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Impact of Financial Inclusion on the Growth of Sudanese Economy
Case of Sudanese Banks (2006-2020)

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Abstract
The paper shed light on the impact of financial inclusion on economic growth indicators of the Sudanese economy during 2006 to 2020, the problem of this paper is based on the main question, what is the impact of financial inclusion indicators on economic growth in Sudan?. Then, the main objective of this paper is to measure the impact of financial inclusion indicators including (the number of bank branches, the number of ATMs, the ease of doing business index, the credit to the private sector, money supply, government expenditure, and the volume of total finance) on the growth of the Sudanese economy. Accordingly, the researcher has used the Principal Component Analysis method (PCA), because is considered one of the techniques used to reduce the dimensionality of such dataset. Also to minimize uncorrelated variables that successively maximize variances) to reach the highest variances for the different variables used in the paper, and the researcher concluded that the number of ATMs, government expenditure, and ease of doing business are among the indicators with the highest variance among the different variables (4.5, 2.1, and 1.1, respectively), accordingly the researcher recommended that the government should provide banking and financial services so that the mass of low-income groups can have access to banking and financial services, and this will affect positively on the gross domestic product and then achieve the desired economic growth, which in turn will be reflected on the income rates of individuals and on the standard of living of the mass of low-income groups in the society.

Keywords: Financial inclusion, Economic Growth, Sudan Economy, PCA.

Introduction

Poverty alleviation through an inclusive growth has become a major tool to improve the standard of living of the low-income groups especially those who excluded from the financial services such as the access to the financial institutions. The term Financial inclusion refer to the fact that a person owns an account at formal financial institution, such an account allows to save, borrow or lend money legally and formally, and to insurance contract or to use payment services. Thus, being financially included leads to economic benefits. Because it can favor poor people through allowing them to increase their income and probability of being employed. Without financial inclusion, monetary and fiscal policy would be difficult to contribute in economic growth and the development of the financial sector (Alexandra Z. & Lauret W. 2016).

Financial inclusion occurs when most of the population equally receive financial services especially the low-income groups and microfinance producers in all areas including the countryside as well as in the cities. Thus, it is recommended that the bank branches should be in remote areas in order to include most of the residence. Additionally removing the barriers towards financial inclusion such as ease of doing business, and infrastructure. In study by Jalal Eldin (2018) measured the financial inclusion by three independent variables (GDP per capita income, bank concentration, and ease of doing business in the Arab world. He found that there is a positively effect of Gdppc income on financial inclusion, as well as the ease of doing business is positively affect the financial inclusion (Jalal E. R, 2018, P 11)

Mostly Sudan is considered one of the low-income countries that face many challenges, because the last financial crisis that hit the Sudanese economy was severe to some extent and has showed that the Sudanese economy is vulnerable in comparison to other

countries. Therefore, financial inclusion policies are the most effective methods for many reasons; one of them is the remote and distant areas that play role in reaching financial institutions, and access financial services. That is because there are huge amount of money outside the banks and financial institutions, in addition to the lack of awareness, the lack of trust between financial institutions and individuals, low income or assets, and social exclusion (Sarath C. and Manju T. 2010). Social and economic exclusion have adverse effects on a large group of people especially those who live in cities, and countryside. Therefore, financial inclusion is an effective tool to bridge the gap between the 'have and do not have' groups (Sarath Chandran, B.P and Manju, T.K, 2010, P1)

According to the above-mentioned literature, we discover that there is a huge gap research in The Sudan in relation to financial inclusion as a policy for an inclusive growth in order to alleviate poverty level as well as improving the standard of living of a large group of people. The main aim of this paper is to measure the impact of financial inclusion on Sudanese economic growth during 2006-2020 and to analyze the causality among the independent variables. The paper hypothesized that there is no significant impact of financial inclusion on Sudanese economic growth as a null hypothesis ($\mathbf{H_0}$), and there is statistically significant impact of financial inclusion on the Sudanese economic growth ($\mathbf{H_1}$).

2. Literature review:

The concept of financial inclusion:

Through the various theoretical literature, we have come through different concepts of financial inclusion each of which depends on the financial situation that exists in a country. Therefore, in this allocated space, we will summarize the most common concepts. Thus, according to Essam Y *et al*. (2018) financial inclusion has four components: access, usage, consumer protection, and financial literacy. While access refers to the outreach of the financial sector accompanied with appropriate contact points between people and institutions; use refers to usage or 'purchase of one or more financial products or services'. As for Arora (2010), for instance, considered three dimensions in the measurement of financial access: the outreach dimension: how many people does it cover– geographically and demographically (physical access or outreach dimension); how easy is it to undertake transactions (ease dimension); and how much does it cost (cost dimension).

Many papers related to financial inclusion and its effect on economic growth were conducted in various journals. These studies have shown that the more inclusive the economy is the more growth the economy will be. Therefore, in the allocated space we will shed light on the most relevant literature in the field. Rajabrata B. et al (2020) examined the effects of financial inclusion on the economic growth, the study mainly focused on the Access, usage, and quality of financial services. They empirically examined the relationship with specific development outcomes. They have constructed hybrid methodology. They show that financial inclusion has a positive effect on the development outcomes including health, and education. A Study conducted by Jalal Eldin (2018) measured the financial inclusion by four independent variables (GDP per capita income, bank concentration, and ease of doing business in the Arab world. He found that there is a positively effect of Gdppc income on financial inclusion, as well as the ease of doing business is positively affect the financial inclusion (Jalal E. R, 2018, P 11). In West Africa study by Gaurene G. et al (**2017**), investigated the financial inclusion and economic growth in WAEMU. By using a multi scale heterogeneity panel causality test in order to investigate the causal relationship between financial inclusion and economic growth. They showed that at scale 1 (2-4 years) there is no causality between economic growth and financial inclusion, but at scale 2 (4-8 years), they found a directional causality between economic growth and financial institution. In addition, Kidanemariam G, Daniel M. (**2019**), concentrated on macroeconomic determinants of financial inclusion, they studied the relation between financial inclusion and macroeconomic determinants. They used the generalized method of moments GMM dynamic estimation, which shows that financial inclusion is positively related to GDP per capita, and mobile access, and negatively related to government debt. As for Evans, O., (**2017**) the study documented the determinants of financial inclusion in Africa, using the dynamic panel data approach, he found that per capita income, broad money (% of GDP), literacy, internet access and Islamic banking and activity are significant factors

explaining the level of financial inclusion in Africa. Another paper conducted by Nkuna, O., et al, (**2018**) investigated the role of commercial banks on financial inclusion in Malawi. Primary and secondary data were used, using a combination of stratified and judgment sampling methods. The study reveals that whenever banks expand their services to unbanked population, the more growth of economy will take place. One of the recommendations is that bank should set up units for financial literacy programs. Additionally**,** Ghosh and Saibal. (**2009**). the paper made a systematic attempt to ascertain the connection between finance and growth at the sub-national level for an emerging economy. They examined the measures of financial outreach on per capita economic growth in India. They analyzed the issue through multivariate regressions. Therefore, they found that there was a significant impact of financial outreach on economic growth. Additionally, they pointed that the social banking strategy pursued in India has raised state per capita growth. In Asia, we find Duc H. et al (**2020**) examined the linkage between financial inclusion and financial market stability in the Asian region, using bank level dataset of 3071 banks in Asian region. They also used generalized method of moments GMM approach.so, they found that, the higher level of financial inclusion from providing access to banking facilities contributes positively and significantly to stability in banking sector, as well as economic growth**.** Nwanne, T. F. I. Ph.D, Hcib (2015), examined the sustainability of financial inclusion in rural areas in Nigeria, the variables included in their study are; deposit banks, microfinance banks, and communication services, in order to test the data, he used descriptive and content analysis. The researcher noticed that the sustainability of financial inclusion to rural residents in Nigeria remain the corner stone for economic growth. Jude O. and Cletus (2014) investigated the causality between financial depth and economic growth in Nigeria. Their study includes macroeconomic variables. Also, they used financial depth as a proxy for financial development such as the ratio of bank sector's credit to private sector to GDP (PSC), the ratio of broad money to GDP (M2Y), the ratio of bank deposit liabilities to GDP (BDL), and loan deposit ratio (LDR). They estimated the relation by Augmented Dicky Fuller Approach; they found that financial depth and economic growth have a stable long-run relationship.

Sadham, K. (**2011**) have assessed the extent of financial inclusion in the country in general and West Bengal in particular. It observed that an outreach activity in the banking sector and heterogeneity is widespread. The paper recommended that government should have policies to improve financial policies among poor and urban areas. As for Varghese, G. and Viswanathan, L. (**2018**): have identified the opportunities, issues, and challenges of financial inclusion in India. Their paper recommended that policymakers should focus on developing policies considering a sustainable banking services delivery model and need-based products for rural and urban consumers.

Badr A. and Shaista S, (**2017**), examined the impact of financial inclusion on growth of economy over seven years, the paper uses secondary data that analyzed by multiple regression, he finds that there is a positive and significant impact has been observed in Indian GDP**.**

3. Data and Methodology:

Data were collected from secondary sources including the annual reports provided by Central Bank of Sudan (CBOS) in addition to the World Bank group. The macroeconomic variables included in the models are Gross Domestic Product (GDP) which proxies the economic growth in Sudan (2006-2020). Then, the paper employed Principal Component Analysis (PCA) and Factor Analysis are data reduction methods used to have a multivariate data with fewer dimensions. The overall objective is to re-orient the data so that a multitude of original variables can be summarized with relatively few factors or components that capture the maximum possible information (variation) from the original variables. The principal component analysis is used to find out the factors that explain the most variance in the data that used in the paper. So, the eigenvalues are considered as the criterion to decide the number of factors to be identified with cumulative percentage of variance explained. Only those factors whose eigenvalues are above 1 are extracted.

3.1 Model specification:

Theoretically, economic growth is demonstrated to be driven by some factors such as physical capital, Investment, government expenditure and population growth. Therefore, the model is specified in such manner in order to accurately estimate the impact of financial inclusion indicators including (ATMs per 100,000 adults, the bank branches, credit to private sectors, ease of doing business, total finance as a percentage of GDP, Bank deposits, and money supply) on economic growth in Sudan during 2006-2020. In the various literature on economic growth have emphasized that financial inclusion has positive effect on economic growth. Therefore, based on the previous literature the following model will be used to estimate the relationship between financial inclusion and economic growth in Sudan during the period 2006-2020. The model will go through some steps.

$$\boldsymbol{RGDP_t} = \beta_0 + \beta_1 branches_t + \beta_2\, M2_t + \beta_3\, CrP_{\,t} + \beta_4\, Gspend_{\,t} + \beta_5\, ATM_{\,t} + +\beta_6\, Inflationr_{\,t} + \beta_7\, Tfinance_{\,t} + \beta_8\, Bdeposit_{\,t} + \beta_9\, doings_{\,t} + \varepsilon i \quad (*)$$

Where, the subscript t, denotes time period; B_0 is the constant of the model; Tfinance denotes the total finance as percentage of GDP; Bdeposit represents the total deposits by individuals; $branches_t$ represents bank branches per 100,000 adults; M_2 denotes money supply; CrP_t stand for credit to private sector; $ATMs_t$ denotes Automated teller machines per 100,000 adults; $Inflationr_t$ denotes inflation rate; $Doings_t$ denotes the ease of doing business indicator; GE_t shows the government expenditure.

Development of Sudanese Banks:

The banking system in Sudan has passed through many stages. The first one started 1903 to 1956 during the British colonial occupation which characterized by the domination of foreign bank branches including English, British and Egyptian. The second one started from 1956 to 1976 following the independence of the state. Where they established the central bank of Sudan, and other national banks until their amalgamation into national banks between 1970 and 1975. Then from 1976 to 1989 which was marked by the declaration of Sharia' law in Sudan, Islamization of financial legislations, and establishment of many Islamic banks. Then, 1989 to 2002 Sudan has witnessed the strengthening of Islamisation of financial institutions and legislation. Then, during the comprehensive peace agreement (CPA), a new transitional constitution was made between north of Sudan and people liberation Army. Through that time Sudan financial system has witnessed two new banking systems. One is Islamic banking system in the north, whilst a conventional banking system in the South of Sudan according to Nevasha agreement. Finally, after the secession of south Sudan, the banking systems have returned to a full sharia'h- complaint financial system (Mohammed A., and Naomie, 2017, P114).

Table 1, the Geographical Spread of the Operating Banks in the Sudan during 2006-2020

Item	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Khartoum State	190	NA	211	221	242	239	256	263	260	287	312	336	347	450	469
Middle States (Sennar, Aljazera, Blue Nile And White Nile)	111	NA	110	118	119	121	123	126	126	121	137	147	151	179	181
Eastern States (Gadarif, Kassala And Red Sea)	66	NA	65	57	61	64	74	80	78	82	85	89	90	113	114
Northern States (North And River Nile)	54	NA	52	59	63	63	67	67	67	70	72	76	82	93	93
Kurdofan States(North, South And Western States	49	NA	48	52	54	55	58	63	63	65	70	73	70	79	80
Darfur States (North, South, West, Middle And East Darfur	36	NA	40	45	46	47	51	56	56	54	56	57	61	73	76
Southern States (Bahr Elgazal, Upper Nile, and Equatoria)	16	NA	38	33	32	-	-	-	-	-	-	-	-	-	-
Total	522	-	564	585	617	589	629	655	650	679	732	778	801	987	1,013

Source: Central Bank of Sudan- Annual Reports (2006-2020).

Table1 shows the geographical outreach of Islamic and commercial banks operating in Sudan during the period 2006-2020. We note that the number of bank branches increased from 522 in 2006 to 655 branches in 2013, and then exceeded 700 branches in various states and regions of Sudan. We also observe that a steady increase in the year 2018 to more than 800 branches, and then jumped to 1,013 branches in 2020 in all states. This indicates the government represented by the Central Bank of Sudan has serious steps towards an inclusive policy in the banking sector to bring about a qualitative leap for the banks operating in Sudan.

The Empirical Results and Discussion:

Table 2, descriptive statistics:

	N	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Rgdp	**15**	**3145.06667**	**2124.78138**	**8229.24291**	**67720438.92**	**2.41888973**	**0.58011935**	**4.46323416**	**1.12089708**
Bdeposit	**15**	**11.4666667**	**1.03218062**	**3.99761834**	**15.98095238**	**-1.3568407**	**0.58011935**	**4.88512478**	**1.12089708**
Crp	**15**	**9.46666667**	**0.37628088**	**1.45732959**	**2.123809524**	**0.63505988**	**0.58011935**	**-0.920752**	**1.12089708**
M2	**15**	**209227**	**90826.6847**	**351770.237**	**1.23742**	**2.49258785**	**0.58011935**	**6.30436047**	**1.12089708**
G SPEND	**15**	**8690.8**	**610.82299**	**2365.70727**	**5596570.886**	**0.52288815**	**0.58011935**	**-1.1930094**	**1.12089708**
Bankbr	**15**	**2.66666667**	**0.12598816**	**0.48795004**	**0.238095238**	**-0.788227**	**0.58011935**	**-1.6153846**	**1.12089708**
ATMs	**15**	**3.73333333**	**0.46256703**	**1.79151439**	**3.20952381**	**-0.7420408**	**0.58011935**	**-0.2324883**	**1.12089708**
Tfinance	**15**	**144184.467**	**68828.3235**	**266570.951**	**71060071674**	**3.12195042**	**0.58011935**	**10.4342169**	**1.12089708**
doings	**15**	**154.666667**	**2.71269795**	**10.506234**	**110.3809524**	**-0.0358976**	**0.58011935**	**-0.58162**	**1.12089708**
inflation	**15**	**35.4666667**	**10.0061251**	**38.7535559**	**1501.838095**	**2.8525479**	**0.58011935**	**9.245751**	**1.12089708**
Valid N (listwise)	**15**								

Source: SPSS output, the author

Skewness is used to check whether the data is normally distributed or not, then for a normal distribution the skewness is zero **(0),** and any symmetric data should have a skewness near zero. In addition to any negative values show that data are skewed left, while the positive values indicate that data are skewed to the right. Therefore, the government expenditure, ease of doing business, bank branches, automated teller machines, and credit to private sector reveal values near to zero indicate that, they are normally distributed. As for the Kurtosis the normal distribution is 3, therefore, any value less than three is normally distributed. Thus, here the table reveals that the government spending (Gspend), ease of doing business (doings), the automated teller machines (ATMs), bank branches (Bbranch), and credit to private sectors (Crp) are normally distributed since their values are less than three.

	Bdeposit	Crp	RGDP	M2	G SPEND	Bankbr	ATMs	Tfinance	doings	inflation
Bdeposit	1.000									
Crp	.144	1.000								
Rgdp	-.149	.280	1.000							
M2	-.376	-.377	-.219	1.000						
GSPEND	-.088	.317	.251	-.551	1.000					
Bankbr	.085	-.469	-.554	.384	-.691	1.000				

ATMs	.049	-.578	-.726	.573	-.678	.872	1.000			
Tfinance	-.221	.124	.543	.217	-.249	-.211	-.338	1.000		
doings	-.047	-.689	-.080	.640	-.540	.339	.568	.163	1.000	
inflation	-.524	-.327	-.254	.941	-.519	.443	.592	.138	.517	1.000

Source: SPSS output, the author

In order to decide whether the matrix is valid for factor analysis, the matrix must show at least some relationships that is equal to **0.3** or above. When we look at the above matrix, we notice that there are relationships that are higher than **0.3**, which indicates that this matrix is significant and valid for analyzing the main components in the analysis. We also find that the significant values of the correlations are less than **0.05**.

Table 4, KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.546
Approx. Chi-Square	112.562
Bartlett's Test of Sphericity df	45
Sig.	.000

Source: SPSS output, the author

(A) Kaiser-Meyer-Olkin **(**KMO) and Bartlett's Test measures the sampling adequacy which should be between 0 and 1 for a satisfactory factor analysis to proceed. With small values indicating that the overall variables have little in common to warrant a principal components analysis, and values above 0.5 are considered satisfactory for PCA. Here the KMO tests the sample adequacy achieved is **(0.000)** which indicates that the relationship among variables is significant at (0.000), also the KMO test checks whether the correlation matrix is significant or not in which the correlation between the variables are all zero.

(B) As for **Bartlett's Sphericity Test** is used to show whether the original correlation matrix is the unit matrix or not. So through Table (4) we notice that the value of the Bartlett test is (**112.5),** while the level of significance is (**0.000)**. This is prove that the correlation matrix is not the identity matrix. Therefore, we can use the principal component analysis in the study.

Table 5, Communalities

	Initial	**Extraction**
Bdeposit	1.000	.852
Crp	1.000	.442
Rgdp	1.000	.798
M2	1.000	.861
GSPEND	1.000	.801
Bankbr	1.000	.765
ATMs	1.000	.979
Tfinance	1.000	.828
doings	1.000	.687
inflation	1.000	.908

Source: SPSS output, the author

Communalities represent the percentage of variance that is explained by the factors which extracted from the variables. The higher the value of these Communalities, indicates that the extracted factors explain a high percentage of the variance of the variables. Looking at Table number (5), we notice that the extracted factors explain a high percentage of the variance, as we find that the lowest percentage it is 0.442 which refers to the credit to private sectors. We also find that the highest percentage is 0.97 for the ATMs variable.

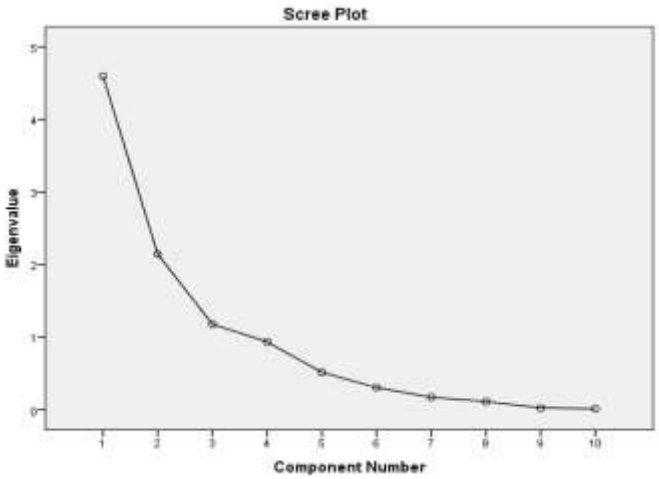
(4) The next step is to determine the number of factors that should be included in the research through the table below:

Table 6, Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	**4.599**	**45.990**	**45.990**	**4.599**	**45.990**	**45.990**	**3.828**	**38.279**	**38.279**
2	**2.144**	**21.442**	**67.433**	**2.144**	**21.442**	**67.433**	**2.160**	**21.601**	**59.880**
3	**1.178**	**11.780**	**79.212**	**1.178**	**11.780**	**79.212**	**1.933**	**19.332**	**79.212**
4	.936	9.359	88.571						
5	.516	5.161	93.733						
6	.305	3.053	96.786						
7	.171	1.709	98.494						
8	.112	1.125	99.619						
9	.025	.253	99.872						
10	.013	.128	100.000						

Source: SPSS output, the author

The above table (6) shows the total variance explained that mainly depends on the factors whose values exceed one which represents the total variance of the variables. However, we find that factor 1, 2, and 3 have distinct values that exceed one, and these factors explain about **79.2%** of the total variance. As for the scree plot which prove the previous table.



Graph 1, Scree plot

Source: SPSS output, the author.

The scree plot of the eigenvalue is examined to determine whether there is "a break" in the plot with the remaining factors explaining considerably less variation. The above scree plot shows that the factor 1, 2, and 3 explain most of the variance compared to the other factors, since the lines breaks in points 3 down from left to right.

Table (7) Component Matrix

	Component		
	1	**2**	**3**
ATMs	.924	-.353	
M2	.798	.448	-.153
inflation	.790	.423	-.322
Bankbr	.789	-.359	.121
G SPEND	-.758		-.470
doings	.728	.261	.298
Crp	-.663		
Tfinance		.794	.441
Rgdp	-.536	.651	.296
Bdeposit	-.159	-.619	.666

Source: SPSS output, the author

Table 8, Rotated Component Matrix

	Component		
	1	**2**	**3**
GSPEND	-.893		
Doings	.797	.123	.192
ATMs	.784	-.591	.124
Bankbr	.729	-.483	
M2	.657		.655

Crp	-.592	.240	-.186
Tfinance	.201	.878	.129
Rgdp	-.292	.844	
Bdeposit	.136	-.112	-.906
Inflation	.570		.760

Source: SPSS output, the author

(1) **PC1**= $-0.292X_1 - 0.893X_2 + 0.797X_3 + X_4 + 0.72X_5 + 0.65X_6 - 0.59X_7 + 0.20X_8 + 0.13X_9 + 0.56X_{10}$

(2) **PC2**= $0.84X_1 + 0.00X_2 + 0.124X_3 - 0.59X_4 - 0.48\,0.72X_5 + 0.0X_6 + 0.23X_7 + 0.87X_8 + 0.84X_9 - 0.112X_{10}$

(3) **PC3**= $0.00X_1 + 0.00X_2 + 0.190X_3 + 0.125X_4 + 0.00X_5 - 0.65X_6 - 0.184X_7 + 0.129X_8 - 0.90X_9 + 0.761X_{10}$

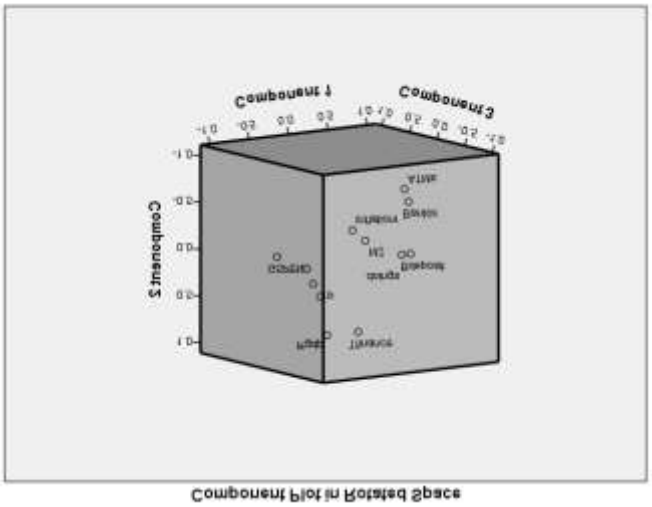
According to the equations above, we observe that in PC1 the factor X2 has a great impact on the main first factor 0.893. Also factor X3 effect the main factor by 0.79. As for equation (2), we notice that factor X1 has an effect on the PC2 by 0.84 as well as X8 0.87, X9 0.84 respectively.

Finally the factor X9 effect the main factor by 0.90. In addition to X10 effect PC3 by 0.76

Table 9, component transformation matrix

Component	1	**2**	**3**
1	.880	-.324	.348
2	.061	.803	.593
3	.472	.501	-.726

Source: SPSS output, the author



Graph 2, Component Plot in Rotated Space

Source: SPSS output, the author.

Table 10, component score coefficient Matrix

	Component		
	1	2	3
Bdeposit	.219	.063	-.594
Crp	-.135	.054	-.023
M2	.104	.046	.279
G SPEND	-.335	-.175	.212
Bankbr	.189	-.138	-.114
ATMs	.160	-.204	-.017
Tfinance	.187	.489	-.057
doings	.266	.173	-.056
Rgdp	.035	.407	-.043
inflationr	.034	-.034	.375

Source: SPSS output, the author

Table 11, Table Component Score Covariance Matrix

Component	1	2	3
1	1.000	.000	.000
2	.000	1.000	.000
3	.000	.000	1.000

Source: SPSS output, the author

The Regression Analysis:

Table 12, Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.893	.798	.743	4171.750	.798	14.49	3	5	.000	2.372

Source: SPSS output, the author

The results of the regression analysis is shown on the table 12 which is carried out through SPSS version 20. The result of the model shows that the value of R is 0.89 that prove there is a correlation between the dependent variable GDP and the explanatory variables. The value of R-square is 0.798 indicating that 0.79 changes of the dependent variables explained by the explanatory variables including (Ease of doing business, Automated Teller Machines, and government expenditure), while 0.21 only refers to residuals. Also, the adjusted R-Square is 0.74. The P-value of the model is **0.00** which reveals that the model is statistically significant and fit proving that can be used for further policies. As for the value of Durbin-Watson 2.37 which is acceptable, as a role of thumb and indication of no autocorrelation problem in the model as displayed in the table 10. Also, in table 12 we run the Variance Inflation Factor to prove where a Multicollinearity problem exists among the independent variables or not. Thus, the table below shows that variables whose Variance Inflation Factor is less than 10 indicate that a Multicollinearity problems is not a problem in the model. Only money supply (M2), the number of Automated Teller Machines (ATM), and inflation rate (Inflation).

Table 15 illustrates the results of regression analysis for GDP and Financial Inclusion indicators including ATM, Credit to private sector, and number of bank branches, bank deposits, money supply, government expenditure, total finance, and ease of doing business. The results reveals that the beta value of the factors have a positive impact on GDP as a proxy for economic growth. While the p-value is less than 0.05.

Table 13, Coefficients

Model	Collinearity Statistics	
	Tolerance	VIF
REGR factor score 1 for analysis 1	1.000	1.000
REGR factor score 2 for analysis 1	1.000	1.000
REGR factor score 3 for analysis 1	1.000	1.000

Source: SPSS output, the author

Table 14, variance proportions

			Variance Proportions			
Model Dimension	Eigenvalue	Condition index	(Constant)	REGR factor score 1 for analysis 1	REGR factor score 2 for analysis 1	REGR factor score 3 for analysis 1
1	1.000	1.000	.00	.90	.10	.00
2	1.000	1.000	.00	.10	.90	.00
3	1.000	1.000	1.00	.00	.00	.00
4	1.000	1.000	.00	.00	.00	1.00

Source: SPSS output, the author.

Table 15, ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	756647657.158	3	252215885.719	14.492	0.000[b]
Residual	191438487.776	11	17403498.889		
Total	948086144.933	14			

Source: SPSS output, the author.

In comparison to the value of F- Distribution table we found that T_{tab} equals 3.68 which is less than F_{cal} (14.49) showing that the model is significant at (0.000), then we reject the null hypothesis, and accept the alternative one, proving that there is an impact of financial inclusion on the Gross Domestic Product.

Table 16, coefficients

MODEL	Unstandardized Coefficients B Std Error		standardized Coefficients beta	t	sig	Correlations		
Constant	**3145.067**	**1077.141**		**2.920**	**.014**	**Zero-order**	**Partial**	**Part**
Regre factor score 1 for analysis 1	-2404.422	1114.947	-.292	-2.157	.054	-.292	-.545	-.292
Regre factor score 2 for analysis 1	6946.190	1114.947	.844	6.230	.000	.844	.883	.844
Regre factor score 3 for analysis 1	-124.357	1114.947	-.015	-.112	.913	-.015	-.034	-.015

Source: SPSS output, the author.

$$\boldsymbol{RGDP_t} = 3145.06 - 2404.422\ X_1 + 6946.19X_2 - 124.357X_3 + \varepsilon i$$

4. Conclusion:

4. Conclusion:

Table 17 Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-1292.25	25953.15	3145.07	7351.616	15
Residual	-5021.664	11185.733	.000	3697.861	15
Std. Predicted Value	-.604	3.102	.000	1.000	15
Std. Residual	-1.204	2.681	.000	.886	15

Source: SPSS output, the author

In developing nations like Sudan, the banks whether commercial or Islamic banks play an important role as a mobilizers of savings and allocation of credit for production and investment as well as financial institutions embodied in financial intermediaries. Thus, banks contribute to the growth of any economy whether developing or well-developed by identifying the entrepreneurs with the best opportunities and chances. Also, allocate credit to them (Badar A., et al, 2017, P655). The Central Bank of Sudan has taken steps towards an inclusive policies including microfinance to the low-income groups as a policy to reduce the number of poor through financing them 12% as a percentage of the total finance provided by Sudanese banks. Therefore, banks have increased their branches, automated teller machines, and sales points hoping that could reach the majority. Thus, the paper hypothesized that there is no significant impact of financial inclusion on the growth of Sudanese economy. Therefore, in this paper, we have examined the impact of financial inclusion indicators on the growth of Sudanese economy through applying Principal Component Analysis (PCA), because the number of variables included in the paper should be reduced by identifying the highest variances whose values are above 1. Accordingly, the present paper found that there is statistically significant impact of financial inclusion on the growth of Sudanese economy by focusing on the first three component factors that appear in the tables including (number of bank branches, doing business, and government spending). Hence, the paper observed that financial inclusion is associated with the development and progress of the economy. Even though there should be a bad need for such inclusive financial policies in order to facilitate financial services to the mass of poor as well as to the middle-income groups, for that will feed into the benefits of needy and poor, and to the country. Since such policies will flourish the economic activities through which the economy will grow.

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