ENTREPRENUERSHIP AND ECONOMIC GROWTH IN NIGERIA; AN EMPIRICAL APPROACH

Okoye Chinasa R1
1Senior Lecturer, Department of Social Sciences, School of General Studies, Federal Polytechnic, Oko, Anambra State, Nigeria

Nwisienyi, Kenechukwu J2.
2Lecturer II, Department of Banking and Finance, School of Financial Studies, Federal Polytechnic, Oko, Anambra State, Nigeria

ABSTRACT

This study seeks to add to knowledge by estimating the relationship between entrepreneurship and Nigerian economic growth using time series data for the period 1996 - 2018. The study used the Autoregressive Distributed Lag (ARDL) approach to identify the long-run and short-run dynamics between selected variables. The estimation of both the long-run and short-run models is based on the ARDL error correction methodology. The study shows that both in the long run and short run, no positive relationship between entrepreneurship and economic growth is established within the period under study. Entrepreneurship is statistically insignificant and negatively correlated with economic growth in the long and short run respectively. Entrepreneurship has not contributed positively to the economy. This is attributed to the poor state of entrepreneurial activities and ecosystem in the country. Among other recommendations, the study proffers that Government should review their attitude towards the entrepreneurial sector. Further research is also called on considering the paucity of data for this study.

KEYWORDS: Entrepreneurship, Innovation, Economic Growth, Self-Employment, Long-Run Relationship, Short-Run Relationship

INTRODUCTION

Entrepreneurship is a common word or concept used in different aspects to mean different things depending on the context of concern.

In the context of economics, entrepreneurship, alongside land, labour, natural resources and capital is seen as a factor of production. In other words, when combined with other factors of production (land, labour, natural resources and capital) produce profit.

In the context of education, it provides students with knowledge, skills and motivation to encourage entrepreneurial success in a variety of settings. Variations of entrepreneurial education are offered at all levels of school; Primary, Secondary and Tertiary alike. It focuses on realization of opportunity.

Social entrepreneurship, as an entirely different context is the process of pursuing innovative solutions to social problems. It’s all about adopting a mission or purpose to create and sustain social value.

However, whatever context of entrepreneurship that exists, revolves around making good with available resources for a desirable output which could be profit, self-development, expansion etc.

There are few studies on the relationship between entrepreneurship and economic growth in Nigeria. These studies concerned adopted the survey method in analyzing data collected for the research. However, the level of entrepreneurship in a country can be measured with several proxies. On this premise, this paper seeks to empirically investigate the relationship between entrepreneurship and economic growth in Nigeria using one of these proxies as opposed to the survey method. Interestingly, no study has made use of any of these proxies to determine how
Entrepreneurship impacts on economic growth in Nigeria.

**THEORETICAL FRAMEWORK**

The Concept of Entrepreneurship:

Entrepreneurship has been widely linked to economic growth by several literatures (Fritsch and Wywirich, 2017 & Kasseeah, 2016). Riti and Kamah (2015), opined that entrepreneurship constitutes a vital engine for economic, social, practical and all round development of any country. Entrepreneurship is considered a vital factor in production, growth and development (Cao, 2018). According to Godlin, Clemens and Veldhuis (2008), there is no general consensus on the definition of entrepreneurship. However, understanding entrepreneurship revolves round theories of Schumpeter (1942) on the premise of innovation, Knight (1921) on the premise of risk-taking and Kirzner (1982) on the premise of discovery.

**Theories of Creative Destruction, Discovery and Risk-Taking**

Twentieth – century economists; Joseph Schumpeter, Israel Kirzner and Frank Knight in further refining the academic understanding of entrepreneurship, came up with two theories.

Schumpeter, in his creative destruction theory of 1942, views entrepreneurship as a process of introducing new goods and new methods of production (innovation). The creative destruction or what is known as the disruptive force applies to the fact that the introduction of new products displaces the old ones. It results in the obsolescence or failure of these old products. Still on this theory, an entrepreneur is seen as one who implements change in the economy.

However, contrary to Schumpeter’s view, Kirzner (1982) saw entrepreneurship as a process of discovery. Previously unnoticed profit opportunities are discovered in this case. This discovery initiates a process whereby these newly discovered profit opportunities are then acted on in the marketplace until market competition eliminates the profit opportunity.

Knight (1921) reflected entrepreneurship as an embodiment of risk. For them, an entrepreneur is one who is willing to put his or her career and financial security on the line and take risks in the name of an idea, spending much time as well as capital on an uncertain venture. Entrepreneurship involves bringing something into the world whose market never exists.

**Measuring Entrepreneurship**

There are different measures of entrepreneurship. This study attempts to explore the most widely cited or used measures. Different literatures have adopted these measures as proxy for entrepreneurship. However, Godlin, Clemens and Veldhuis (2008), states that these measures focus on only one aspect and as such, are not well connected to the aspects of entrepreneurship as postulated by Schumpeter, Knight and Kirzner. This can be anchored on the fact that there is no general consensus on the definition of entrepreneurship. Some of these measures are outlined below:

- Total Entrepreneurial Activity (TEA) Index
- Self-Employment Rates
- World Bank Entrepreneurship Survey
- Global Entrepreneurship Index (GEI)
- Global Innovation Index (GII)

The study employed the self-employment rate as a proxy for entrepreneurship owing to the paucity of data with regards to other measures. As at the time of this study, TEA, GEI and GII has only 1-year data (2017), 4-year data (2015 – 2018) and 8-year data (2011 – 2018) respectively for Nigeria.

**Entrepreneurship in Nigeria**

Nigeria is a country that cannot be left out when entrepreneurship is on discourse. This is due to the fact that she is naturally endowed with entrepreneurship opportunities. Entrepreneurship development and innovations have manifested or assumed dominance in all aspects of the Nigerian economy via; micro business, micro finance, small and medium industries, information/telecom services, personal services in food vending/restaurant, garments making, embroidering, agricultural produce, music and film production. It occupies an exceedingly significant position in the Nigerian economy.

The importance of entrepreneurship in Nigeria cannot be over emphasized. Amongst other significances, entrepreneurship has created more employment opportunities. Through this, equitable distribution of national income is achieved, capital and human resources that would have otherwise been left idle is mobilized and more importantly, monopoly is eradiated through competition which is delivered by entrepreneurship.

More so, to further sustain the benefits of entrepreneurship in the country, the government has developed certain policies, incentives, facilities and agencies. This is in the bid to further exploit the benefits of entrepreneurship. Agencies like Manufacturers Association of Nigeria (MAN), National Association of Small and Medium Enterprises (NASME), Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), National Poverty Eradication Programme (NAPEP), Small and Medium Industries Equity Investment Scheme (SMIEIS), Microfinance Institutions (MFIs) etc, created by the government, help in one way or another in promoting entrepreneurship.

However, despite all these efforts, entrepreneurship in Nigeria has performed rather below expectation. Ogbo and Nwachukwu (2012), Thaddeus (2012) and Oyelola, Ajiboshin, Raimi, Raheem, and Igwe (2013) attest to this fact.

Ogbo and Nwachukwu (2012) referred to Nigeria’s entrepreneurship as sub-optimized which has remarkably reduced the volume and variety production and employment possible in the national economy. Thaddeus (2012) maintained that the full potentials of entrepreneurship opportunities have not been realized. This is owing to the adoption of
inappropriate industrialization policies at different times. He also went further to stress the failure of several policy interventions that were aimed at stimulating entrepreneurship development to achieve desired goals. This led to the most indigenous entrepreneurs becoming distribution agents of imported products as opposed to building in-country entrepreneurial capacity for manufacturing, mechanized agriculture and expert services.

Tosin (2017) stated that the problems bedeviling entrepreneurial activities in the country would include but not limited to the high cost of doing business, corruption and systemic flaws in the country’s economic policies, massive infrastructural deficits, particularly with regards to roads and electricity, political instability, civil intolerance and rising religious extremism. Another factor that he highlighted is the issues emanating from deplorable human development indicators in the absence of inclusive growth. These problems, according to Tosin (2017), have cumulatively succeeded in keeping off potential investors and by extension, prevented Nigeria from utilizing the benefits inherent in entrepreneurial activities.

EMPIRICAL EVIDENCES

Cao (2008) examined the relationship between entrepreneurship, innovation and economic growth. The study used real GDP per capita, R&D investment per capita and new business density to measure growth, innovation and entrepreneurship respectively. The data used were of 125 countries including developed and developing countries for the period 2006 – 2016. The study used a specification of the Cobb-Douglas production function to test the effect of entrepreneurship and innovation on growth of both groups of countries. It employed two estimation methods which are Static Panel Data Method and Generalized Method of Moments (GMM). The study showed that in short-term, the impact of innovation and entrepreneurship on growth is not significant or even have negative significance in developing countries but the in long-term, there is a positive and significant correlation in both groups of countries.

Savrul (2017) consolidated entrepreneurship as an intermediate variable to the Cobb-Douglas growth model beside the basic variables of labour, gross capital formation, and gross domestic product per capita. The data of 35 countries covering 2006-2015 period was used in the study. The study showed that although the changes in the entrepreneurial variables don't effect economic growth immediately, they present a significant and positive effect in the long run.

Salgado-Banda (2005) proposed a new variable based on patent data to proxy for productive entrepreneurship. Data on self-employment was used as an alternative proxy. In particular, the paper studied the impact of entrepreneurship on economic growth by using these two measures. The study considers 22 OECD countries and finds a positive relationship between the proposed measure of productive entrepreneurship — degree of innovativeness of different nations — and economic growth, while the alternative measure, based on self-employment, showed negative correlation with economic growth.

Akinyemi, Oyebisi and Odot-Ikoro (2018) examined the trend between entrepreneurship, unemployment and economic growth over the period 1981-2011. The study made use of descriptive and econometric method of analysis. For the descriptive method, tables and/or graphs were used to achieve objective one while for the econometric method, Ordinary Least Square (OLS) method and Error Correction Model (ECM) was used to achieve objective two. The econometric technique adopted showed that entrepreneurial activities, investment are positively related to economic growth. The result from this study also showed that there is a positive relationship between unemployment and economic growth.

Chu, Kara and Cynthia (2010) maintained that the development of African economies as well as the economic growth in many developing countries is all due to small enterprises.

DATA AND METHODOLOGY

Data

The study seeks to investigate the relationship between entrepreneurship and economic growth in Nigeria using a time series data spanning from 1996 – 2018. The study used GDP (2010 constant basic prices) as a measure of economic growth, Self-employment rate as a measure of entrepreneurship, credit to private sector and inflation rate. All the data used were secondary data and were sourced from the 2018 Statistical Bulletin of the Central Bank of Nigeria, and World Bank.

Methodology

In estimating the relationship between entrepreneurship and economic growth in Nigeria, considerations were made with respect to the properties of time series. The model is specified in log form thus;

\[
\ln gdp = \beta_0 + \beta_1 \ln ser + \beta_2 \ln cps + \beta_3 \ln ir + \epsilon_t
\]

Where \( gdp \) = GDP @ 2010 constant basic prices
\( ser \) = Self-employment rate
\( cps \) = Credit to Private Sector
\( \ln \) = Log
\( \beta_0 \) = Additional factor affecting \( \ln gdp \)
\( \beta_1, \beta_2, \beta_3 \) = Coefficients of \( ser, cps \) and \( ir \)
$\varepsilon_t$ = Error term

As is conventional, a unit root test is first to be performed in an econometric analysis (Shrestha and Bhatta, 2018). It is imperative to conduct this test in order to prevent spurious regression results. This test is to determine the stationarity or order of integration of the variables. For this purpose, the Augmented Dickey-Fuller test will be used to determine whether the variables are integrated of order I(0) or I(1) or both.

The Autoregressive Distributed Lag (ARDL) model approach to co-integration is used to investigate the existence of co-integration relationships among variables. As proposed by Pesaran, Shin and Smith (2001), it is an appropriate method for variables with mixed order of integration; I(0) and I(1). This test approach is preferred based on the fact that both the long run and short run parameters of the model specified can be estimated simultaneously. This study will adopt the ARDL approach to estimate the long run and short run parameters of equation (1). Thus, the models specified for this approach are as follows:

$$
\Delta \ln gp_t = \beta_0 \sum_{i=1}^{q} \beta_{1i} \Delta \ln gp_{t-1} + \sum_{i=1}^{q} \beta_{2i} \Delta \ln ser_{t-1} + \sum_{i=1}^{q} \beta_{3i} \Delta \ln cps_{t-1} + \sum_{i=1}^{q} \beta_{4i} \Delta \ln tr_{t-1} + \varepsilon_t
$$

Where $\Delta$ = first difference operator, $q$ = optimal lag length and $\varepsilon_t$ = error term. The left hand side in equations (2) represents GDP while in the right hand side, $\beta_1 - \beta_4$ expressions with summation sign represent the short run dynamics and the $\beta_5 - \beta_8$ expressions represent the long run relationship of the model.

The ARDL Bound test for co-integration is based on the Wald-test (F-statistic). Two critical values are given by Pesaran et al (2001) for co-integration test; the lower bound I(0) and the upper bound I(1). The null hypothesis of no co-integration and the alternative hypothesis of co-integration amongst variables are denoted as follows;

$$
H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0 \quad (\text{there is no co-integration})
$$

$$
H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0 \quad (\text{there is cointegration})
$$

The test criteria will be to accept $H_0$ if F-statistic < I(0) and reject $H_0$ if F-statistic > I(1). However, if the F-statistic falls between I(0) and I(1), then the test is deemed inconclusive meaning that the relationship between the variables cannot be ascertained.

$$
\ln gp_t = \beta_0 + \beta_1 \ln gp_{t-1} + \beta_2 \ln ser_{t-1} + \beta_3 \ln cps_{t-1} + \beta_4 \ln tr_{t-1} + \varepsilon_t
$$

The error correction version of the ARDL models relating to the variables are as follows;

$$
\Delta \ln gp_t = \beta_0 \sum_{i=1}^{q} \beta_{1i} \Delta \ln gp_{t-1} + \sum_{i=1}^{q} \beta_{2i} \Delta \ln ser_{t-1} + \sum_{i=1}^{q} \beta_{3i} \Delta \ln cps_{t-1} + \sum_{i=1}^{q} \beta_{4i} \Delta \ln tr_{t-1} + \lambda \Delta EC_{t-1} + \varepsilon_t
$$

Where $\lambda$ = the speed of adjustment and $EC_{t-1}$ is the error correction term which is derived from the residuals obtained from equations (5).
structural stability of the models. In addition, there will also be a check for serial correlation, normal distribution and problems of heteroscedasticity.

**ANALYSIS AND RESULTS**

The analysis in this study was run with Eviews 10 software. As required, the variables for this study were tested for stationarity using the Augmented Dickey-Fuller (ADF) unit root test. The test reveals that all the variables are integrated of either order I(0) or I(1). Therefore, it is then appropriate to apply the ARDL approach or method of analysis since there is a mixture of stationary and non-stationary variables. The results of the ADF test is summarized in table 1 below;

**TABLE 1: UNIT ROOT TEST (AUGMENTED DICKEY-FULLER TEST)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intercept</th>
<th>Trend and Intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>1st Difference</td>
</tr>
<tr>
<td></td>
<td>t-stat</td>
<td>5% critical value</td>
</tr>
<tr>
<td>LNGDP</td>
<td>-1.574</td>
<td>-3.012</td>
</tr>
<tr>
<td></td>
<td>0.327</td>
<td>-3.633</td>
</tr>
<tr>
<td>LNSER</td>
<td>-1.507</td>
<td>-3.012</td>
</tr>
<tr>
<td></td>
<td>-1.289</td>
<td>-3.645</td>
</tr>
<tr>
<td>LNIR</td>
<td>-3.942</td>
<td>-3.012</td>
</tr>
<tr>
<td></td>
<td>-3.837</td>
<td>-3.645</td>
</tr>
<tr>
<td>LNCPS</td>
<td>-1.287</td>
<td>-3.012</td>
</tr>
<tr>
<td></td>
<td>-0.798</td>
<td>-3.645</td>
</tr>
</tbody>
</table>

*Null Hypothesis: There is Unit Root  
**Criteria: Accept Null hypothesis if t-stat < Critical value

Source: Author’s compilation from Eviews 10 computations

Equations (2) was applied for the ARDL Co-integration test. The ARDL model of 2,1,0,1 was automatically selected using the Akaike Information Criterion. The calculated Wald F-statistic for the model is 8.583 which is greater than the lower and upper bound critical values of all the significance levels (1%, 5% and 10%) as is depicted in the table 2 below.

**TABLE 2: ARDL BOUNDS TEST**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>F STATISTIC</th>
<th>SIG LEVEL</th>
<th>LOWER BOUND I(0)</th>
<th>UPPER BOUND I(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SER</td>
<td>8.583</td>
<td>10%</td>
<td>2.72</td>
<td>3.77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5%</td>
<td>3.23</td>
<td>4.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1%</td>
<td>4.29</td>
<td>5.61</td>
</tr>
</tbody>
</table>

Source: Author’s compilation from Eviews 10 computations

Based on this, the null hypothesis of no co-integration is rejected implying that a long run co-integration relationship exist among the variables. The long run level equation coefficients for the variables are stated as follows;

\[ CointEq = \ln GDP - (3.4871\ln SER + 0.3076\ln CPS + 0.0540\ln IR) \]  

(7)

**TABLE 3: LONG RUN COEFFICIENTS**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNSER</td>
<td>3.487093</td>
<td>2.617107</td>
<td>1.332423</td>
<td>0.2056</td>
</tr>
<tr>
<td>LNCPS</td>
<td>0.307593</td>
<td>0.025846</td>
<td>11.90087</td>
<td>0.0000</td>
</tr>
<tr>
<td>LNIR</td>
<td>0.054000</td>
<td>0.033994</td>
<td>1.588493</td>
<td>0.1362</td>
</tr>
</tbody>
</table>

Source: Author’s computation using Eviews 10

From table 3, it is deduced that Inser and Inir are statistically insignificant whereas ln CPS is statistically significant at 1% significance level. This implies that at the long run, Inser has no relationship with economic growth. Lncps has a positive relationship with economic growth at 0.307593 which implies that a 1% increase in credit to private sector amounts to a 30.76% increase in the economic growth.

The short run (error correction model) representation of the model is shown in the ensuing table below;
TABLE 4: Short Run (Error Correction Model) Representation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-2.935331</td>
<td>0.454119</td>
<td>-6.463786</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LNGDP(-1))</td>
<td>0.579496</td>
<td>0.095749</td>
<td>6.052267</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LNSER)</td>
<td>-2.946479</td>
<td>1.173706</td>
<td>-2.510407</td>
<td>0.0261</td>
</tr>
<tr>
<td>D(LNIR)</td>
<td>-0.027835</td>
<td>0.008304</td>
<td>-3.351843</td>
<td>0.0052</td>
</tr>
<tr>
<td>CointEq(-1)*</td>
<td>-0.396146</td>
<td>0.060943</td>
<td>-6.500266</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Source: Author’s computation using Eviews 10

The results show that lnser and lnir are statistically significant at 5% and 1% level of significance respectively in the short run. Their coefficients are -2.9465 and -0.0278 respectively. This implies that they contribute negatively to the economy.

The error correction term (ECT) represented by CointEq(-1) in the table measures the speed at which prior deviations from the equilibrium are corrected in the current period. The ECT is as expected, significantly negative at 1% level of significance with estimated coefficient of -0.396146 (CointEq(-1) = -0.396146). This indicates that 39.61% of the disequilibrium due to the previous year’s shocks is adjusted back to the long-run equilibrium in the current year.

The diagnostic/fitness and stability tests deployed for this model are summarized in the table 5 and figure 1 below.

TABLE 5: Diagnostic and Stability Tests

<table>
<thead>
<tr>
<th>Diagnostic Test</th>
<th>P-value (P)</th>
<th>Sig. (S)</th>
<th>Null Hypothesis (H0)</th>
<th>Decision Criteria</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breusch-Godfrey Serial Correlation LM Test</td>
<td>0.8888</td>
<td>0.05</td>
<td>No Serial Correlation</td>
<td>Reject H0 if P&lt;S</td>
<td>No Serial Correlation</td>
</tr>
<tr>
<td>Breusch-Pagan-Godfrey Heteroskedasticity Test</td>
<td>0.5282</td>
<td>0.05</td>
<td>No Heteroskedasticity</td>
<td>Reject H0 if P&lt;S</td>
<td>No Heteroskedasticity</td>
</tr>
<tr>
<td>Jarque-Bera Normality Test</td>
<td>0.4079</td>
<td>0.05</td>
<td>Normally distributed</td>
<td>Reject H0 if P&lt;S</td>
<td>Normally Distributed.</td>
</tr>
<tr>
<td>CUSUM Stability Test</td>
<td></td>
<td></td>
<td></td>
<td>Model is Stable</td>
<td></td>
</tr>
<tr>
<td>CUSUMSQ Stability Test</td>
<td></td>
<td></td>
<td></td>
<td>Model is Stable</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s Compilation from Eviews 10 Computation

The model’s residuals are normally distributed as it is also free from serial correlation and heteroskedasticity. The Cumulative Sum of Recursive Residuals (CUSUM) and the Square of Cumulative Sum of Recursive Residuals (CUSUMSQ) test for structural stability as shown in Fig 1 indicates that the model is stable as the blue CUSUM and CUSUMSQ lines fall within the 5% boundary.
The study adopted a time series data of 1996 – 2018 with GDP as the dependent variable and self-employed index, credit to private sector and inflation rate as the independent variables.

The ARDL model was used to estimate the long run and short run dynamics between the selected variables. The long run analysis showed that self-employed rate and inflation rate were statistically insignificant. Credit to private sector was statistically significant with a positive coefficient depicting a positive relationship with economic growth. In the short run analysis, self-employed rate and inflation rate are statistically significant with coefficients -2.9465 and -0.0278 respectively. They are negatively related to economic growth.

The coefficient of the ECT (CointEq(-1)) is as expected at -0.396146 and statistically significant at 1% significance level as well. The study shows that both in the long run and short run, no positive relationship between entrepreneurship and economic growth is established within the period under study. Entrepreneurship has not contributed positively to the economy. This points to the poor state of entrepreneurial activities and ecosystem in the country. The much attention needed to enhance entrepreneurial activity in the country is not given and as such, the potentials of entrepreneurship to foster economic growth is not fully exploited. Again, this also points to flaws inherent in the measures of entrepreneurial activities in the country. Most outfits captured as self-employed are indeed rent-taking outfits while some are more or less illegal. They are founded on the basis of necessity (necessity-based entrepreneurship) instead of the basis of opportunity and innovation (opportunity-based entrepreneurship) and as such, contribute little or nothing to economic growth. This study is in tandem with Salgado-Banda (2005).

RECOMMENDATIONS

This study finds it imperative to proffer the following recommendations;

- Government should review their attitude towards the entrepreneurial sector. Attitude change in that regards is necessary.
- Policy makers should develop policies that would create enabling environment for entrepreneurship to thrive.
- Agencies for promoting entrepreneurship should be enhanced in order to allow for effective entrepreneurship promotion.
- Government should also form agencies or policies that will provide guiding principles for corporate governance and managerial activities of small and medium scale businesses.
- Banks and other financial institutions should also review their policies on granting loan facilities and credit to entrepreneurs. This should reduce the bottlenecks and also make it easy for entrepreneurs to access loans from banks.
- Finally, more study on this is called upon by the researchers.

REFERENCES


