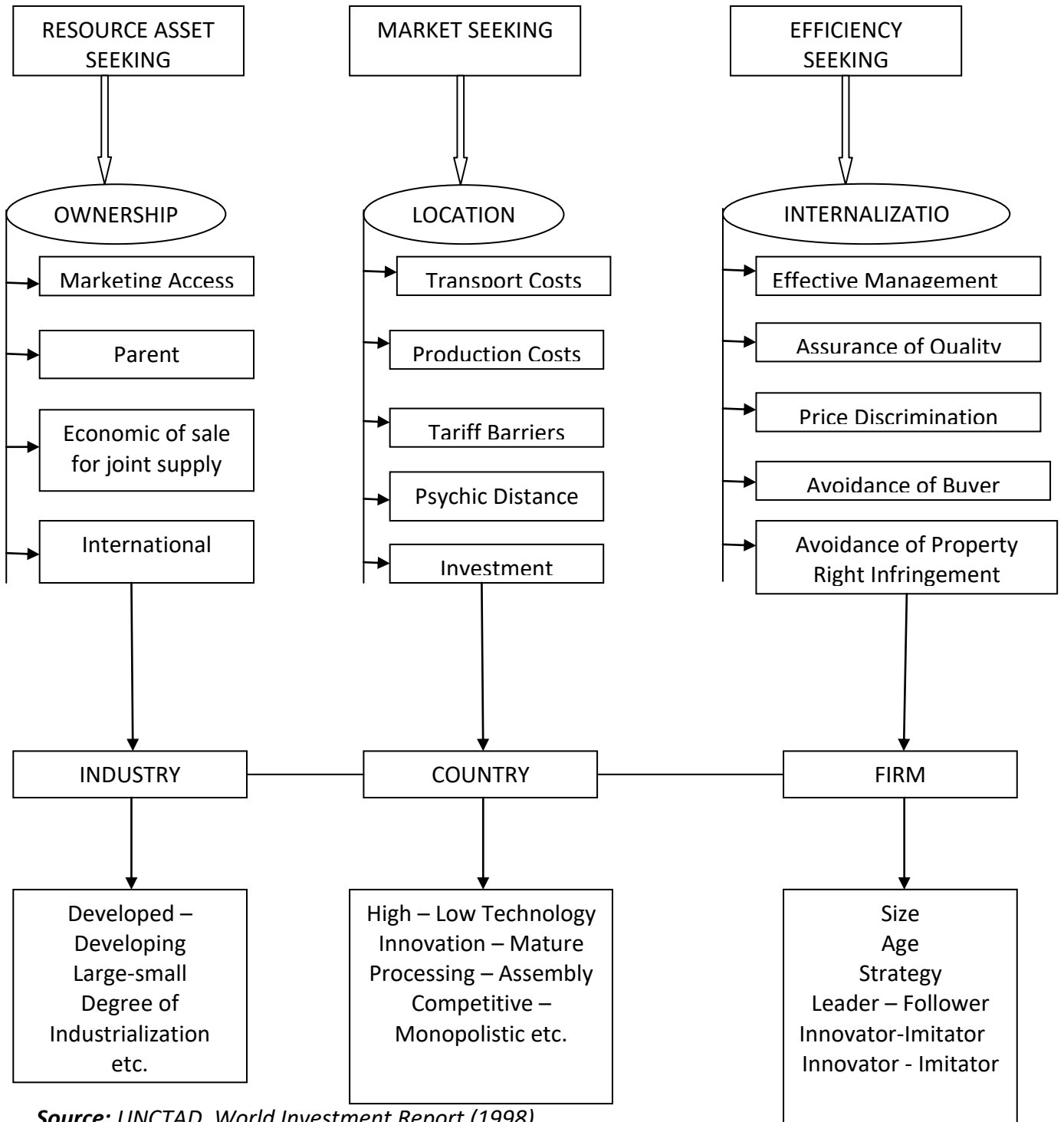
Source: UNCTAD, World Investment Report (1998)

Empirical Review

Kinoshita and Campos (2002) analyzed the location determinants of Foreign Direct Investment in transition economies. The study objectively investigated the determinants of

Foreign Direct Investment inflow in transition economies between 1990 and 1998 with emphasis on the effect of agglomeration all over the transition economies. The study discovered that the main determinants of Foreign Direct Investment in the transition economies are agglomeration, the value of bureaucracy and the degree of external liberalization

Vijayakumar *et al* (2010) investigated the determinants of Foreign Direct Investment in BRICS countries. The study made used of panel data analysis in the course of the investigation, with annual dataset from 1975 to 2007. From the result of the analysis conducted in the study it was discovered that market size, labour cost, infrastructure, currency value and gross capital formation which is the potential determinants of Foreign Direct Investment inflow of BRICS countries. The economic stability and growth prospects measured by inflation rate and industrial production respectively, trade openness(measured by the ration of total trade to GDP) appears to be insignificant determinants of FDI inflow of the BRICS countries

Albulescu *et al* (2010) analyzed the determinants of Foreign Direct Investment in CEECS with emphasis on the role of financial stability. Using panel data techniques and a large sample of central and eastern countries the study investigated the impact of financial stability on Foreign Direct Investment inflow. The study made use of financial stability measure based on a financial stability aggregate index alongside other variables including number of inhabitants, trade openness, labour productivity and lending rate. The study reported that the stability of the financial system played a considerable role in attracting Foreign Direct Investment inflow in Central and Eastern Europe during the period covered in the study

Kristjansdottir (2005) analyzed the determinants of Foreign Direct Investment in Iceland. The study objective investigated whether the low Foreign Direct Investment in Iceland can be explained by its geographical location together with market size measures. The effect of these factors on inward Foreign Direct Investment were analyzed using gravity model which also analyzed sector, trade bloc and country specific effects. The study was based on panel data set running over sectors countries, and years. The results indicated that distance negatively affects Foreign Direct Investment and Foreign Direct Investment appears to be more driven by wealth effects than market size effects.

Holland and Pain (1999) carried out a panel analysis of investment in transition economies. the study emphasized on the factors affecting aggregate inflow of Foreign Direct Investment in eight eastern European economies over five years period covering 1992 to 1996. The result of the analysis conducted in the study indicated that the method of privatization, proximity to EU and the extent of trade linkages with the advanced economies have important impact on the inflow of investment. The study also discovered a role for risk and relative labour costs in the foreign countries, therefore suggesting a measure of competition to attract inward investment. Thus the study concluded that inward investment has had a significant effect on the economic performance of host economies, although beneficial effects on indigenous firms appear to have been slow to development.

Janicki and Wunnava (2004) analyzed an empirical investigation of the determinants of Foreign Direct Investment with the confirmation from the EU accession candidates. The study investigated bilateral Foreign Direct Investments FDI between the members of the European Union and eight central and East European candidates(CEEC) economies in transition, awaiting accession into the European union (EU). Cross-section data were obtained for Bulgaria, Czech Republic, Estonia, Hungary, Poland, Romania, Slovak Republic, and Slovenia for 1997. The study indicates that the key determinants of FDI inflows in CEECs are size of the host economy, host country risk, openness to trade and labour costs in host country.

Mangir, AY, and Sarac (2012) conducted a comparative investigation of the determinants of Foreign Direct Investment of Turkey and Poland. The analysis was carried out using monthly data from 2000 to 2009 for the two countries. Making use of the techniques of granger causality test and VAR model analysis, the study reveals that the correlation between Foreign Direct Investment and economic growth is unclear. Specifically the study discovered that that Foreign Direct Investment positively correlated with market size, and trade openness in Poland, and that there is unidirectional relationship between Foreign Direct Investment and trade openness as well as market size for Turkey.

Petrakou (2013) examined the determinants of Foreign Direct Investment in the Greek Regions. The study aimed at gaining clarity on whether and to what extent the presence of localization economies in the Greek region had impacted Foreign Direct Investment location

decision. The study made use of pooled cross-section dataset of Foreign Direct Investment stock to analyze the effect of localization economies and other basic determinants on the pull of Foreign Direct Investment. The study revealed that the most significant influence to be geographic position, human capital, market size, and the presence of localization economies.

Polat and Payashoglu (2014) conducted a sectoral analysis of the determinants of Foreign Direct Investment to Turkey. The study made use of panel data for the 2007 to 2012 period in the quest to analyze the major determinants of foreign investments into the manufacturing subsectors in Turkey. Strong indication is established that turnover indices and new investment incentives introduced in 2009 have a significant impact on FDI; conversely, taxes, the country risk index of the USA, and the price of coking coal have a negative effect. The study did not establish a significant impact of Country Risk index on Turkey and the price of natural gas.

Walsh and Yu (2010) carried out an investigation on the determinants of Foreign Direct Investment using sectoral and institutional method. The employed dataset which breaks down Foreign Direct Investment flows into primary, secondary and tertiary sector investments and a GMM dynamic method to address endogeneity, the study carried out an analysis on various macroeconomic, developmental, and institutional/qualitative determinants of Foreign Direct Investment in a sample of emerging market and developed economies. While Foreign Direct Investment flows into the primary sector indicate little dependence on any of these variables, secondary and tertiary sector investments are affected in diverse ways by countries' exchange rate valuation and income levels, as well as development indicators such as financial depth and school enrollment, and institutional factors such as judicial independence and labor market flexibility. Finally, it was discovered in the study that the effect of these factors often differs between advanced and emerging economies.

Anyanwu (2011) analyzed the determinants of Foreign Direct Investment inflow to Africa between 1980-2007. The study looked into the question of what determines Foreign Direct Investment inflows to Africa. Employing a panel data analysis the study discovered that there is positive relationship between market size and Foreign Direct Investment inflows,

that openness to trade exhibited positively on Foreign Direct Investment flows and that higher financial development exhibited negatively on FDI inflows, that higher FDI goes where international remittances also goes in Africa, that high government consumption spending attracts FDI inflows to Africa, that agglomeration has a strong positive impact on FDI inflows to Africa, that natural resource endowment and exploitation (especially for oil) attracts huge FDI into Africa, and that East and Southern African sub-regions appear positively disposed to obtain higher levels of inward FDI.

Ravinthirakumaran, Selvanathan, Saroja and Singh (2015) examined the determinants of Foreign Direct Investment in Sri Lanka. The study analyzed the empirical investigation using autoregressive distributed lag (ARDL) model. Data employed for the analysis was secondary time series data covering 1978 to 2012. The outcome of the analysis conducted established the existence of long run equilibrium between Foreign Direct Investment and explanatory variables including trade openness, GDP growth rate, infrastructural, wage and rate of inflation. The study found that trade openness, GDP growth and infrastructure exert positive impact on Foreign Direct Investment while inflation has negative impact on Foreign Direct Investment as expected. The impact of wage was discovered to be statistically insignificant and this indicates that there is no hold for the cheap labour-led Foreign Direct Investment hypothesis in Sri Lanka.

METHODOLOGY

This study made use of secondary data covering a period of forty five years spanning 1970 to 2014. Data were sourced from various sources including Statistical Bulletin of the Central bank of Nigeria, Annual Abstract of National Bureau of Statistics, as well as World bank data base.The study measured foreign direct investment by the stock of foreign direct investment in the country, and identified twenty(20) variables below to be influential on the inflow of foreign direct investment. Identified variables includedexchange rate, lending rate, real gross domestic product, inflation, manufacturing export, real import, real export, net inflow, trade volume, term of trade, domestic investment, investment in percentage of gross domestic product, capital expenditure, expenditure in percentage of gross domestic product, commercial bank loan, real gross domestic product growth rate, real gross domestic capital formation, population, trade openness. Identification of the key

determinants was done in the study using technique of principal component analysis. Principal Component Analysis seeks values of the loading that bring the estimate of the total communality asclose as possible to the total of the observed variances. The orthogonal rotation technique encourages the discovery of factor each of which is related to a small number of variables and discourages the detection of factors influencing all variables.

Data Analysis and Interpretation

This section present result of analysis conducted in the study to ascertain the key determinants of foreign direct investment inflow in Nigeria. Result entails principal components selection based on eigenvalues, scree plot of eigenvalues, as well as the eigenvector variable-component loading estimation

Table 1: *Principal Components Eigenvalue Estimation*

Components	Eigenvalue	Difference	Proportion	Cumulative
Comp 1	10.1395	6.4283	0.5070	0.5070
Comp 2	3.71117	2.15127	0.1856	0.6925
Comp 3	1.5599	.302674	0.0780	0.7705
Comp 4	1.25722	.279656	0.0629	0.8334
Comp 5	.977568	.227102	0.0489	0.8823
Comp 6	.750465	.170518	0.0375	0.9198
Comp 7	.579948	.169669	0.0290	0.9488
Comp 8	.410278	.196436	0.0205	0.9693
Comp 9	.213843	.0202977	0.0107	0.9800
Comp 10	.193545	.0911758	0.0097	0.9897
Comp 11	.102369	.0466159	0.0051	0.9948
Comp 12	.0557535	.0321111	0.0028	0.9976
Comp 13	.0236424	.0109504	0.0012	0.9988
Comp 14	.012692	.00487172	0.0006	0.9994
Comp 15	.00782024	.00422311	0.0004	0.9998
Comp 16	.00359712	.00294459	0.0002	1.0000
Comp 17	.000652534	.000584355	0.0000	1.0000
Comp 18	.0000681791	.0000667555	0.0000	1.0000
Comp 19	1.42363e-06	1.42363e-06	0.0000	1.0000
Comp 20	0.0000	0.0000	0.0000	1.0000

Source: *Authors' Computation (2018)*
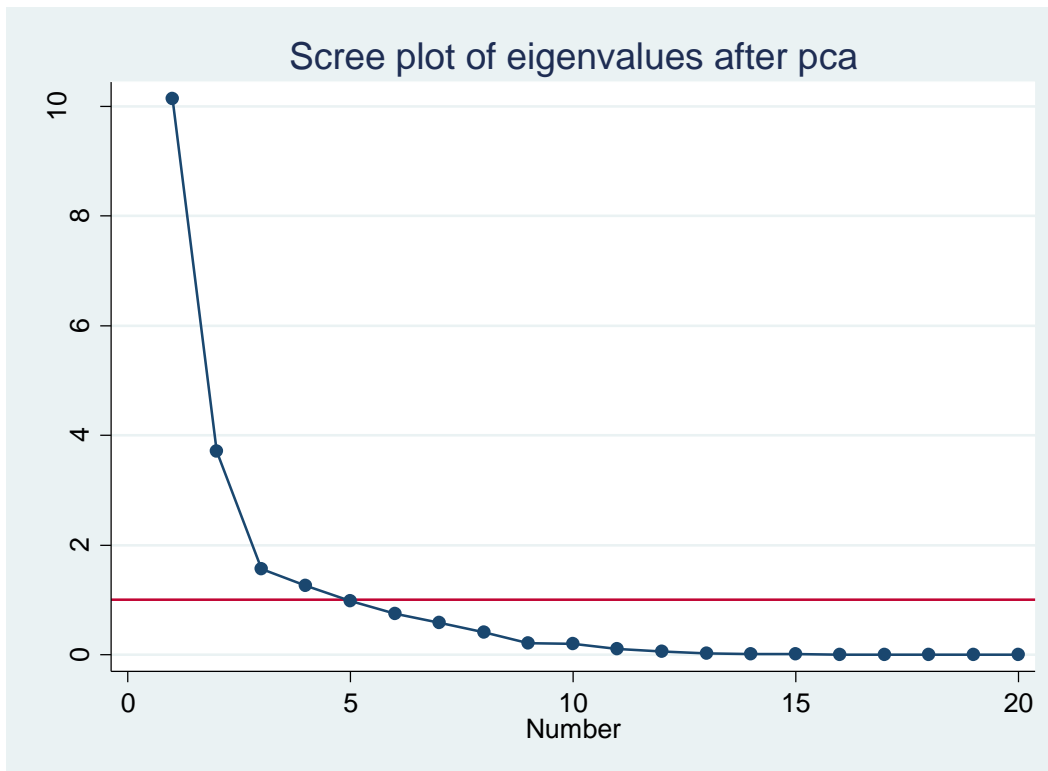
Figure 2: Scree Plot

Table 1 presents the eigenvalues corresponding to each component identified to explain the variation in all the 20 variables included in the principal component analysis conducted. the table reveals that among the 20 corresponding components only four (4) components has eigenvalue greater than 1.0 (the benchmark for selection of principal components). Thus the result shows that among the 20 components only components 1, 2, 3, and 4 are the principal components. Specifically the table reported a corresponding eigenvalues of 10.1395, 3.71117, 1.5599, 1.25722 for component 1, 2, 3, and 4 respectively. Notably the table reveals that the four principal components can jointly explain about 83% of the variation in all the 20 variables identified as determinants of Foreign Direct Investment. Evidently the scree plot presented in figure 2: above confirmed the selection of four principal components based of eigenvalues greater than one (1). From the figure it can be observed that only four component positions are above the evaluation line while the remaining 16 component positions fallbelow the unit eigenvalue evaluation line, thus corroborating the selection of only four principal components amidst the twenty components estimated in the analysis.

Table 2:*Principal Components Eigenvector Loading*

Variables	Comp 1	Comp 2	Comp 3	Comp 4
Exr	0.2781	0.1569	0.0730	0.0850
Lenr	0.0673	0.0608	0.0714	0.7538
Rgdp	0.2445	-0.2983	0.1823	-0.0009
Inf	-0.1110	-0.1287	-0.2003	0.5800
Manexp	0.2875	0.0582	-0.1293	-0.0609
Rimp	0.3058	-0.0952	0.0240	-0.0175
Rexp	0.2847	-0.2050	0.0739	-0.0186
Ninflw	-0.3074	0.0788	-0.0167	0.0172
Tvol	0.3082	-0.0673	-0.0335	-0.0497
Tot	0.1557	0.4042	-0.2219	-0.0193
Infinv	0.1288	0.1886	-0.2747	-0.1501
Invofgdp	0.1058	0.3177	0.4258	-0.0476
Capexp	0.2952	0.1290	-0.0724	-0.0322
Expofgdp	-0.1644	0.2156	0.2496	-0.1089
Cbloan	0.2395	-0.1480	0.0439	0.0064
Gdpgr	0.0850	0.1464	-0.4012	0.0342
Rgcaf	-0.0038	0.3148	0.5503	0.1183
Popu	0.2958	0.1185	0.0373	0.1552
Pcapinc	0.2418	-0.3024	0.1828	-0.0043
Trop	0.1500	0.4359	-0.1343	0.0607

Source: *Author's Computation (2018)*

Table 2 presents the loading of each variable on the four principal components that explains about 83% of the variation in all the variables combined. Specifically the table reported that exchange rate loading on the corresponding principal component stood at 0.2781, 0.1569, 0.0730, 0.0850 for components 1,2,3 and 4 respectively, thus exchange rate does not significant load on any of the principal components. For lending rate the table reported loading values of 0.0673, 0.0608, 0.0714, 0.7538 for the four principal components respectively which shows that lending rate only load highly on the four components. Eigenvector Loadings of real gross domestic product on component 1, 2, 3, and 4 stood at 0.2445, -0.2983, 0.1823, and -0.0009 respectively, which is indication that real gross domestic product does not significantly load on any of the estimated principal component. Table 2: revealed that inflation eigenvector loading on the four corresponding principal components stood at -0.1110, -0.1287, -0.2003, 0.5800 respectively thus revealing how inflation load averagely well on the fourth component. Manufacturing export loading on the four components stood at 0.2875, 0.0582, -0.1293, -0.0609 for first, second, third and fourth components respectively, thus showing the inability of manufacturing export to load

significantly high on the principal components. The loadings of variables like real import, real export, trade volume on the four principal components revealed that all of these variables does not correlate significantly with the principal components that explain larger percentage of the variation in all the included variables combined. Term of trade as presented in table 2: correlated mildly well with component two among other principal components. variables like investment in percentage of gross domestic product, gross domestic product growth rate and real gross domestic product loads mildly well on component three as oppose other components while other variables including total investment, capital expenditure, expenditure as percentage of gross domestic product and commercial banks holds no significant correlation with any of the principal components estimated in the study, given their very low loadings on the corresponding principal components.

From the principal component analysis conducted it was discovered that only few of the variables included in the principal component analysis loads reasonably high on the four identified principal components. thus in an attempt to select variables that will be used for the investigation of key determinants of Foreign Direct Investment inflow in Nigeria, the study shortlisted all the variables that loads about 40% on the average on any of the estimated principal components. it is noteworthy to stress the 40% benchmarking is due to the fact that selection based on average loading only shortlist three variables among the 20 variables included in the analysis, which is considered too stereotype for investigating the determinants of Foreign Direct Investment in the country. The selection is done by neutralizing or blocking every loadings that is less than 40%. The study inferred from the analysis above that given the fact that the identified principal component can explain about 83% of the variations in all the 20 variables selected in the study as determinants of Foreign Direct Investment, those variables that load reasonably high on these components in other word, those variables that shows considerable measure of relationship with any of these components can better determine the subject matter which is Foreign Direct Investment inflow into the country. Thus the result of selection based on average loading of 40% is presented in the table 3.

Table 3: *Principal Components Eigenvector Loading for variable selection at 40% and above*

Variables	Comp 1	Comp 2	Comp 3	Comp 4
Exr				
Lenr				0.7538
Rgdp				
Inf				0.5800
Manexp				
Rimp				
Rexp				
Ninflw				
Tvol				
Tot		0.4042		
Infinv				
Invofgdp			0.4258	
Capexp				
Expofgdp				
Cbloan				
Gdpgr			-0.4012	
Rgcaf			0.5503	
Popu				
Pcapinc				
Trop		0.4359		

Source: *Authors' Computation (2018)*

Table 3 reveals variables which load on the average of 40% with the principal components identified from the eigenvalue estimation and scree plot analyses above. The table shows that among all the 20 included variables only seven variables were shortlisted based on the average loading of 40%. Table 3: reveals loading values of 0.7538 and 0.5800 for lending rate and inflation rate respectively, 0.4042 for terms of trade, 0.4258 for total investment in percentage of gross domestic product, -0.4012 for gross domestic product growth rate, 0.5503 for real gross capital formation, and 0.4359 for trade openness. Hence the study shortlisted seven variable including lending rate, inflation rate, terms of trade, total investment, gross domestic product growth rate, real gross capital formation and trade openness. Selection of Foreign Direct Investment determinants based on eigenvector loadings on the principal components estimated, which shortlisted variables like lending rate, inflation rate, term of trade, real gross capital formation, domestic investment, growth rate of gross domestic product and trade openness coincides with some of the determinants identified by past researchers such as Erdal and Tatoglu (2002), Udo and Ubiora (2006), Banaik*et al*(2002) e.t.c.

Conclusion and Recommendations

The study concluded that key determinants in Nigeria in the discourse of inflow of foreign direct investment include lending rate, inflation rate, term of trade, real gross capital formation, domestic investment, growth rate of gross domestic product and trade openness. Hence ensuring adequate inflow of foreign direct investment in Nigeriarequires that government shouldfocus policy simulations on stabilization of price level, cost of capital, trade transactions within and outside the country, optimum factor utilization that can engender higher productivity and place the country on a better vantage position for international dealings

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