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Contents

ACCESS TO FINANCE AND PERFORMANCE OF SERVICES SECTOR MSMEs IN NIGERIA

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Abstract: *This study examines the subjective and objective effect of access to finance on the performance and growth of MSMEs in the services sector in Nigeria. The study used a cross-sectional dataset from the 2014 World Bank Enterprise Surveys database. The study employed the Ordinary Least Squares regression approach to investigate the effect of access to finance on the ability to create employment by MSMEs in the services sector in Nigeria. This study found that MSMEs face credit constraints as the majority (77.56%) of the sampled firms indicated access to finance as the main obstacle, although in different degrees (subjective effect). Also, the study found a negative and significant relationship between access to finance constraint and employment growths (objective effect). In light of these findings, the study recommends that the government should encourage financial institutions to create cheaper and more accessible credit for MSMEs, through favourable tax regimes or incentives in order to reduce the unemployment in the country. In addition, other policies that encourage a reduction in lending interest rate (such as a credit guarantee scheme) should be put in place so as to enable MSMEs to access more credit at a cheaper interest rate.*

Keywords: Access to finance; Micro, Small and Medium-Sized Enterprises; Unemployment; Services sector; Nigeria.

JEL Classifications: J23, L25, M13.

1. Introduction

Micro, Small and Medium Scale Enterprises (MSMEs) financing has been an important discourse amongst development practitioners and policy makers in recent decades due to the important role it plays in employment generation in any economy (Beck and Demirguc-Kunt, 2006). MSMEs are veritable channel for employment creation, accounting for 90% of jobs in the developing world; they help in the reduction of poverty through redistribution of wealth, thereby upgrading the quality of life. They are also drivers of economic growth through industrialisation and modernisation (Abiodun, Harry and Busra, 2014).

Studies have revealed that in Africa, about 70% of the MSMEs encounter the problem of accessing funds either long or short term; this creates a financing gap of about 140 billion

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USD in the continent. The lack of adequate and timely access to finance was revealed to be a hindrance to the good performance of MSMEs in the developing countries (Ajuwon, Ikhide and Akotey, 2017). The success and growth of MSMEs depends on their ability to overcome credit constraints and commits greater investments, which all dependent on easy access to finance.

Agboli and Ukaegbu (2006) found that about 47% of firms in Nigeria have difficulties in accessing finance, and was a major bottleneck preventing them from being profitable in a study sponsored by the United Nations Industrial Development Organization (UNIDO). A study was also carried out in 2014 by EDC-KPMG where access to finance among other hurdles, was one of the main factors restraining the performance of MSMEs in Nigeria. It was estimated that finance contributes about 25% to the success of MSMEs in Nigeria and that more than 70% of funds available to MSMEs are from the informal finance sector (Quartey, Turkson, Abor, and Iddrisu 2017). The objective of this study is to determine the impact of access to finance on MSMEs performance and growth in the services sector of the Nigerian economy. This study will also add to the growing literature on what determines the growth and performance of MSMEs. This study is also narrowing the focus, by just looking at only the services sector to move from aggregate to the specific. All sectors are important but this study focuses on the services sector because it has a high employment growth rate, and Nigeria is faced with high level of unemployment that needs urgent attention.
This paper is structured into 5 sections. Section one is the introduction, while section two is the literature review. Methodology employed is contained in section three. Section four is the result analysis, while section five concludes the study with summary of findings and policy recommendations.

2. Literature Review

2.1. Conceptual Review

There are so many definitions of small businesses but these definitions are usually structured along number of employees, the capital base of the establishment and the rate of turnover or sales per a period of time which is usually a year. According to Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), any business enterprise employing less than 10 workers and has an asset base of not up to ₦5 million is referred to as a micro enterprise. For small scale enterprises, the employment base should be between 10 and 49 with an asset base of between ₦5 million and ₦50 million. Medium scale enterprises are those that employ between 50 and 199 workers, with an asset base of over ₦50 million but less than ₦500 million. However, the assets admitted for these classifications exclude land and buildings. Also, in case of conflict of classification between employment and asset size, the policy gives pre-eminence to the number of employees over asset size. For this study, we will be defining MSMEs base on the number of employees.

2.2. Theoretical Literature Review

2.2.1. Access to finance

Access to finance is of crucial importance for the sustainable growth of MSMEs. According to Bates and Hally (1982), MSMEs require short- to medium-term sources of finance to establish and expand their business operations. Nevertheless, as noted by Demirgüç-Kunt, Beck and Honohan (2008), the term ‘access to finance’ refers to the likelihood of people who desire to start or expand small to medium sized businesses making use of financial services, such as deposit, credit, payment, insurance and other risk management services. However, in explaining the term ‘access to finance’ they make a clear distinction between accesses to, and the use of, financial services. According to them, some individuals have access to financial services, but fail to use it for religious, cultural or other reasons. These

individuals are referred to as voluntary non-users of financial services. Consequently, the group of individuals with access is expected to be more than those who are current users of financial services. We are actually interested in those who are interested in using the financial services but are left out, or are not getting the desired quantity and quality of financial services at the appropriate time.

2.2.2 Information Asymmetry Theory

Many reasons given for MSMEs exclusion from financial services is central on the theory of Information Asymmetry. The central point of Information Asymmetry Theory by Stiglitz and Weiss (1981) is that one group is better informed than other groups, leading to an unbalanced information power play. According to López-Gracia and Sogorb-Mira (2008), this theory comes into play in the form of adverse selection and moral hazard. Consequently, the business owners in this regard have access to information on the firm's future outlook, particularly the financial status, whereas investors do not have access to the information, leading to an information gap between the two. Generally, MSMEs are characterised by low levels of credit accountability, poor accounting records and low information transparency, and this is directly translated into high risk by the finance providers (Altman, Sabato and Wilson 2010). In other words, financial service providers see MSMEs as high-risk borrowers due to their low information transparency, and this hinders their ability to obtain loans, increasing their financial suffering (Berger, Frame and Miller 2005).

2.3. Empirical Literature Review

While only a few studies from Nigeria focused on access to finance and MSME performance, majority of this studies focused on the determinants of MSME performance in Nigeria (Ajuwon, Ikhide and Akotey, 2017; Aminu and Shariff, 2015; Agba, Attah and Ebong, 2015; Mata and Aliyu, 2014; Temitope, Olawunmi and Bolanle, 2013; Okpara, 2011). They all included access to finance as a constraint hindering MSME performance in Nigeria. Also, some studies focused their research on states and regions (Aminu and Shariff, 2015; Mata and Aliyu, 2014; Shasmudeen, Keat and Hassan, 2016; Temitope, Olawunmi and Bolanle, 2013). Other studies shifted their focus directly on access to finance and firm performance (Essien and Arene, 2014).

Okpara (2011) sought to investigate the factors that influence the existence and growth of MSMEs in Nigeria with data gathered from 211 MSMEs all across Nigeria, using the Pearson product-moment correlation technique. The constraints used in the study included finance, corruption, management and infrastructural constraints. The conclusion drawn from the study was that the negative relationship between infrastructural and corruption constraints was less significant than the effects of financial and managerial constraints.

Essien and Arene (2014) examined access to finance for agro-based enterprises in the Niger-Delta region of Nigeria. The study applied a multistage technique dividing enterprises into those that accessed the informal sector finance (264 in number) and those that accessed finance from the formal sector (96 in number) while using the logit model for estimation. The results revealed that access to finance and firm performance had a two-way relationship. Although, access to finance can improve firm performance, firm performance can also influence access to credit. The study also discovered that the channel, whether formal or informal, through which MSMEs sought credit affected their access to credit. Formal channels require strict criteria while the informal sector is limited in its use due to the loan amount or activity limit, even though it is the easier channel to access finance.

Furthermore, Anigbogu, Okoli and Nwakoby (2015) carried out a study on financial intermediation and MSME performance in Nigeria using data from 1980 to 2013, while employing the ordinary least square method of estimation. The study concluded that financial intermediation, commercial bank loans, exchange rate and monetary policy rate, and bank

lending rate have positive relationships with MSME performance, while bank interest rate has a negative relationship.

Subsequently, Shasmudeen, Keat and Hassan (2016) investigated the mediatory role of access to finance between finance awareness and performance of MSMEs in Nigeria. The study used primary data collected from about 73 MSMEs from only the north-western region of Nigeria, using the partial least squares structural equation model. The conclusion drawn from the analysis was that financial awareness improved firm performance, and also access to finance facilitated the relationship between financial awareness and MSME performance.

The studies reviewed cut across different estimation methods in determining the effects of finance on the performance of MSMEs. Most of these studies showed that there was a positive relationship between access to finance and the performance of MSMEs. This study is therefore narrowing the focus, by just looking at only the services sector to move from aggregate to the specific sector and identify the impact of access to finance for MSMEs in the services sector. All sectors are important but this study focuses on the services sector because it has a high employment growth rate, and Nigeria is faced with high level of unemployment that needs urgent attention.

3. Methodology

Following Fatoki (2011), and Fowowe (2017), we used the OLS estimation technique on the cross-sectional dataset obtained from World Bank's Enterprise Survey database to analyse the effect of access to finance on firms' performance in Nigeria using two separate models and 19 explanatory variables.

3.1. Model Specification

This study sought to examine the impact of access to finance, and accessing finance on services sector MSMEs performance. To carry out this objective, two models were employed. In the two models, the dependent variable (firm performance) was measured with employment growth rate (EG) in accordance with Harash, Al-Timimi, and Alsaadi, (2014). In the first model, subjective effect of access to finance constraint (ATF) was used as the independent variable. In the second model, accessing finance variables were measured on the employment growth rate of MSMEs' firm (similar to Fowowe, 2017)). The objective effect of accessing finance variables are: Credit Constraint Status (CCS), Access to Credit Constraint (ACC), Overdraft (Ovd) and Credit line (Crdl).

The control variables for the first model are: Electricity (Elec), Telecommunications (Telco), Transportation (Trans), Customs and Trade (Cust), Informal Sector Competitors (ISC), Access to Land (ATL), Crime/theft (C/T), Tax rates (Trat), Tax administrations (Tadm), Business licensing and permits (BLP), Political Instability (PI), Corruption (Corr), Courts (Cour) and Labour Regulations (LR).

3.2. Models Expressed in Linear Form

$$EG_i = \alpha_0 + \alpha_1 ATF_i + \alpha_2 Elec_i + \alpha_3 Telco_i + \alpha_4 Trans_i + \alpha_5 Cust_i + \alpha_6 ISC_i + \alpha_7 ATL_i + \alpha_8 C/T_i + \alpha_9 Trat_i + \alpha_{10} Tadm_i + \alpha_{11} BLP_i + \alpha_{12} PI_i + \alpha_{13} Corr_i + \alpha_{14} Cour_i + \alpha_{15} LR_i + \mu_i \quad \text{(i}$$

$$EG_i = \alpha_0 + \alpha_1 CCS_i + \alpha_2 ACC_i + \alpha_3 Ovd_i + \alpha_4 Crdl_i + \mu_i \quad \text{(ii}$$

Where: μ_i is error term or residual, α_0 is regression constant or intercept, $\alpha_1, \ldots \alpha_{15}$ is regression coefficient or slope and i represents each cross-sectional unit.

4. Result and Discussion

4.1. Firm performance/employment growth

In this study, firm performance was measured by firm growth. Employment was used because among other things, sales growth is more volatile and more prone to reporting and measurement biases (Fowowe, 2017). Also, we are more interested in how the country can reduce her high level of unemployment. The summary statistics of the firm growth is presented in Table 1. The firm growth values obtained were symmetric around zero with the lowest rate at -0.818 and the highest rate at 1.268. The overall average firm growth rate was 0.09.

Table 1: Firm Growth

Variable	Observation	Mean	Std. Dev.	Min	Max
EG	1214	0.091815	0.244887	-0.81891	1.268888

Source: Authors' computation

4.2. Correlation Matrix

The purpose of the correlation analysis' result presented in Table 2 was to gain insight into the nature of the relationship among the variables considered for our models, and to ensure that the correlations among the explanatory variables were not so high that they posed multicollinearity problems. From the result, correlation coefficients for the relationships among the performance indicator and access to finance indicators, as well as the control variables, take values between - 0.14 and 0.22. The correlation coefficient for the relationships between the firm growth (EG) and Access to Finance constraint is 0.091. These correlation coefficients are generally weak. However, moving to the explanatory variables, the correlation coefficients for the relationships among the access to finance indicator and control variables take values between 0.13 and 0.83. From the results, it can be seen that the associations among the explanatory variables were so high, particularly the one between BLP and Tadm (0.83). Based on the result, the study further checked whether the high correlations pose multicollinearity problems or not, by using Variance Inflation Factor (VIF).

Table 2: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
EG (1)	1																
ATF (2)	0.091	1															
Elec (3)	-0.084	-0.074	1														
Telco (4)	-0.009	-0.019	0.143	1													
Trans (5)	-0.037	-0.050	0.154	0.316	1												
Cust (6)	0.022	-0.054	0.257	0.257	0.403	1											
ISC (7)	-0.030	-0.041	0.229	0.175	0.393	0.511	1										
ATL (8)	-0.062	-0.034	0.328	0.125	0.193	0.258	0.237	1									
C/T (9)	-0.034	-0.018	0.362	0.129	0.296	0.299	0.294	0.254	1								
Trat (10)	-0.133	0.006	0.287	0.195	0.248	0.313	0.252	0.233	0.310	1							
Tadm (11)	-0.002	-0.026	0.234	0.304	0.445	0.446	0.350	0.243	0.323	0.210	1						
BLP (12)	0.001	-0.081	0.228	0.295	0.443	0.372	0.311	0.210	0.297	0.242	0.825	1					
PI (13)	-0.080	-0.039	0.365	0.154	0.318	0.421	0.349	0.256	0.308	0.332	0.461	0.464	1				
Corr (14)	-0.096	-0.031	0.262	0.348	0.398	0.427	0.366	0.218	0.241	0.245	0.442	0.451	0.415	1			
Cour (15)	-0.078	-0.051	0.230	0.366	0.439	0.403	0.393	0.265	0.253	0.338	0.528	0.561	0.401	0.668	1		
LR (16)	-0.054	-0.022	0.225	0.313	0.480	0.419	0.479	0.206	0.264	0.302	0.538	0.556	0.481	0.599	0.659	1	
LR (17)	-0.060	-0.087	0.258	0.261	0.423	0.482	0.361	0.235	0.271	0.329	0.429	0.408	0.440	0.434	0.416	0.432	1

Source: Authors' computation

4.3. Variance Inflation Factor (VIF)

Following the result from correlation matrix in Table 2, the explanatory variables considered in this study were subjected to multicollinearity testing using VIF, and the result is presented in Table 3. Various authors have emphasised that a VIF that is below 10 and a tolerance value that is above 0.10 indicate no harmful effect of multicollinearity (Hair, Anderson, Tatham and Black, 1995; O'brien, 2007).

Judging from the result, the average VIF values were 1.92 for model (1) which were below 10, and the corresponding tolerance values which were above 0.10, the high associations among the explanatory variables indicate no harmful effect.

Table 3: Variance Inflation Factor

	Model 1		**Model 2**	
Variable	VIF	Tolerance	VIF	Tolerance
Trat	3.51	0.285	3.40	0.294
Tadm	3.5	0.285	3.36	0.298
Corr	2.52	0.396	2.83	0.353
Cour	2.38	0.419	2.74	0.365
PI	2.13	0.471	1.93	0.518
Trans	1.77	0.565	1.53	0.652
BLP	1.69	0.592	1.47	0.679
LR	1.62	0.616	1.52	0.659
Cust	1.6	0.626	1.56	0.643
Telco	1.58	0.633	1.61	0.621
ATF	1.35	0.739	1.26	0.793
ATL	1.34	0.745	1.38	0.726
C/T	1.33	0.751	1.53	0.652
Elec	1.25	0.800	1.31	0.761
ISC	1.22	0.819	1.33	0.750
Mean VIF	**1.92**		**1.92**	

Source: Authors' computation

4.4 Inferential Analysis

This study sought to examine the effect of access to finance constraints on the employment growth of services sector MSME firms. The models were estimated using employment growth as dependent variable. Variables measuring access to finance constraint and participation in financial markets were the primary independent variables.

4.4.1 Effect of Access to Finance Constraints on Employment Growth

The study examined the relationship between access to finance constraints and employment growth, using OLS regression. Employment growth was computed as the log difference between the current number of permanent employees and the number of permanent employees three years before the survey year, divided by the number of employees in the survey years. In addition, the independent variables included: access to finance constraint, denoted by k30, which is ranked by firms on a scale of 1-5 (1 being no obstacle and 5 being a severe obstacle). Thus, if access to finance is a constraint on firm performance, it will have a negative sign. Other business environment obstacles which were also ranked on the scale

of 1-5 were also included. All these independent variables are subjective measures of the investment climate obtained from the Enterprise Surveys.

The results in Table 4 show R^2 value of 0.027 and F-statistics value of 2.050 which is significant at 5% level. This confirms the goodness of fit of the model. From the result presented in the table, the access to finance constraint variable has a negative coefficient (-0.807) and it is significant at 5% level of significance. The negative sign and significance of the coefficient of access to finance constraint means that access to finance constraint has a significant negative effect on firm growth. This shows that inadequate finance is a serious constraint on the growth of firms. Furthermore, the other constraints which had significant negative effect on employment growth of firms, as presented in the result are: crime; theft and disorder; tax rates; tax administration; and labour regulations. This is also in tandem to result obtained by Fowowe, 2017.

Table 4: Effect of Access to Finance Constraint on Firm (Employment)Growth

VARIABLES	**OLS**
ATF - access to finance Constraint	-0.807**
	(0.322)
Elec – Electricity	0.101
	(0.432)
Telco – Telecommunications	-0.403
	(0.644)
Trans – Transport	-0.518
	(0.541)
Cust - Customs and Trade Regulations	-0.170
	(0.351)
ISC - Informal Sector Competitors	-0.067
	(0.353)
ATL - Access to Land	0.240
	(0.320)
C/T - Crimes, Theft and Disorder	-0.995**
	(0.415)
Trat - Tax Rates	-2.127***
	(0.794)
Tadm - Tax Administration	-2.471***
	(0.800)
BLP - Business Licensing and Permits	0.164
	(0.482)
PI - Political Instability	0.415
	(0.463)
Corr - Corruption	-0.486
	(0.464)
Cour – Courts	0.664
	(0.451)
LR - Labour Regulations	-1.434**
	(0.712)
Constant	11.217***
	(1.187)

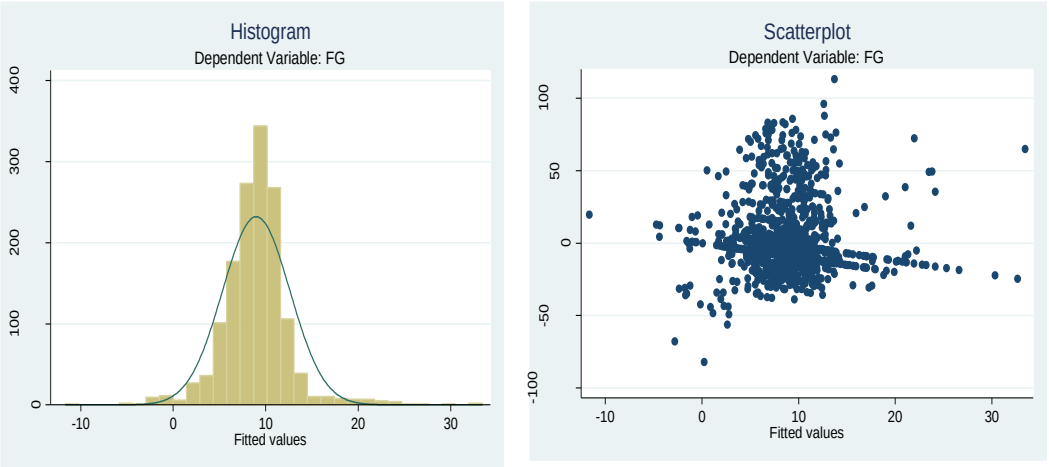
Observations	**1,457**
R-squared	**0.027**
Adj. R-squared	**0.016**
F-test	**2.050**
Prob > F	**0.010**

Note: Standard errors in parentheses and *** p<0.01, ** p<0.05, * p<0.1
Source: Authors' computation

4.4.2 Normality and Homoscedasticity Test

Figure 1 presents the histogram and scatterplot that were used for testing the regression assumptions of normality and homoscedasticity, respectively. The residual of the model appears to meet the assumptions of normality and homoscedasticity since the shape of the histogram is much closer to the shape of the normal curve, and there is no apparent pattern in the scatterplot.

Figure 1: DV FG Histogram and scatterplot for normality and homoscedasticity test



Source: Authors computed

4.4.3 Effect of Accessing Finance/Participation in Financial Markets on Performance of Firms

In order to estimate the effects of participation in the financial markets on firm employment growth, we made use of the objective measures of financial access provided in the enterprise surveys datasets. Table 5 contains the results of estimating the effects of objective access to finance variables on the performance of Nigerian firms in the services sector. In this model, the dependent variable is employment growth which is denoted by EG_i, the independent variables include objective access to finance variables – credit constrained status variable (CCS), Access to Credit Constraint (ACC), Overdraft (Ovd) and credit lines (Crdl).

Table 5: Effect of Accessing Finance on Firm (Employment) Growth

VARIABLES	OLS
CCS-Credit Constraint Status	8.614**
	(3.905)
ACC-Access to Credit Constraint	-1.228*
	(0.643)
Ovd-Overdraft	-0.079
	(0.242)
Crdl-Credit Line	1.460**
	(0.728)
Constant	-20.874
	(15.680)
Observations	**287**
R-squared	**0.075**
Adj. R-squared	**0.061**
F-test	**4.173**
Prob > F	**0.003**

Note: Standard errors in parentheses and *** p<0.01, ** p<0.05, * p<0.1
Source: Authors' computation.

The results showed that the coefficient of credit constrained status (CCS) was positive and significant at 10% level of significance (8.614). Thus, the result of the coefficient of CCS being positive and significant implies that accessing financial markets had a significant positive impact on the growth of firms in Nigeria. In other words, the more firms access financial markets, the higher growth they will experience. However, firms who are credit constrained will experience lower employment growth.

The result also showed that the coefficient of access to finance constraints was negative and significant at 5% level of significance. This implies that access to finance was a serious constraint to firms' performance and growth in Nigeria. Access to credit constraints was also a categorical variable; in this case, higher values implied higher severity of access to finance constraint, which means higher values of access to credit constraint denoted lower access to finance. Thus, the result of the coefficient of access to finance constraint being negative and significant implies that access to finance constraint had a significant negative impact on growth of firms in Nigeria. This indicates that, the higher the severity of the access to finance, the lower the employment growth of the firms.

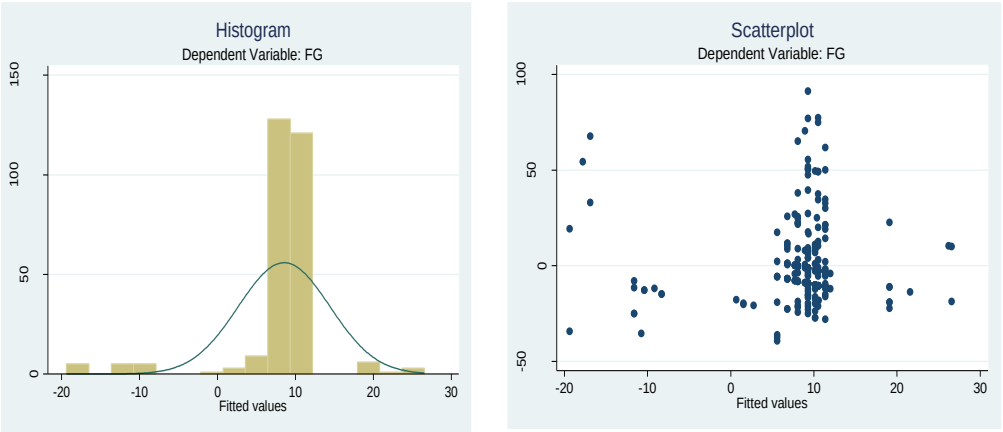
The firms that had loans and credit lines had faster growth rates than firms without loans and credit lines. This is seen in the coefficient of this variable as it was positive and significant at 5% level of significance. In other words, this result implies that having loan and credit line, which also means market participation, positively influenced firm growth or firm performance in Nigeria. In summary, the result so far shows that inadequate financing was a serious constraint that African firms faced, and which adversely affected their growth. This result is in tandem with Fowowe, 2017.

4.4.4 Normality and Homoscedasticity Test

The histogram and scatterplot that were used for testing the regression assumptions of normality and homoscedasticity respectively are presented in Figure 2. The residual of the model appears to meet the assumptions of normality and homoscedasticity since the

histogram follows the shape of the normal curve fairly well and no pattern is present in the scatterplots.

Figure 2: DV FG Histogram and scatterplot for normality and homoscedasticity test



Source: Authors' computation

5. Conclusion

This study has investigated the effect of access to finance and accessing finance on the performance of services sector MSMEs in Nigeria. The study was conducted using the cross-sectional enterprise-level dataset obtained from the World Bank's Business Enterprise Surveys for Nigeria in 2014 and the main estimation technique employed is OLS regression. Using the descriptive result from the responses to the relevant questions in the World Bank's Business Enterprise Surveys, it became evident that the average firm growth rate in terms of employment was 9.1%. The implication is that MSMEs development can be beneficial to growing the nation's economy in terms of employment generation given the relatively high growth rate value. Also, it was evident that one of the challenges facing MSMEs in Nigeria was access to finance, as the majority (77.56%) of the sampled firms indicated access to finance as an obstacle, although; in different degrees, which included minor, moderate, major, and very severe obstacle.

Based on the OLS results, the study found a negative and significant relationship between access to finance constraint and employment growth. The implication of this result is that an increase in access to finance constraint has an adverse effect on the employment growth rate. Furthermore, the positive and significant relationship between credit constrained status and employment growth rate, given the fact that higher values of CCS denote higher values of access to finance, indicates that an improved credit constrained status is an avenue to increase the employment growth rate. Alternatively, the significant positive relationship means that access to finance improves firms' performance in terms of employment growth rate in Nigeria.

It is also pertinent to state that firms that have access to overdraft and credit lines will have faster growth rate compared to the firms without those facilities, and as a consequence, firms' performance is improved. This is evident in the significant and positive relationships that exist between access to overdraft and credit, and firms' performance indicators.

Policy Recommendations

Based on the empirical finding that significant and positive relationships exist between access to overdraft, credit and firms' performance indicators, indicates that access to overdraft and credit are determinants of MSMEs performance, and suggests that government should encourage financial institutions to create cheaper and more accessible credit for MSMEs, through favourable tax regimes or incentives in order to reduce the unemployment in the country. In addition, other policies that encourage a reduction in lending interest rate (such as a credit guarantee scheme) should be put in place so as to enable MSMEs to access more credit at a cheaper interest rate.

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GRADUATES ON LABOUR MARKET IN ROMANIA. PRECARITY OR RESILIENCE?

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Abstract: *Young people on the labor market is a topical issue both in academia and in the latest European and national policies. Young graduates are no exception. They invest in education and want a better match of their studies with the job. Some analyzes performed on AMIGO data and data performed with economics graduates help us to analyze the existing situation. The conclusions show us significant differences in terms of income, in terms of the field of study as well as the mismatch with the graduated field. In terms of gender, there are differences in job satisfaction, with men being more likely to reach leadership positions than women.*

Keywords: labour market; young people; unemployment; labour market integration; education.

JEL classification: I26; J01; J08

1.Introduction

In the dynamics of preparing students for the labor market, higher education institutions play a major role. They have been called upon in recent decades to prepare students for the labor market with skills necessary for the labor market. This approach has intensified especially through the expansion of higher education and the Bologna process which has somewhat redefined the way education is viewed in terms of the transition from school to the active life of graduates (Schomburg and Teichler, 2011). In this regard, research was conducted to provide valuable information about the employment skills of graduates. As Furlong and others have shown, the instability for young people entering the labor market is led by the processes of social, political and economic changes.

Simple international statistical comparisons, starting from national indicators of labor market participation, can reveal groups of countries with similar sizes and dynamics of the same indicators, which suggests relatively similar institutional or institutionalized realities on the respective labor markets. Overeducation can be seen as a loss of society in terms of resources invested. It can bring lower income to the individual and lower opportunities to engage in appropriate positions. Although studies show that this phenomenon of asymmetry has not increased in the last 20 years, the explanation for why it is so widespread is being studied and analyzed. Although the transition from school to work can be seen in terms of individual participation in economic activity or employment, by age groups, economic domains, areas of residence and sex, occupations, production, income, etc. . often, these explanatory criteria are combined.

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Although the transition from school to work is a natural phenomenon and assumed at the individual level, the success of the transition is largely due to the social and economic context of the country. Romania is no exception (Mursa, et al., 2015) from having an imperfect picture of the insertion of young people on the labor market. Concerns for the efficiency of the labor market for young people are materialized in measures and policies that the state must apply to increase the employment rate and investment in human capital.

2.Literature Review

Beyond the important differences by country in terms of the transition of young people from school to work, the literature considers an extremely complex concept of the neoliberal economy defined as precariousness in the labor market. We find in the literature the concept of precariousness as being strictly related to the insecurity of the 21st century on the labor market. As is well known, neoliberal deregulation of the labor market has led to a higher degree of insecurity manifested in many jobs over a period of time, part-time or insecure in Europe (Standing, 2011).

Over-education can also be seen in terms of earnings and job search. (Quintano et al., 2008). The likelihood of being over-educated can be explained by gender, education, the channels used to enter the labor market, the location of the job or the labor sector. According to the study, women seem to be the most affected when it comes to over-qualification, as they have qualifications above the level of the position held. The study by García-Aracil and Van der Velden (2008) shows that jobs with higher requirements in terms of skills and complexity are better paid. Also, high skills requirements increase job satisfaction. Over-education and over-skills in the labor market severely affect incomes. Studies show that the relationship between labor market income and asymmetry is strongly influenced by an unnoticed heterogeneity (Mavromaras et al., 2013). The results of studies conducted on graduates show that the asymmetry of skills expresses a professional path with many disadvantages (Liu et al., 2016). Matching the first job has an important effect at the beginning of your career.

Over-education can bring the individual lower incomes and a lack of employment opportunities in qualifying positions. Also, for society, overeducation is a loss in terms of resources invested for education (Caroleo and Pastore, 2015).

The issue of the transition from school to employment is not specific to our country, but exist in all countries and take on increasingly complex dimensions, in the economic framework based on knowledge. The impact of a generation that suffers from the effects of exclusivity will act together with the political and social evolution that will shape Europe in the coming years (Dimian, 2014).

Although there is a rich literature on the school-labor transition in developed countries, for post-communist countries the literature for this topic is lacking. Analyzing the entry patterns of higher education graduates from several former communist countries (Zamfir et al., 2020) it is argued that much of the variation between countries in the school-labor transition can be attributed to differences in labor market circumstances.

An analysis conducted on data from Romania (Mursa et al., 2015) aimed to demonstrate that the high unemployment rate among young people in Romania is caused by the difficulties that arise in the process of transition from the education system (school) to the labor market (labor). Although the transition from school to work is a natural phenomenon and assumed at the individual level, the success of the transition is largely due to the social and economic context of the country. Romania is no exception to having an imperfect picture of the insertion of young people on the labor market. Concerns for the efficiency of the labor market for young people are materialized in measures and policies that the state must apply to increase the employment rate and investment in human capital. The analyses show that

the under-employment is not explained by any demographic variables (Hatos and Saveanu, 2016).
Differences related to finding a job and the risk of remaining unemployed are analyzed by various age categories and level of education. As expected (Simionescu and Naros, 2019) the young unemployed with higher education who previously worked are 1.3% less likely to remain unemployed compared to the young unemployed with higher education who did not worked before. Therefore, young people who have recently graduated, with no experience into the labor market, need more support to better integrate. A highly segmented labor market usually favors a mismatch between supply and demand, significantly limiting functional flexibility and market resilience to macroeconomic shocks. (Dobre et al., 2011).
Equal access to education is one of the fundamental human rights. However, numerous studies show that educational disparities persist between different groups in many countries Atkinson and Messy (2012). Educational inequalities are on the agenda of policy makers in many countries, as they affect the life chances of individuals and contribute to the perpetuation of social disadvantages. In many cases, children from disadvantaged communities have lower school results and grow up without gaining the skills needed in the labor market. It is argued (Zamfir, 2017) that rural-urban educational inequalities determine the polarization of human capital, producing long-term labor market segmentation. Also, the institutional performance of Romanian counties (Dragoman, 2011) does not completely correlate with regional wealth; but regional disparities and the mechanisms used to mitigate inequalities must be taken into account in the public debate on further decentralization.
The participation of individuals in education is an important factor for their access to future opportunities, especially to labor market opportunities. Moreover, a significant number of studies show that education is one of the most influential factors that explains the amount of resources available to individuals in all their life cycles. In this context, reducing school dropout and increasing the share of people who are graduates of higher education are national objectives for Romania (Zamfir and Mocanu, 2016).
The social and economic changes of the Romanian society have affected the labor market, leading to unprecedented imbalances between the supply and demand in the labor market also in terms of both quantitatively and qualitatively (Deaconu and Rasca, 2014). The relationship between universities and the labor market is an important subject of analysis in terms of the graduate's transition to the labor market. Studies (Stanciu and Banciu, 2012) show that diplomas are considered valuable by employers, but graduates have better theoretical knowledge than practical training in the field. Some studies (Mocanu et al., 2014) focus on the needs of employers of skills by assessing their perception of the importance of different skills required of higher education graduates, as well as satisfaction with the level of the various competencies. Overcoming the current situation, increasing social involvement in universities and establishing appropriate strategies would promote employability and economic development.
Given this complex situation we focus in our analyses to reflect some of the aspects related to income and how the job match the diploma of the graduates in to the labour market.

3. Methodology

The analyzed data focuses on both indirect data set and direct data collected about graduates. We used the quarterly databases of the AMIGO survey (Household Labor Force Survey), the Romanian version of the LFS (Labor Force Survey) from 2018.

Details on the sampling scheme, estimation errors and survey in general can be found in the INSSE report on the 2018 AMIGO survey:

https://insse.ro/cms/files/Rapoarte%20de%20calitate/Amigo/RO_AMIGO_rap_calitate_Rom_2018.pdf
Number of records in the database: 228114. Since the selection unit is the household and the data collection is done repeatedly from the same household according to a certain algorithm, we identified unique individuals in the database: 58,229 cases. We selected the most recent records for analysis.
The second set of analyzed data is sampled by graduates of the Faculty of Economic Sciences. The tracer survey was conducted by the technique of indirect survey of the self-administered online questionnaire in the period 2015-2016, with 419 answers.

4. Data Analysis and Discussion

In the first part we intend to see if the income is significantly different in relation with specialization that youth graduated.

Table 1: Graduated specialization and income decile (standardized chi-square residues)

	1	2	3	4	5	6	7	8	9	10
Teaching studies and educational sciences	-1,6	-0,9	0,9	-1,3	-1,3	-1	2,6	2	0,4	-0,8
Humans, languages, arts	-0,2	-1,9	-0,6	2,4	1,5	-0,7	-0,7	0,9	-0,4	-0,6
Social sciences, business and law	-0,2	1,5	1,8	-1,8	0,3	0,3	-0,6	0,6	0,9	-2,1
Sciences, mathematics computer sciences	1,6	1,5	0,4	0,3	-0,4	0,4	0,8	-0,5	-2,3	-0,7
Engineering, production and constructions	1,8	0,8	-1,1	-1,5	2,4	-0,5	0,1	-0,7	-0,4	-0,1
Agricultures and vets	-1	-1,4	1,1	0,4	-0,7	-0,5	-1,1	1,6	-0,6	1,5
Medical and wellbeing	-0,4	-0,7	-1,5	2	-2,1	0,3	-0,3	-2,3	1,8	2,2
Services	-0,9	-0,2	0,2	-2	1	0	1,5	0,6	-0,1	-0,4
Unknown	-0,9	-0,8	-1,6	-0,3	0,2	0,8	-1,4	-0,5	1,9	1,6

Source: Our statistical processing based on AMIGO dataset

The interpretations of the analyzes for the income situation show us that in the income decile of the different specializations, where we have the coefficient 2, we have a significant concentration of incomes in that decile on specializations. The concentration of high incomes is found in the last decades for the specializations: "medical and welfare", "science, mathematics, computers" and "social sciences, business and law". This indicates to us that for these specializations, the incomes registered on the last deciles are higher than the average of the decile. For the domains where we have the coefficient less than 0 for the income deciles then we have in that decile registered cases less than the general average of the respective decile.
The limits of this analysis are given by the data set that does not provide the variables needed to evaluate underemployment or overemployment. Another limitation is the fact that we do not know if he works in the field of graduated specialization.

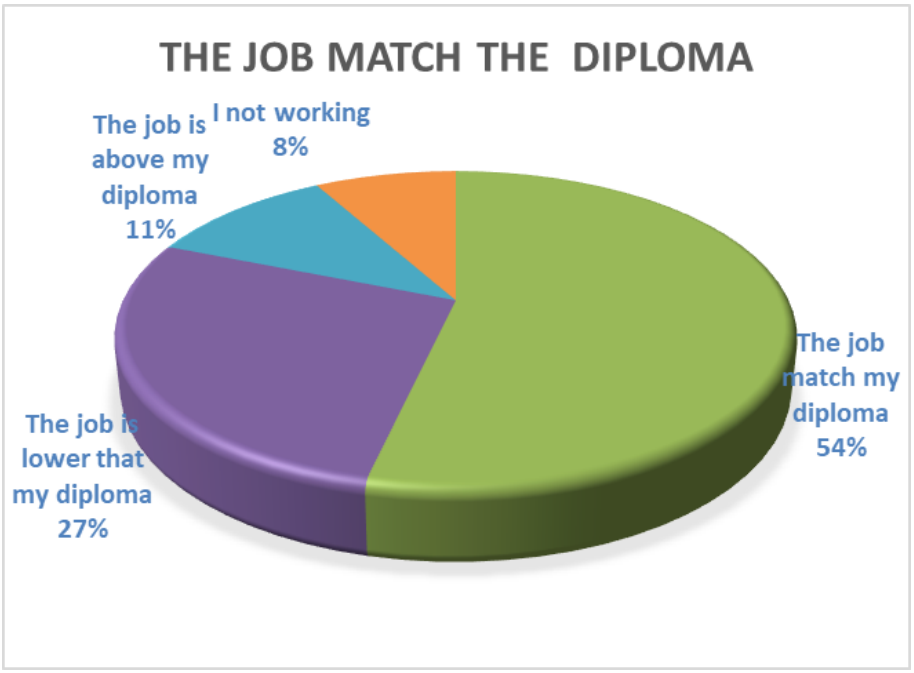

Figure 1: The job match the diploma

We have as the result that our graduates are more likely to have a match, 53,6%, between the workplace and the qualification. Also 27.5% declare that they have a workplace that is lower to their qualification.
We know from previous analyzes that job satisfaction is significantly associated with both gender (men have higher satisfaction) and the position held (the highest levels of job satisfaction are manifested by those in management positions).
Given the documented existence of discrimination in the workplace against women, the question arises as to whether higher levels of job satisfaction in men are explained by the fact that men are more present in leadership positions.
As expected, the relationship between the two variables is significant, the presence of men in leadership positions being significantly higher than that of women (p (chi-square) <0.01).

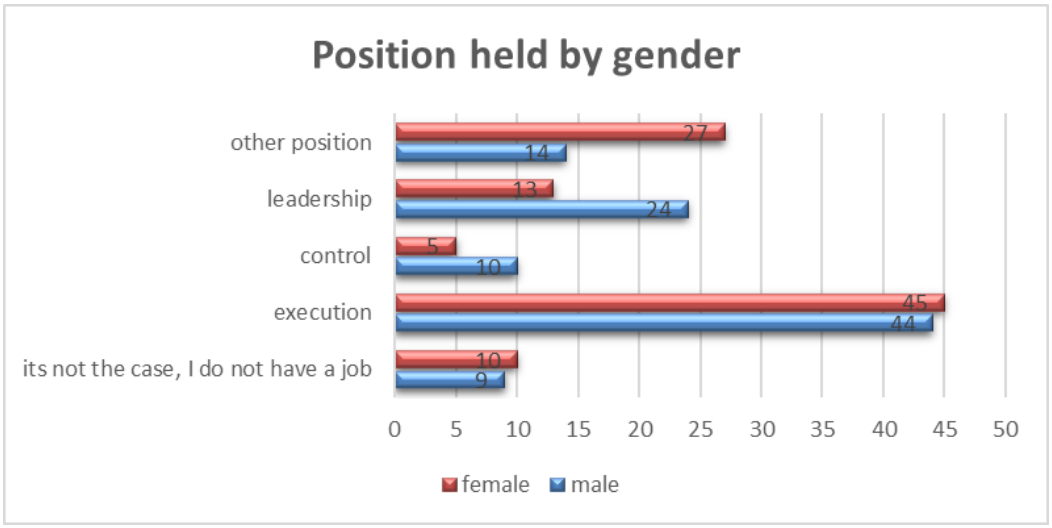

Figure 2: Position held by gender

Therefore, it is plausible to assume that the relationship between gender and job satisfaction is explained, at least in part, by the fact that men are more likely than women to be promoted to leadership positions.

5. Conclusion

Young people on the labor market are a widely debated topic in a contemporary socio-economic context. The integration process of young graduates on the labor market is inhomogeneous and with uncertain and lasting results. The data analyzed by us in this paper come to emphasize the precariousness reflected by this approach of theirs. Their lack of experience but also the relatively long time spent in education are just a few aspects that make them vulnerable. The first set of analyzes at national level presents graduates with very different incomes, although they are all graduates of higher education. Some professions are characterized as having above average incomes. The concentration of high incomes is found for the specializations: "medical and welfare", "science, mathematics, computers" and "social sciences, business and law". This aspect emphasizes the socio-economic differences given by the field in which the graduate is preparing to work. Training in a certain field brings him predictable income. The analyzes performed with the data collected from the economics graduates are no exception when it comes to their studies and the job occupied. We have as the result that our graduates are more likely to have a match, 53,6%, between the job and the qualification. Also 27.5% declare that they have a job that is lower to their qualification. The mismatch between the graduate field and the job, especially at the beginning of the career, may be due, to the existing imbalances between institutions and the labor market. Relationship between gender and job satisfaction is explained, at least in part, by the fact that men are more likely than women to be promoted to leadership positions.

The conclusions of the study underline that Romanian universities should take the students, and after that the graduates, into account in order to fulfill their role of partner in medium business, to adapt to its growing requirements, to strengthen its position vis-à-vis competitors working in the field of education in and to contribute more actively to facilitating the immediate integration of their graduates into the profession for which they have been

trained. Our results have a practical approach in order to find the best ways in supporting our graduates for better integration into the labour market.

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Bionote

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THE IMPACT OF DIGITAL INFRASTRUCTURES AND TRANSPORTATION SERVICES ON ECONOMIC GROWTH: RECENT EVIDENCE FROM HIGH-, MIDDLE- AND LOW-INCOME COUNTRIES

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Abstract: *This study investigates the links between digital infrastructures (DI); transportation services (TS) and economic growth using simultaneous-equation panel data models for a panel of 62 countries for the period 2000-2018.*
The results indicate that there is evidence of bidirectional relationship between DI and economic process. Economic growth and TS are interrelated bidirectional relationship. Bidirectional link is validated between DI and TS for high-income and middle-income countries. Unidirectional causality is running from TS to DI for low incomes countries. These empirical insights are of particular interest to policymakers, working in low incomes countries. They help them to develop modern DI and TS to sustain economic development and to push substantial changes within the way of life and productivity. This has led to enormous technological advancement which is in line with but at a faster pace than the technological advancement of previous revolutions.

Keywords: Digital infrastructure. Transportation services. Economic growth. GMM.

JEL Classification: A10, C31, L86, L91

1. Introduction

The new economy as opposed to the old one is based essentially on the technologies as one of the main components to support the economic development (Jorgenson and Vu, 2016; Niebel, 2018; Romer, 1990; Saidi and Mefteh, 2020). Moreover, Hong (2007) argue that ICT affects positively the FDI attractiveness by improving traffic volume, reducing travel times and costs. Additionally, Cardona et al. (2013); Paunov and Rollo, (2016) indicated that digitalisation benefits economic growth by facilitating transactions, production innovations and network externalities. In relation to the main reasons for additional recent studies on the relationship between digital infrastructures and economic growth including other important variables, such as human capital (Aleksandra and Joan, 2017). Similarly, some others studies have incorporated transportation services into production function to investigate the relationship between economic growth and digital infrastructures.
The automotive of 2020, reduced from digital economy would have the ways of defining and realizing the journeys, through communicating, for optimal security, with the infrastructure. It is to be noted that no study worth noting that has been concluded that analyzed the ICT development role in transport and economic development. Moreover, as we know so far,

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http://doi.org/10.47535/1991ojbe127

there have not been any empirical studies focusing on examining the causal associations between digital infrastructures and growth through the cointegration model.
Our study is different from the previous studies in three ways. (i) To the best of our knowledge, none of the previous studies have estimated the three-way linkages between digital infrastructures, transportation services and economic growth. For this reason, we found great motivation to integrate a first approach to investigate the three-way linkages between these variables. (ii) The empirical investigation concerns 62 countries with different income levels and divided into three sub-groups, namely; high-income, middle-income, and low-income countries. (iii) We use the Generalized Method of Moments for the dynamic panel data model following the three sub-panels. The present paper starts by an introduction followed by a literature review. In section three, we have the methodological framework and we present the obtained results and discussions. Finally, the conclusion and policy implications are given in section four.

2. Theoretical framework

Numerous researchers' studies argued that the application of telecommunication infrastructures promotes the effectiveness of production at a global level (Garbacz; 2011). Similarly, Jorgenson and Vu (2007) disclosed a straight link between economic growth and ICT for 110 countries, counting the USA. Roller and Waverman (2001) identified a positive linkage between ICTs infrastructures and economic growth for a panel of 21 OECD countries between 1970 and 1990. Seo et al. (2009) settled that investment in digital infrastructures affects GDP growth positively for 29 countries along with Venturini (2009) for the USA and 15 EU countries Oulton (2012) for the United Kingdom; Daveri (2002) for economies of European Union; Kumar and Kumar (2012) for Fiji; Kuppusamy et al. (2009) for Malaysia. In the same vein, Vu (2013) explored the effect of ICT on the economic development of Singapore and resulted that ICTs contributed by 1% to Singapore's economic growth between 1990 and 2008.
Lee and Khatri (2003) examined the impact of ICT on economic development of South Asian countries. They introduced the non-ICT capital, ICT capital (including hardware, software and communications) and labor force as independent variables. The study made use of ICT expenditure data provided by WITSA 1 for the periods of 1990-94 and 1995-99. The main results showed that ICT's influence economic development stems from capital deepening effect of the ICT sector in 1990s. Matambalya and Wolf (2001) used the data form150 companies between 1999 and 2000 to investigate the causal relationship among ICT and economic development in Kenya and Tanzania. In the empirical study, the authors included non-ICT capital, ICT, productivity and labor force as explanatory variables. In the conclusion, Matambalya and Wolf (2001) argued that the economic growth was significantly and positively affected by the ICT.
Khadaroo and Seetanah (2008) investigated the impact of transport infrastructures on economic growth in the case of Mauritius during the 1950- 2000. In addition, Shan et al. (2014) investigated the economic impact of seaports on host city's economic development in China from 2003 to 2010. Based on data from 41 major port cities, they found that port cargo throughput considerably contributed to the economic growth of the Chinese host city. Correspondingly, Park and Seo (2016) investigated the positive influence of port infrastructure on Korean economic development from 2000 to 2013. They asserted that actually cargo ports contribute chiefly to regional economic development when they having sufficient throughputs. For multinational companies, transport infrastructure has been perceived to be a consequential intermediate input in private production process, which could directly influence their competitiveness. For multinational companies, a smart transport system is critical to advance their logistics functions, and smooth investments

overseas. Many studies nowadays, have established the considerable economic worth of logistics. They contend that logistics itself is becoming a novel industry that contributes significantly in the economic progress of nations. To examine the impact of transport on economic growth for China from 1980 to 2009, Lean et al. (2014) used dynamic structural models. The authors found a positive and bidirectional relation in the long run. Several researches have studied the economic role of transport infrastructures, and emphasized their positive influence to economic development, in both developing and developed countries; Khadaroo and Seetanah (2008) for Mauritius; Park and Seo (2016) for Korea; Shan et al. (2014) for China. They conclude that transportation affects the effectiveness of private businesses, and significantly controls their competitiveness. Additionally, they argue that transportation has anpositif effect on FDI attractiveness, thus stimulating fiscal development of host countries.

Moreover, several additional studies have tried to inspect the causal connection between digital infrastructure and logistics functions. Crowley (1998) established the positive linkage between digital infrastructures, transport and logistics services in a global supply chain. The author added that third-party logistics (3PLs) could in fact use digital infrastructure to convert a supply chain configuration. Recently, Saidi and Mefteh (2020) examined the relationship between information and communication technologies (ICT) and transport in 63 countries with different income levels. Their results confirm the positive role of transport and ICTs in supporting economic growth by strengthening countries' economic openness and increasing their participation in international trade.

As conclusion, the intelligent transport system is a new economic factor that needs both elaborate theoretical and empirical studies. Several authors have fleetingly conversed on the increasing role of advanced ICT tools in improving the productivity of transportation systems and logistics functions. However, to our limited knowledge, no researches in the past have looked to study a three-way relationship among digital infrastructures, transportation services and economic growth. Our major contribution to the existing literature would be by exploratory the different linkages between the three variables with examined to their impacts on economic growth in different income countries.

3. Methodology and data

3.1 Model Specification

Therefore, the main objective of this paper is to examine the three-way linkages between digital infrastructures, transportation services and economic growth in 62 countries. We used a Cobb–Douglas production function where by the gross domestic product (GDP) depends on capital and labour force. The gross domestic product (GDP) depends on endogenous variables including digital infrastructures (DI), transportation services (TS), labor force (L), foreign direct investment (FDI), capital stock (K), human capital (HK) and trade openness (TO). The general production function is modelled as follows:

$$Y_t = f(DI, TS_t, HK_t, FDI_t, TO_t, K_t, L_t) \quad (1)$$

Where, economic growth (Y_t) is a function of digital infrastructure (DIt), transportation services (TSt), human capital (HKt), foreign direct investment inflows (FDI_t), trade openness (TOt), capital stock (K_t) and labor force (L_t). We use the log-transformation of variables and we write equation 1 with a time series specification, as follows:

$$ln\,Y_t = \alpha_0 + \alpha_1\, ln\,D\,I_t + \alpha_2\, ln\,T\,S_t + \alpha_3\, ln\,F\,DI_t + \alpha_4\, ln\,T\,O_t + \alpha_5\, ln\,K_t + \alpha_6\, ln\,H\,K_t + \alpha_7\, ln\,L\,t + \mu_{i,t} \quad (2)$$

where, $ln\,Y_t$ represents natural-log of per capita GDP, $ln\,D\,I_t$ is natural log of digital infrastructures, $ln\,T\,S_t$shows natural-log of transportation services,$ln\,F\,DI_T$is natural-log of foreign direct investment inflows, $ln\,T\,O_t$ represents natural-log of trade openness, $ln\,K_t$ represents natural-log of capital stock, $ln\,H\,K_t$ indicates natural-log of human capital$ln\,L_t$andrepresents the natural-log of labor force.
In Equation 2, we also have αik representing the estimated coefficients of all independent variables where k= 1…7. The subscript i = 1...62 denotes the country. The subscript t = 1…19 denotes the time period (2000-2018). Finally, equation 2contains α0 and εit indicating constant and classical error term respectively.
There is a panel study, which allows us to write equation 2 in panel data form as follows:

$$ln\,Y_{t,i} = \alpha_0 + \alpha_{1,i}\,ln\,D\,I_t + \alpha_{2,i}\,ln\,T\,S_t + \alpha_{3,i}\,ln\,F\,DI_t + \alpha_{4,i}\,ln\,T\,O_t + \alpha_{5,i}\,ln\,K_t + \alpha_{6,i}\,ln\,H\,K_t + \alpha_{7,i}nL_t + \mu_{i,t} \quad (3)$$

Keeping effect of labor force in production function and divide the equation 3 by total population, we convert all the variables into per capita units. Equation 3 can be rewritten as follows:

$$ln\,Y_{t,i} = \alpha_0 + \alpha_{1,i}\,ln\,D\,I_t + \alpha_{2,i}\,ln\,T\,S_t + \alpha_{3,i}\,ln\,F\,DI_t + \alpha_{4,i}\,ln\,T\,O_t + \alpha_{5,i}\,ln\,K_t + \alpha_{6,i}\,ln\,H\,K_t + \mu_{i,t} \quad (4)$$

Based on prior studies (Shahbaz et al. 2015, Omri et al. 2015, Omri and Kahouli 2014, Sy et al. 2009, Saidi et al. 2020), we use equation 4 to derive the empirical models to simultaneously treat inter-relationships between economic growth, digital infrastructuresand transportation services. In these models, we have introduced urbanization (U_t), financial development (FDt) and energy consumption (E_t), as explanatory variables. The three-way links among growth-digital infrastructures-transportation services are examined by making use of the following three equations:

$$ln\,Y_{t,i} = \alpha_0 + \alpha_{1,i}\,ln\,D\,I_t + \alpha_{2,i}\,ln\,T\,S_t + \alpha_{3,i}\,ln\,F\,DI_t + \alpha_{4,i}\,ln\,T\,O_t + \alpha_{5,i}\,ln\,K_t + \alpha_{6,i}\,ln\,H\,K_t\mu_{i,t} \quad (5)$$

$$ln\,T\,S_{t,i} = \delta_0 + \delta_{1,i}\,ln\,Y_t + \delta_{2,i}\,ln\,D\,I_t + \delta_{3,i}\,ln\,F\,DI_t + \delta_{4,i}\,ln\,E_t + \delta_{5,i}\,ln\,U_{tt} + \delta_{7,i}\,ln\,K_t + \mu_{i,t} \quad (6)$$

$$ln\,D\,I_{t,i} = \delta_0 + \delta_{1,i}\,ln\,Y_t + \delta_{2,i}\,ln\,T\,S_t + \delta_{3,i}\,ln\,H\,K_t + \delta_{4,i}\,ln\,U_t + \delta_{5,i}\,ln\,F\,D_t + \delta_{6,i}\,ln\,K_t + \mu_{i,t} \quad (7)$$

Equation-5 states that economic growth may be potentially affected by digital infrastructures (DIt), transportation services (TSt), human capital (HKt), foreign direct investment (FDI_t), trade openness (TOt) and capital stock (K_t). The majority of previous research studies confirm the positive impact of these variables on economic growth (Achour and Belloumi 2016, Saidi et al. 2020, Saidi et al. 2018).
Equation-6 assumes that transportation services in a country depends significantly on economic growth (Y_t), digital infrastructures (DIt), foreign direct investment inflows (FDI_t), energy consumption (E_t), urbanization (U_t), capital stock (K_t) (Marazzo et al. 2010, Chi 2016, Saidi andHammami 2017).

Equation-7 postulates that economic growth (Y_t), transportation services (Ts_t), human capital (HKt), urbanization (U_t), and capital (K_t) affect significantly the digital infrastructure. (Solomonand Klyton, 2020, MbarekandZghidi, 2017, Adedoyin, 2020).
In our study, we use dynamic panel data models with simultaneous-equations where lagged values of economic growth, transportation services, and digital infrastructures are taken into account by using the Arellano and Bond (1991) GMM estimator. The empirical models to estimate can be rewritten as follows:

$$ln\,Y_{i,t} = \alpha_0\, ln\,Y_{i,t-1} + \beta_1\, ln\,TS_{i,t} + \beta_2\, ln\,DI_{i,t} + \sum_{j=1}^{4} \delta_j X_{i,t} + \mu_{i,t} + \varepsilon_{i,t} \quad (9)$$

$$ln\,TS_{i,t} = \eta_0\, ln\,TS_{i,t-1} + \lambda_1\, ln\,Y_{i,t} + \lambda_2\, ln\,DI_{i,t} + \sum_{j=1}^{4} \delta_j X_{i,t} + \mu_{i,t} + \varepsilon_{i,t} \quad (10)$$

$$ln\,DI_{i,t} = \ell_0\, ln\,DI_{i,t-1} + \gamma_1\, ln\,Y_{i,t} + \gamma_2\, ln\,TS_{i,t} + \sum_{j=1}^{4} \delta_j X_{i,t} + \mu_{i,t} + \varepsilon_{i,t} \quad (11)$$

Where *lnYi,t*, *lnTSi,t*, and *lnDIi,*t represent respectively, the GDP, the transportation services and digital infrastructures of country i at time t. α0 is the parameter to be estimated; X represents the vector of explanatory variables used to model economic growth (digital infrastructures, transportation services, foreign direct investments, trade openness, capital and human capital), to model transportation services (economic growth, digital infrastructures, foreign direct investment, energy consumption, urbanization, financial development, and capital) to digital infrastructures (economic growth, transportation services, human capital, urbanization, capital and financial development). μ is country-specific effects; and ε is the classical error term.
In the first equation, β captures the effect of digital infrastructure and transportation services on economic growth. Also, the effect of economic growth and digital infrastructure on transportation services is measured byλ. Finally, γ captures the effect of economic growth and transportation services as explanatory variables on the variability of digital infrastructure as endogenous variable in the third equation.

3.2. Data

We identified and selected data from 62 countries based on the availability of data from 2000 to 2018.We use annual data for the per capita GDP (constant 2010 US$), DI (number of individual using internet % of population), TS (% of exports of commercial services), human capital (percentage gross), FDI net inflows (constant 2010 US$), trade openness (total trade as share of GDP), capital stock (constant 2010 US$), energy consumption (kg of oil equivalent), urbanization (% of urban population of total population), and FD (constant 2010 US$). All the data, collected for the period 2000-2018 are sourced from the World Bank's World Development Indicators (WDI,2020).

4. Empirical results and analysis

The global panel (GP) is divided into high, middle, and low-income panels. Twenty-six countries are included in high-income panel, namely, Australia, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Italy, Japan, Korea Rep, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and USA. Twenty-two countries in middle income panel, namely, Albania, Algeria, Argentina, Brazil, Bulgaria, China, Colombia, Croatia, Fiji,

Gabon, Iran, Jamaica, Lebanon, Malaysia, Mexico, Panama, Paraguay, Peru, Thailand, Turkey, Serbia, and Venezuela. Fourteen countries in low-income panel, namely, Bangladesh, Egypt, Ghana, India, Indonesia, Kenya, Morocco, Nigeria, Pakistan, Sri Lanka, Tunisia, Vietnam, Philippines, and Zambia.In this study, we investigate the relationships among economic aggregates (economic growth, transportation services, and digital infrastructuresin62 countries with different income levels between 2000 and 2018.

4.1 Descriptive statistics

The descriptive statistics for all variables used in the empirical investigation are in Table-1. These statistics show that all variables are normally distributed since the values of mean and median are close. The skewness negative coefficients indicate that the distribution is skewed to the left, with more observations on the right.

Table1: Descriptive statistics

	Mean	Median	Maximum	Minimum	SD	Skewness	J-Bera
$ln\,Y_t$	3566.72	3928.74	7763.292	51.016	2967.457	-0.163	4.308
$ln\,FDI_t$	43.369	37.853	82.652	10.096	5.736	-0.770	5.141
$ln\,TS_t$	46.295	47.322	439.703	9.351	2.969	-0.917	6.545
$ln\,DI_t$	114.350	112.207	4320.372	19.334	5.442	1.000	3.724
$ln\,TO_t$	378.100	326.800	409.904	-53052	408.514	-0.425	4.573
$ln\,E_t$	130.928	124.991	373.743	26.005	9.930	-0.931	3.750
$ln\,U_t$	223.100	207.854	630.712	0.000	213.400	-0.305	3.372
$ln\,FD_t$	245.274	240.136	180047.38	37.983	24.696	-0.540	2.582
$ln\,K_t$	118.116	113.579	54004.661	-6.286	7.504	-0.652	3.473
$ln\,HK_t$	114.350	112.207	4320.372	19.334	5.442	1.000	3.724

Note: SD indicate standard deviation (standard deviation-to-mean ratio), respectively.

4.2 Panel unit root tests

In panel data analysis, two-panel unit root tests are appliedto determine the stationary of variables; the Levin et al. (LCC, 2002) and Im and Pesaran (IPS, 2003). However, these tests identify the stationary of the relevant variables. According to Levin et al. (2002) and Im and Pesaran (2003) the variables are non-stationary, whereas the alternative hypothesis states that the variables are stationary. The level of p-value determines the acceptance or rejection of H0. When associating the p-value to the threshold level of 10%, we admit H_0 if the p-value is greater 10% and we accept the alternative hypothesis (reject H_0) if the p-value is less than 10%. Statistics in table 2 show that all series are of order one and therefore stationary in first difference.

Table2: Panel unit root analysis

Variable	Levin-Lin-Chu (LLC)		Im-Pesaran-Shin (IPS)	
	At Level	First difference	At Level	First difference
$ln\,Y_t$	-3.2256 (0.2135)	-5.5689 (0.0032)***	-2.6248 (0.5020)	-2.3628 (0.0232)**
$ln\,FDI_t$	-2.2248 (0.2071)	-3.7481 (0.0146)**	-3.3158 (0.44310)	-5.0014 (0.0018)***
$ln\,TS_t$	-4.1489 (0.1072)	-8.8452 (0.0000)***	-3.3248 (0.4511)	-4.6241 (0.0024)***
$ln\,DI_t$	-4.4787 (0.1001)	-7.1114 (0.0000)***	-5.3800 (0.1442)	-5.14474 (0.0011)***

$ln\,TO_t$	-4.1485 (0.1615)	-6.6597 (0.0000) ***	-4.5487 (0.1720)	-6.6248 (0.0000) ***
$ln\,E_t$	-5.1482 (0.1027)	-7.2635 (0.0000) ***	-0.8001 (0.6280)	-4.6148 (0.0023) ***
$ln\,U_t$	-3.6899 (0.1751)	-5.4177 (0.0030) ***	-0.7004 (0.6552)	-6.9875 (0.0000) ***
$ln\,FD_t$	-1.5011 (0.3471)	-5.7025 (0.0037) ***	-5.6895 (0.1413)	-6.5814 (0.0000) ***
$ln\,K_t$	-2.6001 (0.3238)	-4.7887 (0.0038) ***	-1.7488 (0.6120)	-4.7003 (0.0021) ***
$ln\,HK_t$	-3.1414 (0.2004)	-6.2650 (0.0000) ***	-4.2400 (0.1640)	-2.4111 (0.0166) **
Notes: P-values in parentheses, ***, ** significant at 1% and 5% levels respectively				

The next step is to test whether there is a long-run equilibrium relationship between these variables. We use the co-integration test of Pedroni (2004) formed by seven co-integration tests on data from both homogeneous and heterogeneous panels. The results of Pedroni's (2004) test reported in Table 3 confirm the rejection of the null hypothesis of no co-integration. Based on the p-values, we conclude that economic growth and its determinants are co-integrated in the long-run. In fact, the results of both within and between dimensions statistics show that the alternative hypothesis of co-integration should be accepted for the three sub-panels along with the global panel. Based on these findings, we conclude that endogenous and exogenous variables do have a long-term relationship to all panels.

Table 3: Pedroni Cointegration Test

	High-income panel		**Middle-income panel**	
Tests between Dimensions				
	Statistics	P-value	Statistics	P-value
V-stat	-4,0846	(0,0031)***	-2,1351	0,0253**
Rho-stat	-4,0833	0,0030***	-3,0934	0,0134**
Pp-stat	-5,096	0,0000***	-3,0945	0,0131**
Adf-stat	-4,9071	0,0005***	-5,3889	0,0000***
Tests within Dimensions				
Rho-stat	-3,4474	0,0114**	-4,7161	0,0011*
Pp-stat	-5,1052	0,0000*	-5,4003	0,0000*
Adf-stat	-6,4915	0,0000*	-2,9612	0,0220**
	Low-income panel		**Global panel**	
Tests between Dimensions				
Tests between Dimensions	Statistics	P-value	Statistics	P-value
V-stat	-6,6536	0,0000***	-4,1246	0,0029***
Rho-stat	-3,4523	0,0112**	-5,4283	0,0000***
Pp-stat	-3,6122	0,0105**	-5,4353	0,0000***
Adf-stat	-4,8353	0,0008***	-6,0276	0,0000***
Tests within Dimensions				
Rho-stat	-5,0751	0,0000*	-2,4102	0,0232**
Pp-stat	-4,5072	0,0017*	-3,7041	0,0143**
Adf-stat	-4,3252	0,0021*	-3,1654	0,0135**

Note: Panel cointegration tests include intercept; ***, ** significant at 1% and 5% levels respectively,

The results of the global panel are recorded in Table 4 below. The DI has coefficient of 0.159 indicating positive impact on economic growth. We note that 1% increase in DI leads to enhance economic growth by 0.159%. The results confirm the findings of Qiang (2009) for 120 developing countries who indicate that increase a 10 % of the information communication technology adoption rate has resulted in an increase of 0.8% of economic growth in middle income countries. The TS affects positively and significantly the economic growth. A magnitude of 0.221 implies that if TS increases by 1%, the economic growth augment by 0.221 %. Theoretically, the positive impact of transportation is very supported and confirmed by Samir et al, 2020 for 46 developing countries; Khadaroo and Seetanah (2008) for Muritius.

In addition, the human capital affects positively the economic growth at 1% level. Our results confirm the ones of importantly, we find that trade openness and capital stock have positive effects on economic growth at 1% level. Moreover, the statistics of Model 2 present the influence of explanatory variables on the variation of transportation services. In fact, we found a positive impact for economic growth, FDI, capitalstock. An increase by 1% in these variables gives a development on the transportation services by 0.313 %; 0.168%; 0.192% respectively. For the energy, urbanization, the impact on transportation services is positive at different level of significance. However, the transportation services not affect by digital infrastructures in a significant way. Finally, in Model 3, we found that DI depends on economic growth at 1% level. A high coefficient confirms strongly the positive link between economic growth and digital infrastructures. These results are in line with those of Oulton (2012) for the United Kingdom; Daveri (2002) for economies of European Union; Kumar and Kumar (2012) for Fiji; Kuppusamy et al. (2009) for Malaysia.

The same positive impact is also detected for transportation services, urbanization, capital stock and human capital in different level of signification.

For the high-income countries (HI), Model 1 summarizes the impact of different factors on economic growth. First, the impact of FDI is found positive since a development of FDI stock by 1% tends to increase the economic growth by 0,278%. The transportation service has also a strong effect on economic growth. A coefficient of 0,324implies that the economic growth augments by 0,324% when the transportation service increases by 1%. The same positive impact is detected for the DI, trade openness, capital stock and human capital.

Model 2 seems to show how different factors affect transportation services in HI countries. A positive impact at the 1% level of significance is attributed to the economic growth, FDI, energy consumption and urbanization. The development of these variables by 1% leads to enhance the transportation services by 0,244%; 0,324%; 0,358%; 0,317%, respectively. Concerning the DI and capital stock the impact ispositive at 5 % level.

The statistics of Model 3confirm a direct impact of economic growth on the digital infrastructures which increase by 0,308% if there is an economic development by 1%. Also, we found a positive relationship between transportation services and digital infrastructures. The coefficient of 0,163 indicates that a 1% augmentation in transportation services tends to develop the digital infrastructures by 0,163 %. Moreover, the development of urbanization by 1% leads to rise digital infrastructures by 0,262%. Furthermore, the results show that both capital stock and human capital have a direct and positive influence on the digital infrastructures. The statistics of 0,188and 0,199 demonstrate that these infrastructures may augment by 0,188% and 0,199% if the capital and human capital augment by 1%, respectively. However, we do not find a significant relationship between FD and DI for the HI countries.

For the panel of middle-income countries, the statistics of Model 1 show that the economic growth depends positively on the attractiveness of FDI, transport, and DI. A coefficient of 0,253 indicates that the economic growth in middle income countries grows by 0.253% if the stock of FDI augments by 1%. Similarly, the magnitude of 0,264 and 0,123 imply that 1% increase in the transport and digital infrastructure causes the augmentation of economic growth by 0.264% and 0.123%, respectively. Moreover, the development of trade openness by 1% leads to rise the economic growth by 0,363 %. Furthermore, we found that the human capital and capital stock have positive effects on the economic growth in the middle-incomes countries.

Model 2 presents the influence of explanatory variables on the variation of transportation services in the countries of the second panel. In fact, we found a positive impact for the economic growth, FDI inflows, and DI. An increase by 1% in these variables gives a development on the transportationservices by 0,324%, 0,182%, and 0,034%, respectively. For the energy use, urbanization and capital stock the contribution on transport services is positive at different level of significance. Finally, in Model 3, we found that the digital infrastructures in the middle-incomes countries depend on economic growth at the 1% level. Indeed, an augmentation by 1% on the economic growth gives an increase in the digital infrastructures by 0,293%. The same positive impact is also detected for the transportation services and urbanization. A magnitude of 0,292 and 0,229 implies that the digital infrastructures increase by 0.292% and 0.229% if the transportation service and urbanization increase by 1% respectively. Concerning the influence of capital and human capital, the findingsprove a positive impact at the level of 1% for the capital and at the level of 5% for the human capital. In contrast, the FD has no significant impact on digital infrastructures in middle incomes countries.

Concerning the panel of low-income countries, the statistics of Model 1 follow the same trend as the first panel. The results demonstrate that the economic growth depends positively to FDI attractiveness, transport, DI, TO, capital and human capital in different level of significance. By Model 2, we estimate the coefficients of the explanatory variables on transportation services. We found that the economic growth affects positively the development of transportation services in the low-income countries. Indeed, a coefficient of 0,352 indicates that the augmentationby 1% of the economy allows the increase of the transportation services by 0,352%.

In the same way, the impact of FDI and energy demand is found positive and statistically significant. The transport services increase by 0,165% and 0,328% if there is an augmentation by 1% of the FDI inflows and energy demand respectively. The positive relationship between urbanization and transport services is clearly proved by the magnitude of 0,215. Indeed, a 1% increase in the urbanization in the low incomepanel implies a development of transportation services by 0,215%. For the remaining explanatory variables, we found a positive impact at the 1% level of significance for the capital stock at the 5% level. Compared to middle income panel, we found that the influence of digital infrastructures is not important to impact transportation services.

Finally, Model 3 confirms the positive impact of economic growth and transportation service on the development of digital infrastructures. The economic growth has a positive coefficient implying that these infrastructures grow by 0,317%, if there is an economic development by 1%. Also, the coefficient of 0,1506 imply that the digital infrastructures increase by 0,150 % if the transport services increase by 1%. Moreover, the results indicate that the digital infrastructure is positively affected by urbanization, FD, capital stock, and human capital. We can note that in spite middle income countries, FD has a significant impact on DI in low - income countries.

Table 4: Empirical results

	62 countries			High-income countries			Middle-income countries			Low-income countries		
HIC	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Independent variables				**GDPC**	**TS**	**DI**	**GDPC**	**TS**	**DI**	**GDPC**	**TS**	**DI**
$ln\,Y_t$		0,3137 (0.0000)***	0,3019 (0.0000)***		0,2445 (0,001)***	0,3086 (0,0000)***		0,3244 (0,0000)***	0,2934 (0,000)***		0,3529 (0,0000)***	0,3170 (0,0000)***
$ln\,FDI_t$	0,2719 (0.0000)***	0,1682 (0.0414)**		0,2781 (0,000)***	0,3247 (0,000)***		0,2535 (0,0219)**	0,1827 (0,0478)**		0,3269 (0,0000)***	0,1650 (0,0252)**	
$ln\,TS_t$	0,2215 (0.0018)***		0,3008 (0.0000)***	0,3247 (0,000)***		0,1631 (0,0313) **	0,2644 (0,0210) **		0,2924 (0,0115) **	0,2502 (0,0016)***		0,1506 (0,0283)**
$ln\,DI_t$	0,1597 (0.0429)**	0,0229 (0.2348)		0,1980 (0,0201)**	0,1536 (0.0307) **		0,1235 (0,0515) *	0,0344 (0,0810)*		0,1373 (0,0401)**	0,0177 (0,2263)	
$ln\,TO_t$	0,3193 (0.0000)***			0,1504 (0,039)***			0,3634 (0,0000)***			0,3249 (0,0000)***		
$ln\,E_t$		0,3583 (0,0000) ***			0,3583 (0,0000) ***			0,3076 (0,0000)***			0,3289 (0,0000)***	
$ln\,U_t$		0,3171 (0,0000)***	0,2628 (0,0017)***		0,3171 (0,0000)***	0,2628 (0,0017)***		0,3267 (0,0000)***	0,2296 (0,0244)**		0,2155 (0,0051)***	0,1267 (0,0420) **
$ln\,FD_t$			0,0994 (0,352)			0,0994 (0,352)			0,0165 (0,260)			0,0905 (0,0662) *
$ln\,K_t$	0,15048 (0,039)**	0,1013 (0,0401) **	0,1882 (0,0262) **	0,15048 (0,039)**	0,1013 (0,0401) **	0,1882 (0,0262) **	0,2626 (0,0212) **	0,3129 (0,0000)***	0,3014 (0,0000)***	0,2343 (0,0031)***	0,2107 (0,0052)***	0,1017 (0,0540)*
$ln\,HK_t$	0,3247 (0,000)***		0,1993 (0,0200) **	0,3247 (0,000)***		0,1993 (0,0200) **	0,1992 (0,0353) **		0,2021 (0,0300)**	0,2725 (0,0032)***		0,2246 (0,0044)**
Constant	1,3186 (0,001)***	0,2227 (0,041)**	0,2445 (0,048)**	1,3186 (0,001)***	0,2227 (0,041)**	0,2445 (0,048)**	1,3186 (0,001)***	0,2227 (0,041)**	0,2445 (0,048)	1,3053 (0,001)***	0,2205 (0,041)**	0,2420 (0,048)**
Hansen J-test (p-value)	22,077 (0,115)	16,3825 (0,225)	14,7213 (0,325)	22,077 (0,115)	16,3825 (0,225)	14,7213 (0,325)	22,077 (0,115)	16,3825 (0,225)	14,7213 (0,325)	21,854 (0,115)	16,2170 (0,225)	14,5726 (0,325)
AR2 test (p-value)				0,0623 (0,950)	0.1465 (0.684)	0.244 (0.847)	0,06237 (0,950)	0,1465 (0,684)	0,24453 (0,847)	0,0617 (0,950)	0,3529 (0,684)	0,3170 (0,847)

Notes: P-values in parentheses, ***, **, *significant at 1%, 5% and 10% levels respectively.

Conclusion

This study has investigated the linkages between economic development, transportation services, and digital infrastructures in 62 countries from 2000 to 2018 (during the amount of 19 years). The relationships between the variables are estimated by applying the GMM estimator. The empirical results show a bidirectional relationship between economic development, digital infrastructures and transportation services for all panels. The economic development contains a positive impact on transportation services and digital infrastructures for the high-income, middle income, and low-income countries. Furthermore, the results show that the connection between transportation services and digital infrastructures is bidirectional for the middle and high-income panels and unidirectional, from transportation services to digital infrastructures, for the low-income countries panel.

Importantly, developing countries could take various measures to adopt new strategies to reinforce their competitiveness in terms of digital infrastructure. For this reason, the government could also implement programmers that increase the provision of digital infrastructures, which could facilitate learning and other activities. Consequently, the connection between human capital and digital infrastructure allows several countries to draw in new talents and improve the citizen's competences. Therefore, investment in human capital is a vital policy consideration to boost the expansion effects of digital infrastructures. Besides, digital infrastructures promote science and research and stimulate innovation, productivity, employment and growth. Moreover, the positive and significant impact of digital infrastructures on transportation services shows that the event of digital infrastructures will be useful for the countries' economies especially for the foreign companies. Furthermore, this observation confirms that countries can augment the transportation services if they augment their investments on digital infrastructures. It is to be noted that digital infrastructures can facilitate cross-border communication, financial transactions and might also play a catalytic role in regional integration and trade facilitation particularly by reducing time frames and costs.

In the same context, these findings recommend, to encourage and support the investment of digital infrastructure which is useful for countries to play positive role in upgrading the economic sector and have in generating the creation of latest opportunities to reinforce production processes. In others words, digital infrastructures is the most crucial driver to boost transport, trade and financial development. As a final point, it is to be mentioned that our findings may be enhanced by considering the strong relationship between DI, TS and economic growth and by examining their impact on other variables such as heath expenditure, intelligent transport within the industry 4.0 erea.

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Bionote

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VECTOR AUTOREGRESSIVE APPROACH AFTER FIRST DIFFERENCING: A TIME SERIES ANALYSIS OF INFLATION AND ITS DETERMINANTS IN TANZANIA

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Abstract: *The objective of the study was to examine the trend of inflation and its key determinants in Tanzania. We used secondary time series data observed annually from January 1970 to 2020 which are inflation rate, GDP, Exchange rate and money supply. The vector autoregressive (VAR) model was employed for modeling. Augmented Dickey-Fuller test (ADF) found that inflation rate, Gross Domestic Product (GDP), exchange rate and Money supply (M3) were initially non-stationary but they became stationary after first differencing so as to proceed with the analysis. Preliminary tests before obtaining vector auto regressive model were carried out before determining the relationship between the variables. Diagnostic test such as serial correlation, heteroscedasticity, stability and normality were also important to evaluate the model assumptions and investigate whether or not there are observations with a large, undue influence on the analysis. We used Granger causality test (GCT) to determine causal- effect relationship between the variables. The results show that, there is a long run relationship between the variables, also the results showed that exchange rate and money supply (M3) both have a positive impact on inflation rate while gross domestic product (GDP) revealed a negative impact on inflation rate. Finally, the forecast of inflation rate for 15 years ahead was performed. The study recommends that the government should pursue both contractionary monetary policy and fiscal policy in order to control inflation in the country.*

Keywords: Autoregressive, money supply, inflation

JEL classification: C32, C53, E17

1. Introduction

Inflation is one of the most difficult to define and bound complex phenomena (Baciu, 2015). It is referred to as a process in which the price index is rising and money is losing its value. It is a persistent increase of the general price level of the economy. Inflation rate is directly relate to gross domestic product, money supply, exports, prices of imports, exchange rate, interest rate, fiscal policy, inter alia (Bashir et al., 2011). Volatile inflation can be caused by major fluctuations in the demand and/or supply in the economy. The unstable and unpredictable inflation rates not only makes the long term planning difficult but also

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discourages both the investments and savings (Baciu, 2015). There are two types of economic effects as a result of uncertainty of inflation. The first one is an effect that occurs to companies and consumers that must take economic decisions taking into account the future inflation forecasted. According to Devereaux (1989), the uncertainty of inflation in this case affects financial markets by raising interest rates in the long term, leads to uncertainty regarding other variables that are important in economic decisions and encourages companies to direct their resources in order to avoid certain risks related to inflation. The second effect is when the inflation rate differs significantly from its projection. An inflation that is better than expected leads to a transfer of wealth from the creditor to the debtor. The latter is favoured because repayment is done with money whose purchasing power is penalized by the inflation rate.

It is argued that inflation is not a desirable situation due to its effects in both economic and social aspects (Khan and Gill, 2010). The causing factors of high inflation remained inconclusive by both monetary and fiscal perceptions. Inflation impacts on income distribution making a random redistribution of real income. Inflation that raises the price level in a country creates financial problems in raising the prices of commodities, services, and other factors. It is, therefore, found that inflation is one of the major reasons of raising the price level of different commodities in any economy. Inflation in Tanzania has been harmful to economic growth but do not show the degree of responsiveness of GDP growth rate to changes in the general price levels (Shitundu and Luvanda, 2000)

Inflation and inflation volatility in Sub-Saharan Africa (SSA) have been gradually declining. However, in the years 1980s, the region experienced high inflation rate which was also associated with fixed exchange rates and overvalued real exchange rates. This increase was due to subordinating monetary policy to the objective of financing fiscal deficits in the region (Berg et al., 2015). From the mid–1980s to the late 1990s countries began reform programs, often with exchange rate unifications and movement toward more market-determined exchange rates, notable reductions in central bank financing of government and financial liberalizations. The other main cause of inflation in SSA would be unpredicted rise in food costs.

Experience from Tanzania shows that, inflation was once recorded at an average of 8 per cent for consecutive 9 years, a high and risky inflation in the country (BoT, 2011). According to the Bank of Tanzania (BoT) report, this appeared to be a challenge in the macro economy. Various initiatives have been in place such as the macroeconomic reforms applied in the mid-1990s. These included such initiatives like booming up of the strong domestic output together with favorable global financial prerequisites which altogether helped keep headline inflation close to the authorities' indicative target of 5 percentages per annum. Data from the BoT reports shows that, in mid-2008, the country recorded a year-on-year headline inflation edged above 10 percent per annum for the first time given that of the early 1990s, and whilst it dropped back to low single digits in 2009, it rose again sharply in the direction of the give up of 2010, reaching close to 20 percentages per annum in the closing quarter of 2011(BoT, 2011).

According to BOT (Monetary Policy statement 2020-2021), headline inflation has shown a declining trend. The twelve-month headline inflation averaged 3.6 percent during July 2019 to April 2020, compared with 3.2 percent in the corresponding period of 2018/19. There could be several reasons or explanations for this trend but mostly might be on account of adequate domestic food supply, prudent monetary and fiscal policies, stability of power supply, and significant decline in oil prices in the world market. Likewise, core inflation was low, averaging at 2.4 percent compared with 2.7 percent for the same periods. Further, inflation is projected to remain around the medium term target of 5.0 percent, in the range of 3.0 percent to 5.0 percent in 2020/21, supported by adequate domestic food supply, low world oil prices, subdued demand, stable power supply and again, prudent monetary and fiscal policies. On the other hand, there are real factors such as food production, which also

influences inflation (BoT, 2020)
The purpose of this study is to examine the trend of inflation and its key determinants in Tanzania using VAR. The model incorporated both the demand and cost-push or structural elements of price movements. It is based on annually data which simultaneously explores the importance of time lags of key variables that includes money supply, exchange rate and GDP.

2. Methodology

The study used the strengths of documentary review and secondary data, which were compiled annually for the period of 51 years from 1970 to 2020 by the Bank of Tanzania and the Ministry of Finance and Planning. Such data include Inflation rates, Money supply, Exchange rate and Gross Domestic Products. According to McCleary et al (1980), time series analysis suffices to use not less than twenty (20) observations. However, to obtain robust results, it is recommended to fit time series models with at least 50 observations. More data is always preferable, but at the very least, a time series should be long enough to capture the phenomena of interest. Henceforth, the study uses a sample of 51 years for the data taken on yearly basis from 1970 to 2020. This is healthy number of observations in any data to take the result on VAR model. We used STATA 14 to analyze the time series data.

2.1 Technical considerations and model specification

2.1.1. Testing for Stationarity (Unit Root Test)

In testing for stationarity of a time series, one must ensure that statistical properties such as average, standard deviation and autocorrelation do not change over time, that is they are constant. Non- stationary data have got the disadvantage of producing spurious results or non-sense results (Gujarati, 2004). Augmented Dickey Fuller Test (ADF) was used to test the unit root problem. The ADF was preferred because it includes extra lagged terms of the dependent variables in order to eliminate autocorrelation in the test equation when the error term is unlikely to be white noise. The ADF used to estimate the following equation;

$$\Delta Y_t = \beta + \delta Y_{t-1} + \sum_{t=1}^{m} \alpha_i \Delta Y_{t-1} + \varepsilon_i \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

The null hypothesis for the test is that a variable is not stationary (has a unit root) against the alternative hypothesis that it is stationary (has no unit root). If the data is not stationary, we will transform them to stationary time series by differencing. The difference time series is the change between each observation in the original series over time.

$$Y_t = Y_t - Y_{t-1} \qquad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

2.1.2. Granger Causality Test

The assessment of causal- effect relationship among variables is important in time series analysis and in this context, Granger causality test is used to test whether one time series is useful in forecasting another (Farook and Kannan, 2015). If a variable Y can be predicted by another variable, say X then the Granger test may reveal the causal- effect relationship between Y and X. The test statistic to test the null hypothesis that X does not granger-cause Y and the alternative hypothesis that X does Granger cause Y is given by:,

$$F = \frac{(RSS_R - RSS_{UR})/m}{RSS_R/(n-k)}$$

Where;

RSS_R = restricted residual sum of square

RSS_{UR} = unrestricted residual sum of square
m = number of lagged terms
k = number of parameters estimated in the unrestricted regression. The test statistics follows the F- distribution with m and (n-k) degree of freedom.

2.1.3. Conceptual framework and definition of variable

The conceptual framework involves dependent and independent variables which guides the assessment of the causal –effect relationships hypothesized to exist between the variables. The dependent variable is inflation rate(IR) and is measured in per centage and independent variables are namely money supply (M3), measured in billions TZS , exchange rate (ER), measured in US dollars and gross domestic product (GDP) in millions TZS as shown in figure 1.

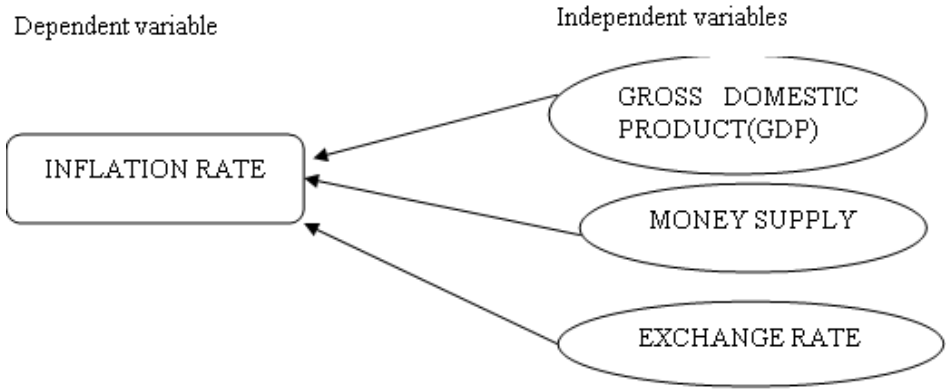

Figure 1: Conceptual framework of the variables in the model
Source: Researcher's own construct, 2021

2.1.4. Model specification

This paper has used Ordinary Least Squares by employing the Vector Autoregressive Model (VAR). This is the suitable estimation technique to be used because it has the ability to provided the existence of the short run relationship or past and causal relationship between the Inflation rate and its determinants such as Growth Domestic Products (GDP), exchange rate (ER) and the money supply (M3) in time (Mantua, 2004). Therefore, VAR commonly employs the multivariate regression time series analysis technique. The model used in this paper have the following functional form:

$$IR_t = \beta_0 + \beta_1 \ln GDP_t + \beta_2 \ln M3_t + \beta_3 lnER_t + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

Where, IR denotes an inflation rate (Dependent variable), lnGDP denotes the natural log of growth domestic products (GDP), lnM1 denotes the natural log of money supply and ER denotes the Exchange rate, β_0 is a constant term, $\beta_1 - \beta_3$ are parameters estimates, and ε_t denotes a stochastic term. It can be seen from the model that the dependent variable is not logarithmic while independent variables are logarithmic. There are three reasons to transform a variable by taking the natural logarithm. These reasons will determine whether one wants to log the explanatory variable (s), response variable or both. The idea is to improve model fit. In our case, we found independent variables (Exchange rate, GDP and Money supply) were not normally distributed and with huge values compared to the response variable (Inflation rate). Taking logarithm of a skewed variable may improve the fit by altering the scale and making the variable more normally distributed.

3. Results and discussion

3.1. Descriptive statistics results

Table 1 gives a summary of descriptive statistics of the explanatory variables and the response variable.

Table 1: Summarized descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
INF_RATE	51	15.60784	11.09994	2.4	36.1
LnER	51	5.215904	2.278747	1.931521	7.746344
LnGDP	51	14.27969	3.182715	9.12402	18.69232
lnM3	51	6.027422	3.079219	.7929925	10.26702

Source: Fieldwork data, 2021

It is revealed from Table 1 that, the minimum value of inflation rate is 2.4 percent and a maximum value is 36.1 percent. The mean inflation rate value is 15.61 while the standard deviation obtained is 11.1. The GDP ranged from 9.12 (to 2 decimal places) to a maximum value of 18.69 (to 2 decimal places). The GDP have got a mean value of 14.27969 and a standard deviation of 3.182715. Similarly, money supply (M3) ranged from a minimum value of 0.79 to a maximum value of 10.267 with an average of 6.0274 and a standard deviation of 3.0792. Finally, the Exchange rate ranged from a minimum of 1.93 to a maximum of 7.746 with the mean value of 15.609 and a standard deviation of 2.2787.

3.2. Trends of inflation in Tanzania

Figure 2 presents how Tanzania experienced inflation for 51 years since 1970 to 2020. It is vivid that inflation was continually rising to the mid of 1970's where it felled down and rose up again. In the period of 1980's namely (1980-1990) Tanzania witnessed very high rate of inflation to a peak of 36.1% in 1984 and 35.9% in 1990. In 1991 inflation began to fall down but it rose again up to 35.3% in 1994. In the late 1990s, inflation rate went down and according to Laryea and Sumaila (2001) this downward trend of inflation rate is a result of the impact of tight monetary and fiscal policies implemented by the central bank. The decline continued and reached up to 4.6% in 2002 and began to rise again 2008 and reached 16% in 2012 but again fall down in 2013 and reach 3.7% in 2020.

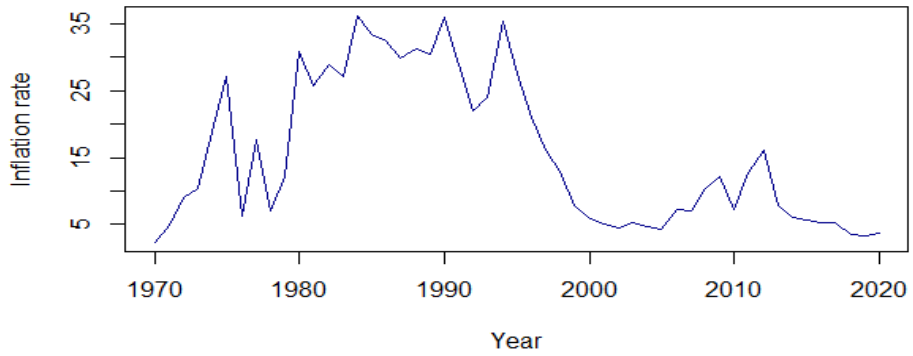

Figure 2: Trend line of Inflation Rate in Tanzania from 1970-2020
Source: Fieldwork data, 2021

Through all this time the minimum inflation rate ever recorded was 2.4% in 1970 and the maximum inflation rate ever recorded was 36.1% in 1984. The upward and downward movement of inflation trend may be due to impact of change in monetary and fiscal policy, the sharp rise of inflation in the late 1970's was due to many internal and external shocks not captured in this study.

In additional the study reveals that GDP, exchange rate and money supply have an upward trend.

3.3. Analysis of the series stationarity

Hypothesis for the unit root test;

H0: Variables are not stationary (variables have Unit root).
H1: Variables are stationary (variables have no unit root).

The null hypothesis is rejected if the calculated value of the test statistic is greater than the absolute value of the critical value. Otherwise, we do not reject the null hypothesis. Table 2 below presents the unit root test at 5% level of significance equivalent to 95% level of confidence.

Table 2: Unit Root at 95% level of confidence

Variables	At Level		First Difference	
	Test Statistics	Critical Value at 5%	Test Statistics	Critical Value at 5%
INF_RATE	-2.906	-3.500	-9.176	-3.504
LnER	-0.571	-3.500	-4.830	-3.504
LnGDP	-0.141	-3.500	-5.269	-3.504
LnM3	1.005	-3.500	-4.376	-3.504

Source: Fieldwork data, 2021

The result in Table 2 shows that the data were not-stationary at level I (0). With respect to all variables the null hypothesis is accepted that the time series data is not stationary. After first differencing, all the data series became stationary or integrated at first order which implies that, the null hypothesis at first difference were rejected in favor of the alternative hypothesis for all data series and this is because Augmented Dickey Fuller (ADF) test for the probability values in all variables is less than 5% level of significance.

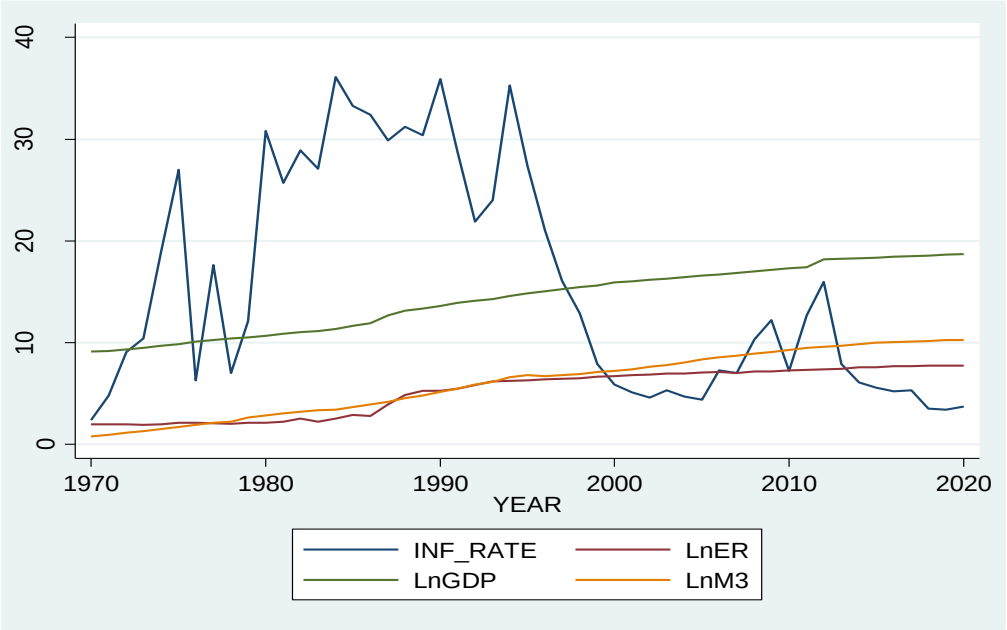

Figure 3: Line graph for non-stationary data
Source: Fieldwork data, 2021

Figures 3 and 4 shows line graphs for non- stationary data and stationary data respectively. Line graph presented in figure 4 was obtained after first differencing. In the first place, data was not stationary. Obtaining stationary data was important in order to proceed fitting of the VAR model.

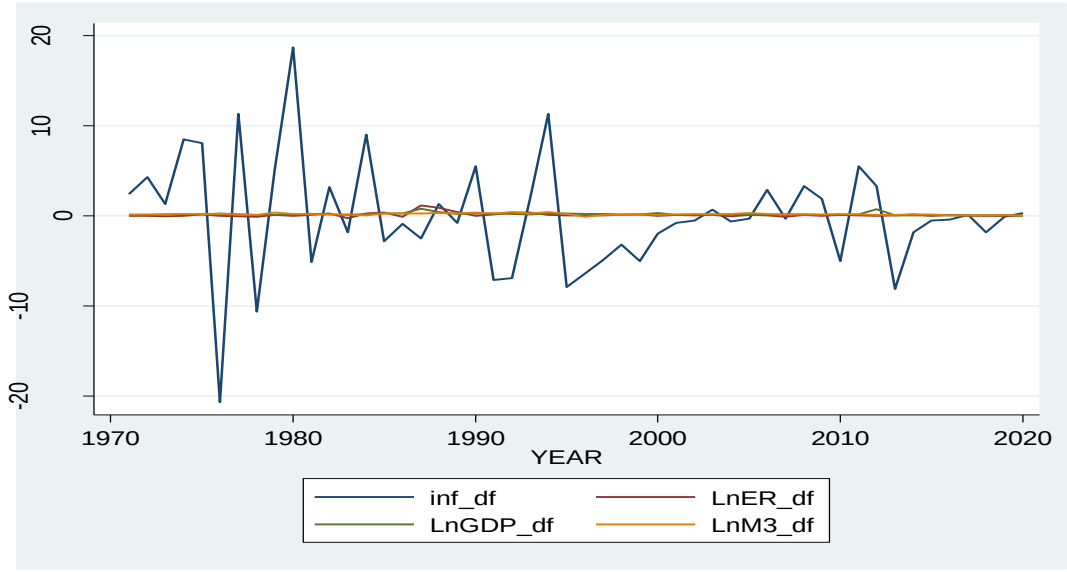

Figure 4: Line graph for stationarity data (after first differencing)
Source: Fieldwork data, 2021

3.4. Lag Length Selection

Before running the Vector autoregression, there must be established number of lags that will be used during VAR test. In this section we are going to estimate AR lag length p, which is not known (but can be estimated) by using various lag lenght selection criteria. The available selection criteria includes Akaike's information criteria (AIC), Schwarz information criteria (SIC), Hannan- Quinn criterion (HQC), Final Prediction error (FPE) and Bayesian information criteria (BIC). The autoregressive lag length of time series explains how the current value depends on its first p lagged values which is normally denoted as $AR(p)$. Table 3 shows the estimated values.

Table 3: Selection of the Optimum Number of Lags

Lag	LL	LR	Df	p	FPE	AIC	HQIC	SBIC
0	-307.032				6.57923	13.2354	13.2947	13.3929
1	-44.7963	524.47	16	0.000	.000186*	2.75729*	3.05355*	3.54458*
2	-31.5815	26.43*	16	0.048	.000213	2.87581	3.40908	4.29294
3	-22.3738	18.415	16	0.300	.000295	3.16484	3.93513	5.21181
4	-10.0341	24.679	16	0.076	.000373	3.3206	4.3279	5.99741

Selection-order criteria: Sample: 1974 - 2020 Number of obs = 47
Endogenous: INF_RATE lnER lnGDP lnM3; Exogenous: _cons
Source: Fieldwork data, 2021

Table 3, presents the lag selection process from which lag 1 was selected to be the optimum lag worthy to be used in Autoregressive integrated moving average (ARIMA) modelling. This is due to the fact that most of the lag selection criteria namely the Schwarz' Bayesian Information Criterion (SBIC), Akaike's Information Criterion (AIC), and the Hannan -Quinn information criterion (HQC) suggest lag 1, therefore here we used Akaike's Information Criterion (AIC) to select the optima lag and hence the lag that will be used is lag 1.

3.5. Vector Auto Regressive (VAR)

Vector Auto regressive (VAR) is a forecasting algorithm that can be used when two or more-time series influence each other. That is, the relationship between the time series involved is bi-directional*.* The smaller the p -value, the stronger the evidence that one should reject the null hypothesis which shows statistically significant of the test. The test was carried out at 5% level of significance and the results revealed that the second lag of exchange rate (ER) is significant (p – value = 0.032 < 0.05) and has a positive impact on inflation rate. This means that the second lag of exchange rate and inflation rate are not independent and the positive coeffcient implies that as lag of exchange rate increases, inflation rate also increases and vice versa. On the other hand, the first lag of gross domestic product (GDP) is significant (p - value= 0.044 < 0.05) and has a negative impact on inflation rate. This also means that, the first lag of GDP and inflation rate are not independent though are having a reverse relationship that when one increases, the other one decreases. The first lag of money supply (M3) is significant (p- value = 0.002 < 0.05) and has a positive impact on Inflation but the second lag of money supply remain inconclusive since the p -value and the level of significant are the same. The results are shown in Table 4.

Table 4: Vector auto regressive results

	COEFFICIENT	P > Z
INF_RATE		
INF_RATE		
L1	0.3460851	0.009
L2	0.2850314	0.014
LnER		
L1	7.661391	0.078
L2	-8.509943	0.032
LnGDP		
L1	-13.39559	0.044
L2	3.718363	0.579
LnM3		
L1	26.10975	0.002
L2	-16.34669	0.050
LnER		
INF_RATE		
L1	0.0016798	0.735
L2	0.0070534	0.108
LnGDP		
INF_RATE		
L1	0.0040526	0.226
L2	0.00046	0.876
LnM3		
INF_RATE		
L1	-0.0000371	0,987
L2	0.0010302	0.599

Source: Fieldwork data, 2021

Similar findings were also revealed by Khalid (2005) who examined determinants of inflation in Pakistan used a bivariate VAR and concluded that imported inflation, deficit-GDP ratio, exchange rate depreciation, were the important determinants of inflation. Numerous studies such as Nguyen, Cavoli and Wilson (2012) who analyzed the determinants of inflation in Vietnam using VAR model produced similar results as they revealed that money supply, external factors and output all play a role in the Vietnamese inflation process. Similarly, Khalid (2005) also concluded that imported inflation, deficit-GDP ratio, money depth, exchange rate depreciation, openness and domestic credit were the important determinants of inflation. Further, Abidemi and Maliq (2010) concluded that growth rate of GDP and Money supply give positive impression on inflation rate. While other explanatory variables such as fiscal deficit and exchange rate are indirectly associated to inflation.

A number of studies could not establish similar results on the determinants of inflation. A study by Alexander, Andow and Danpome (2015) could not establish gross domestic product as the cause of inflation until when it was analyzed together with import of goods and services, agricultural products and external factors. Similar results were also obtained in Nguyen, Cavoli and Wilson (2012).

3.5. Diagnostic Test

The validity of the model used in this study was subjected to various diagnostics tests so as to justify whether the model was suitable for the study or not. The diagnostic test starts with the test for normality as presented in section 3.5.1

3.5.1. Test for Normality

It is customery to test for normality about residuals in order to validate the model that is used in the study. We used the Jarque - Bera test to check for normality and the results revealed that residuals are normally distributed (chi (2) value = 0.498 which is greater than 0.05). Therefore, residuals are normally distributed. as shown in Table 5.

Table 5: Jarque-Bera test for normality

Jarque-Bera normality test:	1.394	Chi(2) .498

Jarque-Bera test for Ho: normality
Source: Fieldwork data, 2021

3.5.2. Autocorrelation Test

Breuch-Godfrey Correction ML test was carried out to determine the existence of serial correction among residuals. The null hypothesis is that, there is no serial correlation within residuals against the alternative hypothesis that there is serial correlation within the residuals. However, the result showed that the observed p -value was found to be almost as equal as the level of significance with its value 0.0510. Therefore, the null hypothesis can neither be rejected nor accepted since the results remains inconclusive. The test will show better results if the sample size would have been increased.

Table 6: Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	Df	Prob > chi2
1	3.808	1	0.0510

H0: no serial correlation
Source: Fieldwork data, 2021

3.5.3. Heteroscedasticity Test

Breuch-Pagan test was carried out to test the residuals. The null hypothesis stated that the error variances are all equal (homoscedasticity), against the alternative hypothesis that the error variances are a multiplicative function of one or more variables (heteroscedasticity). The results revealed that the null hypothesis cannot be rejected since the observed p-value is 0.1832 which greater that the level of significance (5%) and therefore the residuals were homoscedasticity. The results are shown in Table 7.

Table 7: Breusch-Pagan test for heteroscedasticity

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity Ho: Constant variance Variables: myResiduals	
chi2(1)	1.77
Prob > chi2	0.1832

Source: Fieldwork data, 2021

3.5.4. Stability test

In order to test for the stability of the model at a given level of significance, Cumulative Sum (CUSUM) and Cumulative Sum Square (CUSUM of squares) are used and are called stability test. The null hypothesis tested in stability test is that, the model is stable against the alternative that the model is not stable.

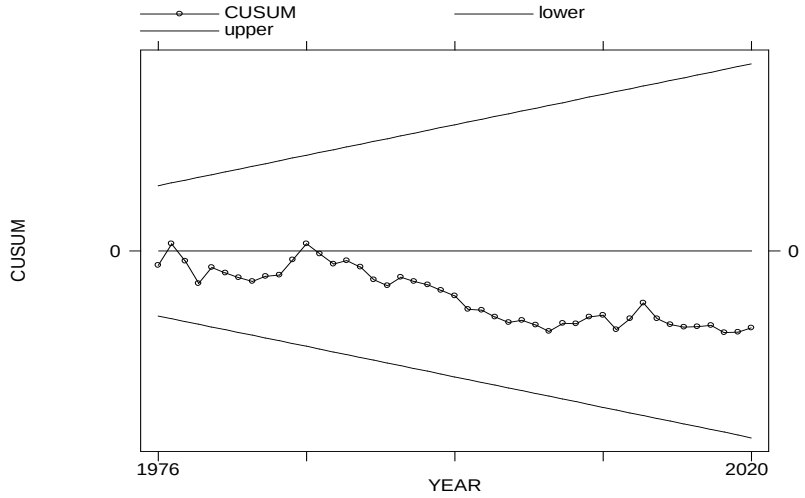

Figure 5: CUSUM results
Source: Fieldwork data, 2021

Results of Cumulative Sum (CUSUM) and Cumulative Sum Squares (CUSUM of squares) as evidenced in Figure 5 and Figure 6 show that the model was stable since the graphs of recursive residuals are within the boundary of the critical region. This is also in accordance with Xiao & Phillips (2002), that a model is stable if the plot reveals that the CUSUM and CUSUM of squares of recursive residuals lie within the band of the critical values. Figure 6 represents a plot for CUSUM of squares and similar information is revealed.

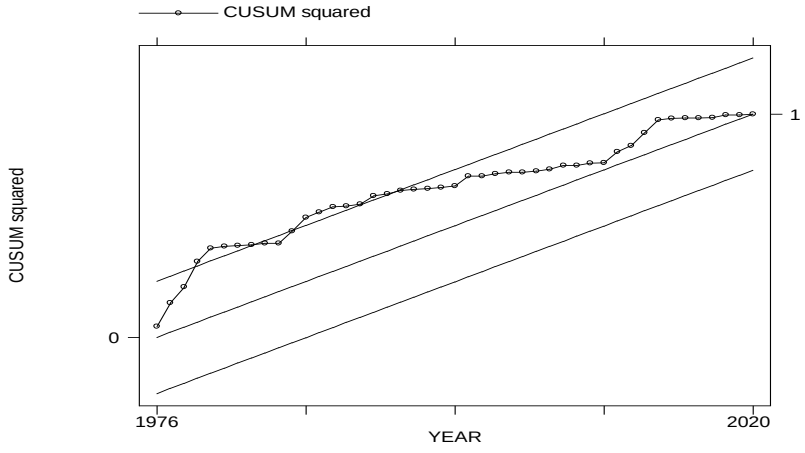

Figure 6: CUSUM square results
Source: Fieldwork data, 2021

3.6. Granger causality Test

In order to improve the forecast, granger causality test was performed and revealed that the money supply and GDP Granger cause inflation rate while exchange does not Granger cause inflation rate rather than inflation rate is the one that Granger cause exchange rate.
In essence, the Granger causality test is used to examine causal-effect relationships between inflation rate and the selected explanatory variables, money supply, exchange rate and gross domestic product. The results of Granger causality Wald test shows that the

observed p -value is greater that the level of significance (0.05) that is 0.089. This do not reject the null and therefore Exchange rate does not granger cause Inflation rate but in the other hand inflation rate is the one that granger cause exchange rate. On the other hand, since the observed p -value is less than 0.05 that is 0.03, on the relationship between exchange rate and inflation rate, the null is rejected and we conclude that exchange rate granger cause inflation rate.

Table 8: Granger Causality Wald Test Results

Granger causality Wald tests				
Equation	**Excluded**	**chi2**	**df**	**Prob > chi2**
INF_RATE	LnER	4.8366	2	0.089
INF_RATE	LnGDP	6.1051	2	0.047
INF_RATE	LnM3	12.734	2	0.002
INF_RATE	ALL	27.611	6	0.000
LnER	INF_RATE	7.0084	2	0.030
LnGDP	INF_RATE	3.5437	2	0.170
LnM3	INF_RATE	.53338	2	0.766

Source: Fieldwork data, 2021

The second test reveal that the observed p -value is less than 0.05 that is Prob > chi2 = 0.047, therefore the null hypothesis can be rejected, hence gross domestic product does granger cause inflation rate. The third test shows that the p-value is less than 0.05 that is Prob > chi2 = 0.002, and hence the null hypothesis can be rejected, and we conclude that Money supply does granger cause Inflation rate. And the fourth test of all variables, the p-value is less that the level of significance that is 0.000, and therefore the null hypothesis can be rejected and hence all variables does granger cause inflation rate.

3.7. Forecasting

One of the fundamental applications of time series analysis or developing a time series model is forecasting. The previous discussion confirms that vector auto regressive model of order two is a good model to describe the series. In this section, we examine the forecast for 15 years from 2021 to 2035. Table 9 and Figure 7, presents the forecasted values for inflation rate.

Table 9: Forecasted value of inflation rate from 2020 to 2035

YEAR	INF_RATE	YEAR	INF_RATE
2020	3.7000	2028	3.6587
2021	1.3627	2029	3.6241
2022	1.8573	2030	3.5310
2023	2.3108	2031	3.3890
2024	2.8400	2032	3.2051
2025	3.2355	2033	2.9856
2026	3.4884	2034	2.7363
2027	3.6207	2035	2.4632

Source: Fieldwork data, 2021

The result indicates that there is moderate increase of inflation rate also there is both upward

and downward trends. There is an upward increase of inflation rate from 2021 up to 2028 reaching 3.7% and then started to experience a downward decrease from 2029 reaching 2.5 approximately in 2035 as also shown in Figure 7 below.

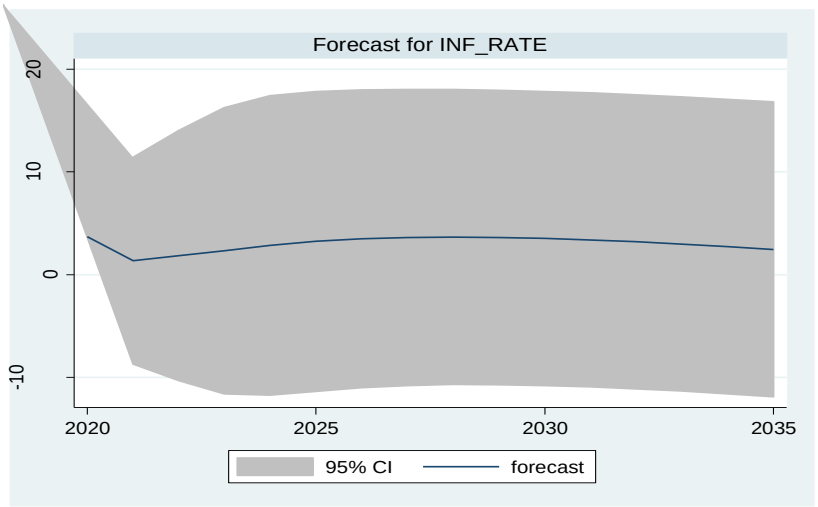

Figure 7: Graph for forecasted value of Inflation rate for 15 years ahead
Source: Fieldwork data, 2021

4. Conclusion

The objective of the study was to examine the trend of inflation and its key determinants in Tanzania using Vector Autoregressive methodology. Analysis of the data revealed that, there were upward and downward trend of inflation rate while the gross domestic product, money supply and exchange rate trend exhibited upward and downward movement. Also the study revealed that, based on the Vector Autoregressive model results GDP, Money supply and exchange rate are the key factors that explain inflation in Tanzania and money supply and exchange rate have a positive impact on inflation rate while GDP has a negative impact on inflation rate. It is imperative to conclude that Tanzanian inflation is more of monetary factors than real factors. The key policy implication is that inflation in Tanzania is a monetary phenomenon. Thus, to control inflation the government will have to pursue a contractionary monetary and fiscal policies.

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Bio- note

Cheti Rachel is a student in the Department of Mathematics and Statistics Studies. Recently, she was attached to National Bureau of Statistics in Tanzania for field work and she developed an interest on time series analysis of economic variables which is also an outcome of this paper we have jointly authored as her supervisor and mentor.

Ilembo Bahati is a lecturer in the Department of Mathematics and Statistics studies and teaches mainly statistics and quantitative techniques. He holds both a Bachelor and Master degrees in Statistics and a PhD in the areas of agricultural economics. His areas of research have been mainly statistical applications to agriculture, development economics and social science in its broad sense. He has published in the areas of agricultural economics in both journal articles and book chapters.

SUPPLY CHAIN MANAGEMENT, COMPETITIVE ADVANTAGE AND ORGANIZATIONAL PERFORMANCE IN THE NIGERIAN MANUFACTURING SECTOR

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Abstract: *In this study, we examined the impact of supply chain management practices (SCMP): strategic supplier partnership, customer relationship, level of information shared, and information quality on competitive advantage and organizational performance in the Nigerian manufacturing sector. In so doing, this study was set out to find out if these practices generate conditions that promote higher or lesser competitive advantage and organizational performance. The survey research design was adopted because the characteristics of the respondents were fully captured in other to make important decisions. A total number of 122 were found usable out of 146 copies of questionnaire circulated. The structural equation modelling (SEM) was the estimation technique employed to measure the relationships among the various variables/constructs using AMOS 22.0. It was found out that the four predictors (strategic supplier partnership, customer relationship, level of information shared, information quality) of SCMP had significant impact on organizational performance. The study also revealed that of the four independent variables, three (strategic supplier partnership, customer relationship, and level of information shared) had significant impact on competitive advantage, while information quality had no significant impact on competitive advantage. In response to our research questions, we concluded that the four constructs or predictors generate conditions that promote higher competitive advantage and organizational performance in the Nigerian manufacturing sector. The study recommended that manufacturing organizations should share quality, timely and accurate information to ensure their product offerings can be altered to meet customers while offering competitive prices. The study further recommended that organizations should assist its suppliers to improve product quality; regularly relate with clients to set dependability, receptiveness, and other standards; notify trading partners early when changing needs arises; and have fast product development.*

Keywords: Competitive Advantage, Organizational Performance, Supply Chain Management.

JEL classification: M11, M19.

1. Introduction

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Today, supply chain management (SCM) is like a household name to many organizations. It has gained so much popularity and usage by firms. The question arises: why now is supply chain management a trending issue? Simple, the environment of business has changed rapidly and this includes globalization, technological innovation, severe competition, heightened customers' expectation, geopolitical factors, and so on (Mentzer, et al., 2001). Supply chain involves series of partners such as the organizations, the suppliers and the customers (Li, Ragu-Nathan, Ragu-Nathan, and Rao, 2006). The suppliers seek to provide the best quality products and or services and to adhere strictly to contractual agreements. Customers basically seek quality and affordable products and/or services, in order to get full satisfaction. Adebayo (2012) identified firms in Nigeria that fall into these categories to include assemblers, sub-contractors or small part makers as part of a supply chain (Omoregbe and Adjaino, 2019). Managers must understand that their businesses are only part of the supply chains and that it is only with effective supply chains that they can gain competitive advantage. On that note, Omoregbe and Adjaino (2019) described supply chains as a means by which organizations with common interest come together with the purpose of adding value to end products. SCMP provide an organization a platform to out-perform its competitors, be sensitive to both suppliers (upstream sector) and customers (downstream sector), build core competence, share quality information and enhance its performance.

In Nigeria like everywhere else, corporate environment is changing rapidly and organizations strive to seek ways to maximize the benefits associated with SCM in order to survive and where possible surpass competitors and the manufacturing sector is not limited. Manufacturing firms are in desperate need to boost their general performance especially its profits. In doing so, they acknowledge that poor partnership/relationship with its suppliers/customers and poor information among others can hinder the possibility of improving performance. In this light, this paper examines the level of effects of strategic supplier partnership, customer relationship, level of information shared, and information quality on competitive advantage and organizational performance in the Nigeria manufacturing sector.

2. Literature Review

2.1. Supply Chain Management (SCM)

SCM according to Mentzer et. al. (2001) is the synchronization of the customary business activities within an organization and its supply chain partners for advancing the strategic performance of the full supply chain. Karimi and Rafiee (2014) viewed SCM as integrating the internal business functions of an organization and extending same to the external operations of its supply chain partners. This he believed will improve the competitive stance of the organization. Annan, Otchere and Amoako (2013) advocated that SCM should be part of an organization philosophy that takes a systemic view of the organization rather than being concerned with its business units separately. Wijetunge (2016) stated that implementation of the SCM is made possible by the network structure of the supply chain, the processes and the management team.

2.2. Supply Chain Management Practices (SCMP)

Several SCMP have been postulated by different authors with all having the same underlying aim of effectively coordinating the supply chain performance to achieve its desired goal. Li, et. al (2006) recognized strategic alliance with suppliers, effective relationship with customers, information viability (in terms of the level and quality) and postponement as practices of SCM; Annan, et al (2013) identified product superiority, shared problem-solving with partners, total quality, customer interface, periodic appraisal of performance as practices of SCM. Prabusankar and Prabusankar (2017) mentioned supplier, customer and

internal integration, information exchange, and postponement as practices of SCM; Mutuerandu (2014) saw practices of SCM the same way as Li, et. al. (2006), Sah, Habidin, Latip, and Salleh, (2014) and Wijetunge (2016) viewed SCM practices as customer and leadership centered, internal lean practice and information quality. In this study, we adopted the four common SCM practices: strategic supplier partnership, customer relationship, level of information shared, and information quality as our second order constructs of our independent variable. In Nigeria, these SCM practices are salient and can be easily identified in organizations.

Strategic Supplier Partnership (SSP)

This describes the strategic partnership between a firm and its partners in the supply chain. It allows for the success of both the firm and the suppliers of products/services. It is premeditated to influence the competencies of all organizations (Li, et. al 2006). A strategic partnership is characterized with mutual planning/goal setting activities, long-standing relationships, product quality, joint-solving problem ability, and new product development processes. The essence of the partnership is to encourage and promote shared benefits including technological, products and markets benefits.

Ho_1: There is no significant association between SSP, competitive advantage and organizational performance.

Customer Relationships (CR)

The essence of customer relationship is to continuously improve the satisfaction level of customers. It involves managing their complaints, improving and preserving long term strategic relationship. Li, et. al. (2006) argued that maintained relationships distinguishes a company product from other competitors and commands brand loyalty thereby positioning the organization in a more advantage point, financially and non-financially.

Ho_2: Firms with high levels of customer relationship do not have same of competitive advantage and organizational performance

Level of Information Sharing

Extent of information sharing in this context in is about the quantity of information to be shared among supply chain partners. Information could range from corporate proprietary data to logistics, customer, product and market data to enable supply chain partners perform effectively. Childerhouse and Towill (2003) considered exchange of information as a crucial part of any supply chain relationship. Information sharing must be promptly done giving consideration to time to enable the supply chain partners to satisfy customer needs.

Ho_3: Firms with high levels of information sharing do not have same of competitive advantage and organizational performance.

Quality of Information Exchange

Feldmann and Muller (2003) posited that information shared by partners in the supply chain must be void of any form of opportunistic behaviour and divergent interest. Information distorted can adversely affect the performance of the supply chain process. According to Li, et. al (2006) tampered information will adversely affect suppliers, customers as well as competitors. Most organizations are unwilling to give complete information because it is believed that full information disclosure invariably means perceived/apparent loss of authority; as such they resort to distorting of information. For supply chain management to be effective, information shared must be adequate, reliable, timely, accurate and complete.

Ho_4: Information quality is independent of competitive advantage and organizational performance.

3. Empirical Review

The study of Li, et. al (2006) in Toledo, United States of America developed five concepts as sub-constructs of SCM practices in their study on supply chain management, competitive

advantage and organizational performance. 196 firms constituted the sample size for the study. Data were analyzed using structural equation model via AMOS 22.0 software. Structural equation modelling allows for hypothesized relationship involving more than one dependent variable to be analyzed. They however found out that only postponement had a low influence on organizational performance, while competitive advantage positively affects organizational performance.

Adebayo (2012) conducted a study that investigated the extent to which Nigerian manufacturing companies SCM practices impact organizational performance. Sample was collected from 31 companies and analyzed using correlation and regression analysis. Result showed that SCMP have a direct and positive effect on organizational performance.

Adebambo, Mcisn, and Tosin (2012) in their study examined SCM practices in Nigeria on firm's competitive advantage. Data were retrieved from 115 manufacturing companies and analyzed using multiple regression technique. The outcome indicated a positive association between SCM practices and competitive advantage. Recommendation was focused on the need for improvement on SCM practices that directly impact competitive advantage.

Babatunde, Gbadeyan, and Bamiduro (2016) examined the level of impact SCM practices have on market performance of merchants of petroleum products in Nigeria. Using the stratified and convenience sampling, 126 respondents were selected to form the sample size. Data were analyzed using Pearson correlation matrix and multiple regression technique. The outcome revealed that SCMP impact on market performance of the organization. They recommended a healthy relationship must exist with customers and suppliers to improve organizational performance.

Prabusankar and Prabusankar (2017) studied the impact of SCMP on competitive advantage of manufacturing firms in India. Using a sample size of 300, data were analyzed using via SPSS. Result showed that all sub-construct of SCM practices impacts positively on competitive advantage. He recommended that suppliers be involved in the goal and planning process and that information be shared adequately and timely.

Gbadeyan, Boachie-Mensah and Osemene (2017) embarked on a study to determine the effect of SCMP in designated private hospitals in Ilorin, Nigeria. They adopted a qualitative and descriptive research design, where 10 out of 58 private hospitals constituted the sample size. Using PLS method the result showed there exist no strong and positive impact on the dependent variable, organizational performance. They concluded that proper implementation of SCM will not only boost competitive advantage but will result in greater satisfaction of patients. They recommended hospitals to diversify its sources of equipment and materials for better procurement of needed supplies.

Omoregbe and Adjaino (2019) examined the impact SCMP have on organizational competitive advantage in table water industry in Edo State. A survey research was adopted were 248 respondents from 50 table water firms constituted the sample size. Analysis of the data was done using correlation matrix and OLS via SPSS 22.0. The study revealed that SCMP is operational in the table water firms and that there exists a positive relationship with the competitive of the selected firms. They recommended managers to be more committed to its relationship with its stakeholders or partners.

4. Theoretical Framework

The Resource Based View (RBV) best aligns with this study. This theory assumes that resources are means to achieving competitive advantage and superior organizational performance. Proponents of RBV are of the school of thought that rather than acquiring novel resource in exploiting external opportunities, exhausting internal resources will be beneficial.

5. Methodology

The research design used was the survey research design. It was chosen because we employed the use of a structured questionnaire to elicit information from respondents. The population consists of all the manufacturing firms in Edo/Delta State of Nigeria listed in the bulletin of the Manufacturers Association of Nigeria, (MAN), Edo/Delta. According to the 2019 Annual Reports of the Manufacturers Association of Nigeria, Edo/Delta Branch, the total number of Edo/Delta membership data of manufacturing organizations is 73. Due to the smallness of the population, the sample size of 146 was used. This was arrived at because we distributed a minimum of two copies questionnaire to each organization.

The analysis was made possible using the following software packages: Microsoft Excel 2010 – for data coding and screening; SPSS (SPSS 23.0) – for descriptive and correlation analysis; and AMOS 22.0 for multivariate analysis techniques. The structural equation modelling (SEM) was used to analyze the relationship between measured variables and latent constructs. The justification for this is that it is useful in estimating models that have more than one dependent variable simultaneously. The measurement model denotes the confirmatory factor analysis (CFA), in that, it postulates the pattern by which each measure loads on a specific factor. It basically authenticates the model rather than explaining relationships between constructs.

This study provides us with three models: first, the model that explained the functional relationship between SCM practices and organizational performance; the second model explained the functional relationship between SCM practices and competitive advantage, while the third model explained the functional relationship between competitive advantage and organizational performance. The three models were regressed and stated functionally as:

Supply Chain Management Practices and Organizational Performance

$$OP = f(SSP, CR, IQ, IE) \quad (1)$$

Econometrically, the model can be specified as:

$$OP_i = \alpha_0 + \alpha_1 SSP_i + \alpha_2 CR_i + \alpha_3 IQ_i + \alpha_4 IE_i + \varepsilon_i \quad (2)$$

Supply Chain Management Practices and Competitive Advantage

$$CA = f(SSP, CR, IQ, IE) \quad (3)$$

Econometrically, the model can be specified as:

$$CA_i = \beta_0 + \beta_1 SSP_i + \beta_2 CR_i + \beta_3 IQ_i + \beta_4 IE_i + \varepsilon_i \quad (4)$$

Competitive Advantage and Organizational Performance

$$OP = f(CA) \quad (5)$$

Econometrically, the model can be specified as:

$$OP_i = \lambda_0 + \lambda_1 CA_i + \varepsilon_i \quad (6)$$

Where:

OP = Organizational Performance; CA = Competitive Advantage; SSP = Strategic Supplier Partnership; CR = Customer Relationship; IQ = Quality of Information; IE = Level of Information Exchange; ε = Error term; α_0 = Parametric constant; β_0= Parametric constant; λ_0= Parametric constant; α_1, α_2, α_3, α_4 = Parametric coefficients of elasticity of supply chain management practices displaying degrees of explanation power about organizational performance; β_1, β_2, β_3, β_4 = Parametric coefficients of elasticity of supply chain management practices displaying degrees of explanation power about competitive advantage; λ_1 =

Parametric coefficients of elasticity of competitive advantage displaying degrees of explanation power about organizational performance.

A priori sign/ expectation: $\alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0, \alpha_4 > 0$…… (7)
$\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0$…… (8)
$\lambda_1 > 0$ …… (9)

6. Empirical Analysis and Result

Validity and Reliability of Instrument

The validity and reliability of our variables is as given below:
The reliabilities of SCM practices, CA, and OP were evaluated with Cronbach's Alpha. According to Nunnally (1978), construct values above the threshold of 0.70 is acceptable.

Table 1: Means, standard deviations, correlations and reliability of (a) SCM practices, (b) competitive advantage, and (c) organizational performance.

Variables	Mean	SD	1	2	3	4	5	Reliability
(a) SCM practices								
1. Strategic supplier partnership	4.29	0.454	-					0.780
2. Customer relationship	4.02	0.445	0.219*	-				0.737
3. Level of information exchange	4.26	0.511	0.092	0.211*	-			0.750
4. Quality of information exchange	4.35	0.002	0.123	.235**	.282**	-		0.799
(b) Competitive Advantage								
1. Price/Costs	4.37	0.645	-					0.722
2. Quality	4.79	0.411	.261**	-				0.725
3. Dependable delivery	4.37	0.484	0.063	.194*	-			0.751
4. Product Innovation	4.15	0.712	.186*	0.057	.193*	-		0.731
5. Time to market	4.32	0.671	.260**	.249**	0.163	.271**	-	0.713
(c) Organizational Performance								
1. Market performance	4.20	0.559	-					0.704
2.Financial performance	4.12	0.569	.258**	-				0.747

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Source: Researchers' computation (2021)

Confirmatory Factor Analysis

The four constructs of the independent variables were represented using 22 items with their respective loadings all above 0.70. Also, the five constructs of competitive advantage were represented by 16 items showed that their loadings are above 0.70, and lastly the seven constructs of organizational performance revealed that just one was below the borderline of 0.70, by implication, the factors below sufficiently demonstrate sufficient convergent validity.

Table 2: Pattern Matrix

Item	**F1-SSP**	**F2-CR**	**F3-IE**	**F4-IQ**	
(a)SCM Practices					
SCMP/SSP1	0.785				
SCMP/SSP2	0.762				
SCMP/SSP3	0.651				
SCMP/SSP4	0.728				
SCMP/SSP5	0.818				
SCMP/SSP6	0.677				
SCMP/CR1		0.680			
SCMP/CR2		0.728			
SCMP/CR3		0.779			
SCMP/CR4		0.730			
SCMP/CR5		0.813			
SCMP/IE1			0.833		
SCMP/IE2			0.804		
SCMP/IE3			0.747		
SCMP/IE4			0.702		
SCMP/IE5			0.779		
SCMP/IE6			0.747		
SCMP/IQ1				0.625	
SCMP/IQ2				0.782	
SCMP/IQ3				0.758	
SCMP/IQ4				0.717	
SCMP/IQ5				0.736	
Item					
(b) Competitive Advantage	**F1-PC**	**F2-QL**	**F3-DD**	**F4-PI**	**F5-TM**
CA/PC1	0.829				
CA/PC2	0.663				
CA/QL1		0.799			
CA/QL2		0.790			
CA/QL3		0.697			
CA/QL4		0.800			
CA/DD1			0.755		
CA/DD2			0.694		
CA/DD3			0.744		

Item	**F1-SSP**	**F2-CR**	**F3-IE**	**F4-IQ**	
CA/PI1				0.751	
CA/PI2				0.728	
CA/PI3				0.729	
CA/TM1					0.685
CA/TM2					0.800
CA/TM3					0.727
CA/TM4					0.732
Item					
(c) Organizational Performance	**F1-MP**	**F2-FP**			
OP1	0.795				
OP3	0.734				
OP4	0.760				
OP7	0.742				
OP2		0.770			
OP5		0.692			
OP6		0.766			

Source: Researchers' computation (2021)

6.1. Results for the Structural Model

The hypothesized relationships were represented using path diagram to describe the relationship among the constructs (observed and latent variables) using AMOS 22.0. From our analysis, we recorded significant loadings in the sub-construct. Below is the path diagram (Figure 1):

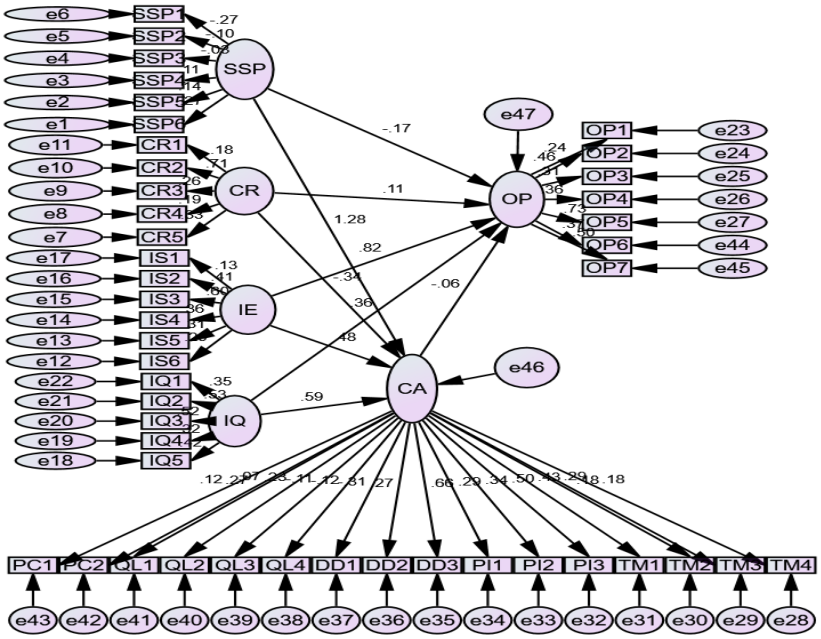

Figure 1: Path diagram

Table 3: Estimates of Regression Weights

			Estimate	S.E.	C.R.	P
CA	<---	IQ	.500	.237	2.113	.035
CA	<---	IE	.659	.123	5.379	***
CA	<---	CR	.598	.164	3.649	***
CA	<---	SSP	.677	.312	2.169	.030
OP	<---	SSP	.741	.104	7.159	***
OP	<---	CR	.859	.150	5.728	***
OP	<---	IE	.885	.100	8.872	***
OP	<---	IQ	.959	.511	1.875	.061
OP	<---	CA	1.475	.678	2.177	.030

Source: Researchers' computation (2021)

Table 3 above shows that the variables are significant with different levels of impact. However, the impact of the quality of information on organizational performance cannot be said to be significant, because it has a value less than 1.96. Also, the report describes a positive relationship among the variables. There is a direct impact of SCM practices (SSP, CR, and IE) on CA and OP. The report also showed that the three significant variables on SCM practices have a relatively higher impact on organizational performance than on

competitive advantage, while IE and CR have more impact than SSP on competitive advantage.

6.2. Test of Hypotheses

The outcomes of the proposed SEM analysis are presented in Table 4 demonstrating support for the hypotheses. It displays the result of the causative association between the constructs. The outcome as shown in Table 4 signifies the position of this study. The t-values are all above the threshold of 1.96 indicating support for the hypotheses.

Table 4: Result for proposed structural equation model

Hypotheses	Relationship	t-statistics	p-value	Result
H_1	SSP-OP	2.113	.035	Supported
	SSP-CA	7.159	***	Supported
H_2	CR-OP	5.379	***	Supported
	CR-CA	5.728	***	Supported
H_3	IE-OP	3.649	***	Supported
	IE-CA	8.872	***	Supported
H_4	IQ-OP	2.169	.030	Supported
	IQ-CA	1.875	.061	Unsupported
	CA-OP	2.177	.030	Supported

Source: Researchers' computation (2021)

The statistical significance of hypothesis 1 confirms that strategic supplier partnership significantly impacts competitive advantage *(7.159)* and organizational performance *(2.113).* Hypothesis 2 revealed that customer relationship impacts positively on competitive advantage *(5.728)* and organizational performance *(5.379*). Hypothesis 3 showed that information exchange impacts competitive advantage *(8.872)* and organizational performance *(3.649)* and finally, hypothesis 4 showed that information quality impacts significantly on organizational performance while there is no impact on competitive advantage. The third model indicates that there exists a significant relationship between competitive advantage and organizational performance.

7. Conclusion

Supply chain management practices can be said to be vital for organizational performance. Considering the dynamic and complex environment of business, locally and globally and the deadly impact of coronavirus, supply chain management practices can aid effective performance and growth of organizations. This study found out that firms with higher levels of strategic supplier partnership, customer relationship, and level of information have higher levels of competitive advantage and organizational performance, while firms with higher levels of information quality have higher levels of organizational performance but do not have higher levels of competitive advantage. This study therefore recommended that organizations should share quality, timely and accurate information to ensure their product offerings can be altered to meet customers while offering competitive prices. The study further recommended that organizations should assist its suppliers to improve product quality; regularly relate with clients to set dependability, receptiveness, and other standards; inform partners promptly of changing needs; and have fast product development.

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AN IMPLEMENTATION PROPOSAL OF INNOVATIVE PRICING IN GREEK COASTAL SHIPPING

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Abstract. *Greek coastal shipping is an industry which passed from the state regulatory interference to market forces. Its fare structure (tariff) was based on average (or total) cost and distance was the representative cost variable. As it is an industry facing strong economies of scale, average cost is higher than marginal cost. This means that companies equalizing prices to marginal cost, following Pareto–efficient allocation of resources, are driven to losses and are forced to seek other methods of efficient pricing policy. The purpose of this article is to examine the implementation of "innovative" pricing in Greek coastal shipping. "Innovative" pricing contains applicable measures in order to increase ticket prices in "peak" periods without affecting the level of quality, the number of passengers and the market share. The analysis results show that average fare will not necessarily raise. Ticket increases may be accompanied by quantitative discounts in periods of low demand. In these cases, "season tickets" can be applied.*

Keywords: Greek coastal shipping, peak periods, economies of scale, innovative pricing, season tickets

JEL Classification: R40, M21

1. Introduction

Greek coastal shipping (GCS), especially after 1976 (Presidential Decree 684/1976), was subjected to government regulation. The state used to decide the level of fares and give an operating license per vessel and per route. It never defined the quality of the supplied service, as it was supposed to and as the rest countries of European Union and Unites States of America, did. The supply of coastal services was based on political criteria. The demand could not be regulated and it was mainly based on domestic and foreign tourism. Later, the situation changed. Greece had to comply, until 01/01/2004, with the European regulation 3577/92 on the abolition of the existing cabotage privilege of ships bearing its flag. Actually, "cabotage" was the institutional right of ships bearing the Greek flag above 1.000 gross register tonnage (GRT) to proceed to coastal shipping. This was a common situation for most European countries (of Southern Europe) that were members of European Union.
According to Greek Law 2932/2001, which was launched in November 2002, the state attempted the "deregulation" of the Greek coastal system. This fact enabled coastal companies to set the fares they wish and submit once a year a draft of the routes they want to serve (based on their business strategy). In practice, the lifting of cabotage privilege on the one hand marked the beginning of gradual removal of entry barriers, and on the other

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introduced the rules of free competition to ensure the appropriate conditions of a full and deregulated market (Goulielmos and Sitzimis, 2014). Actually, there was a long transition from a regulated regime to market forces (lasted 12 years). Only security remained in state hands. The liberalization of coastal market, which was initiated in 2002 and was completed in 2006, led to major changes in fares and pricing policies of Greek coastal companies Unexpectedly, the average fares of conventional vessels raised by 49% and of high speed vessels by 21.5% (were already high). The main reasons were on the one hand the rising fuel prices and on the other that fares (until 2006) were very low (almost 40% lower than the rest countries of European Union) (Goulielmos and Sitzimis, 2014).

The European coastal industry and air transport offer useful conclusions about the impacts of liberalization to a transportation industry (Holloway, 2006; Wilfred, 2006; Forsyth, 1997; Sitzimis, 2012; Arvanitis and Papatheodorou, 2015). We could be based on them and draw the appropriate conclusions for GCS, especially in relation to pricing policy. However, these industries are characterized by different market conditions. Their research results cannot be fully adapted to GCS (Goulielmos and Sambrakos, 2002). This market consists of several concentrated submarkets-coastal routes, which should be analyzed individually (Besanko, et al., 2010; Sitzimis, 2021). Actually, most of Greek coastal itineraries are monopolistic, duopolistic or oligopolistic (Goulielmos and Sitzimis, 2012). Typical examples are the coastal routes “Piraeus-Rethimnon”, “Piraeus-Kissamos” (monopolistic), “Piraeus-Kos”, “Piraeus-Mytilini”, Piraeus-Chania”, “Piraeus-Heraklion”, “Piraeus-Chios” (duopolistic) and “Piraeus-Mykonos”, “Piraeus-Amorgos”, “Piraeus-Santorini” (oligopolistic) (in some of the above routes there are strategic alliances between companies in order to serve the capacity demand together and reduce their cost). We prefer a realistic and rational analysis of GCS, as formed after the lifting of cabotage privilege, by analyzing the impacts of liberalization in pricing strategy per coastal route. Therefore, our suggestions do not aim to cover the entire market but each coastal line separately.

Pricing in GCS has always been difficult. There was an asymmetry of information between Ministry of maritime affairs and insular policy (MMAIP), which determined the fares and coastal business owners which received the fares (Lekakou and Fafaliou, 2003). GCS tried to establish a fare structure (tariff) based on cost and especially the average (or total) cost to receive back what is spent on each trip, plus a reasonable profit (Goulielmos, 1998). MMAIP in order to protect itself from any criticism chose the cost per mile and thus the fare per mile. The distance, according to transport economics theory (Gwilliam and Mackie, 2017), was the representative variable of cost. By this way the intensity of demand, competition and quality was ignored (Goulielmos and Sambrakos, 2002).

GCS, under the rule of distance, claimed fares per mile which were determined by the political pressure of the coastal business owners. Ticket price increases were based on MMAIP decisions as a percentage increase. However, there were differences in passenger and vehicle fares. Prices were never uniform, as they often did not coincide even at the same distances (Goulielmos and Sambrakos, 2002). This is proved by the frequent deviation from the liner model of the fare per mile and per distance (Sitzimis, 2012; Goulielmos, 2004; Goulielmos and Sambrakos, 2002).

Nevertheless, there are reasonable pricing theories, when strong economies of scale exist in an industry. In these cases, marginal cost (MC) is below the average cost (AC) and fixed cost (FC) is high (Train, 1994). The fact that GCS is an industry of strong economies of scale has been demonstrated, and we'll take that for granted (Centre of planning and economic research - CPER), 1992; Goulielmos and Sitzimis, 2014; Sitzimis, 2021; Goulielmos and Gatzoli, 2008). In addition, there are economies of scale in all kinds of vessels (e.g. tankers, container ships) (Ma, 2020).

The purpose of this article is to examine the implementation of “innovative” pricing and “season tickets” in GCS. We think that it is an interesting approach since no other researcher has suggested anything similar for this industry so far. The main research question here is

which is the most efficient pricing in GCS, a shipping industry which passed from the state regulatory interference, partly in the beginning and fully later, to market forces. Its contribution is based on pricing analysis of Greek coastal market per route and the proposition of “innovative” pricing as the best in GCS.

2. Peak periods and economies of scale

As it is known, a necessary condition for Pareto-efficient allocation of resources is the equation of prices (P) and marginal costs (P=MC) (Varian, 2019). It is a first-best pricing policy. However, as Quinet (2005) states for transport industry, “in the first-best world there are no external effects, no public goods, firms are price-takers, there is no tax or taxes are optimal, there is no uncertainty or asymmetry in information and there are no transaction costs and no redistribution issues”. In transport sector, these conditions are non-existent and unrealistic and usually the pricing result is second-best. This means that pricing changes do not make one user better off without making at least one user worse off. If ticket prices cannot be set equal to MC due to constraints within the transport industry or other economy distortions, these policies are considered for (Maffii, Parolin and Ponti, 2010).

In GCS the first-best fare, theoretically, is related to social welfare maximization. It could be defined as the sum of user and coastal operator benefits (Tirachini and Hensher, 2012). Two issues deserve special mention in relation with pricing based on MC. The first one is the problems experienced at peak times (if the size of the ship is not big enough) such as holidays and summer months. The marginal costs in these periods are very high, as high demand potentially requires investment in increased capacity (Rungaar, 2000). These costs must be distributed to a number of passengers who travel during peak periods (when coastal routes show high occupancy rates). The second one is the existence of economies of scale. Regarding the problem of peak times, the marginal costs are relatively fixed and low as the number of passengers is smaller than the available capacity (Verhoef et al, 2008). In the short run, there is no possibility for an increase in supply capacity (only an augmentation in itineraries if 100% of occupancy has been achieved) in order to meet the growing peak demand. So, the short run MC increases. The same applies to the marginal social cost as a result of redundant passengers and crowded vessels and ports (Mathisen, 2008). In non-peak periods MC from an additional passenger, vehicle or private car will increase slightly or not at all (there are aspects of fixed MC until the maximum utilization of the ship is reached), unless there is an increase in speed or routes or fuel costs. In the long run, there could be an adjustment to increased capacity demand by new investments (number or vessel size), without sharp increases in long-term MC (Cole, 2006). There is always the assumption that MC is higher in peak periods (Rantzien and Rude, 2014). The reason is that the coastal fleet and staff cannot be used effectively to serve the peak periods, in contrast to periods of low demand. So, passengers who travel at periods of "high" demand could be charged more than others because of increasing MC.

In relation to the second point, namely the economies of scale, it is necessary to specify that "efficient" pricing means MC pricing (Fearnley, 2003). In GCS there are high fixed costs, estimated at around 70% of total cost (TC)[1] (CPER, 1992; Goulielmos and Sambrakos, 2002; Sitzimis, 2021; Foundation for economic and industrial research (FEIR), 2021). According to economic theory if MC<AC and FC is high there are strong economies of scales

[1] In GCS FC is related to crew costs (41.5%), repairs, maintenance and stores (14.4%), insurance (3.5%) and administration cost-general expenses (8.8%) (totally 68.2%). The other 31.8% is variable (voyage) cost and includes fuel and lubricants (22%) and port expenses (9.8%) (data of 1992). Nowadays, the situation has remained the same. In the year 2016 and for three of the largest companies in the industry (Blue Star Ferries, Anek Lines, Hellenic Seaways) FC is estimated at 70.2% and VC at 29.8%.

and revenues do not cover operating costs (Oustabasidis and Katsoulakos, 1999). If we define MC as the cost of an extra coastal voyage then it is equal to voyage's VC. This means that there is huge deviation between FC and MC in GCS. So companies are driven to losses and are forced to seek other methods of efficient pricing policy (Sitzimis, 2021).
For the effective implementation of an efficient pricing policy in peak periods, passengers should realize that each trip is associated with an operating cost. They must understand that they are required to pay more, and should contribute significantly to this higher MC (Rantzien and Rude, 2014). The "peak" pricing fits in this case. A uniform price in peak periods offers no benefits to either companies or passengers (Larsen, 1998; Rantzien and Rude, 2014). Companies face very high marginal costs and passengers overcrowding and lack of service. Therefore, the prices must be increased in these periods and must be decreased in others (Borge, et al., 1996). By this way, the average annual price could be lower. The fare structure will then reflect the marginal costs and will allocate increases in capacity demand.
Discounts in periods of low demand constitute the most classical method to differentiate fares (Cole, 2006; Holloway, 2006). This will lead passengers who travel in peak periods (excluding those traveling for vacation or business) to periods of excess capacity and will attract new passengers (generally it will attract those who charge the system less) (Fearnley, 2003). In the short run, however, the total revenues of coastal companies will not be increased. Neither the average fare will change. Also, there is "room" for increases in tickets in high demand periods. Of course, even if many travelers of peak periods, have a low-price elasticity of demand (Borenstein and Rose, 1994; Sitzimis, 2012; Hanly and Dargay, 1999) some of them will react to price increases and will modify their behavior (Henn, et al., 2010). Although, if we assume that in some routes there is no alternative transport option (arrival/ departure time, lack of competitors) revenues from the tickets will grow reasonably. For instance, in coastal route "Piraeus-Rethimnon" where there is not an airport and there is only one coastal company (Sea Speed Ferries). The same could happen if the quality of passenger vessel is great (speed, comfort of living spaces, staff service). The high-speed vessel "Elyros" (belongs to the company Anek Lines) which is routed on the coastal line "Piraeus-Chania" received the award for best ship conversion on European area in 2008 (shippax award 2008). Its quality is a given and possibly exceeds the expensive fare.

3. Implementation proposal and methodology

As far as the state subsidies are less than an optimal amount, or cut, coastal business owners will increasingly depend on passenger fares (plus personal vehicles and trucks fares), to finance their business operation, because the equation MR = MC with MC < AC is resulting in losses (Goulielmos and Sitzimis, 2012; Sitzimis, 2021). The controversial matter is how can ticket prices increase and simultaneously remain unchanged: (1) the level of quality, (2) the number of passengers and (3) the market share.
We propose here the use of "innovative" pricing. The objectives of innovative pricing is the effective reimbursement of costs without loss of demand and market share (Fearnley, 2003). It is a strategy to improve the efficiency of pricing in order to minimize the loss of prosperity. The basic principle is, as it is well known, that fares should reflect variations in marginal costs at different times of day and different routes (Cole, 2006). Also, fares should be dependent on the price elasticity of demand for different categories of passengers (Cowie and Ison, 2017). "Innovative" pricing introduces different prices to different user groups (passengers). Passengers who do not have high price sensitivity (inelastic demand), should pay, according to theory, more (Varian, 2019). This pricing strategy is second best, diminishes the loss of wealth (Proost and Dender, 2003) and helps Greek coastal owners to maximize profits (Nagle and Holden, 2001). The most familiar form of "innovative" pricing is the diversification of fares according to the reporting period (e.g. peak pricing) (Goulielmos and Gatzoli, 2008).

If coastal business owners want to cover their costs by setting uniform prices, then prices should be equated with AC. But this is not a perfect choice (Goulielmos, 2004) and used to happen in GCS before deregulation (Spathi, 2005). Prices should be equated to MC. But the pricing based on MC will lead to losses (because MC<AC) and it is not appropriate, as I have already mentioned (Cole, 2006). The existence of economies of scale is a characteristic of capital-intensive industries (such as GCS) and the above result is expected. Passengers may consider that uniform prices are fairer than the discriminated ones (Cole, 2006). Although, in the context of economic efficiency, and where subsidies are lower than the best, the uniformity of prices does not constitute a desirable strategy (Holloway, 2006). The uniform prices encourage coastal companies to focus on passengers with the willingness or ability to pay the fare (Schwieterman, 1985; Gwilliam and Mackie, 2017). That way prices are "pushed" upwards. In other words, price discrimination is not just a tool to maximize profit, but also a tool to achieve satisfactory services and maybe satisfied passengers (Geradin and Petit, 2005). The main difference of uniform pricing and peak pricing is that the first is based on the price elasticity of demand (of passengers) and the second to changes in costs (Cowie and Ison, 2017). It is worth mentioning that price discrimination leads to waste of resources when the total offered capacity is reduced compared to the capacity offered when there is a use of uniform price (Geradin and Petit, 2005). Therefore, a necessary but not sufficient condition for the acquisition of wealth, is when production increases through price discrimination (Mcafee, 2008; Fearnley, 2003).
In GCS, one option is to charge a participation "fee" to access the coastal service along with the ticket price which is equalized to MC. This "fee" will be the same regardless if the passenger makes one or more trips annually. It will not change the (marginal) options of passengers, namely if they make or not an extra trip. This is an efficient pricing. The "fee" should cover the fixed cost of transport. This means that the deviance between AC and MC of transport, will not lead the company to losses.
According to Fearnley's theory (2003), the total ticket price (P) be paid by the passenger for a given period could be:

$$P = F + T \times X$$

Where:
F: The participation fee in the given period.
T: The price which is equalized to MC.
X: The number of trips.

In this pricing structure of fares, passengers will have "quantitative" discounts. As many trips a person makes annually, the lower the level of fares will be. When a trip takes place, the passenger will pay F + T. When the number of trips tends to infinity (theoretically), the average ticket price will be closer to T, namely a price equalized to MC. It is, in our view, a simple pricing for both coastal business owners and for GCS passengers. Occasional passengers must not be discouraged from using the transport service due to a potential high "fee". The sum F + T should not affect the price elasticity of demand.
Persistent research on this issue led us to Fearnley's theory (he supported the "inventive" pricing of urban public transport). The pricing policy described above, is successfully applied in telecommunications, electricity, water supply network and sewage network too (Fearnley, 2003).

4. Season tickets and results

The occupancy rate of Greek coastal companies is quite low during the winter months (Goulielmos and Sambrakos, 2002; Lekakou and Fafaliou, 2003; Sitzimis, 2012). At the same time, fares can be increased only at periods of high demand. We believe that a combination of "innovative" pricing and “season tickets” (ST) (weekly, monthly) could on the one hand increase the capacity of current demand throughout the year and on the other decrease the average fare.

If a pricing policy aims at connecting the level of fares to the actual AC, ST are not consistent with MC pricing (Fearnley, 2003). Their holder does not understand that an additional trip has a cost (unless passenger "lose" time and comfort) and maybe lead to increasing and pointless use of ferry transportation (more itineraries with low occupancy rates). It’s clear that ST will be particularly attractive to those users who travel for business matters. Indeed, a part of the design provision of the offered capacity is based on them. This leads to a situation where the more "regular" passengers, traveling with ST (at peak periods), paying zero marginal fare. Such pricing would create excessive capacity demand in periods where the costs are high. By this way, the issue of ST, without restrictions, does not lead to Pareto efficient pricing.

However, this analysis does not mean that this proposal is wrong. Passengers traveling in non-peak periods in low demand routes impose nearly zero MC. Therefore, in these cases, ST are applicable. In GCS, because of seasonality, months April to September account for 70% of passenger traffic (FEIR, 2021; Sitzimis, 2021). In these “peak” months, when MC is high, fares should be raised. For the remaining months (November to March) the fall of ticket prices is indicated. This can happen through the purchase of ST (quantitative discounts). Particularly, in relation to ST, the more coastal itineraries take place (according to “innovative” pricing and instead of buying a one-way ticket) the more the average fare decrease and approach MC. The final result could be a reduction in the average fares of passengers.

In our opinion, the advantages of the above pricing policy are many. Coastal passengers will realize that the transfer involves costs which vary between peak periods and not. Some passengers will change the day of travel, creating lower operational costs of transport (it is difficult but not impossible for GCS). Discounts (ST or/and offers) in non-peak periods will increase the number of passengers and will reduce the average fare. It will not change the level of coastal services, but will provide increased mobility to less affluent travelers. Also, "peak" passengers will increase operating revenues, as they charged more.

5. Conclusions

The European regulation 3577/1992 and Greek Law 2932/2001 led to “cabotage waiving” of Greek coastal system. GCS abandoned entry restrictions and price determination of the state after a 12-year long transition period (partly in 2002 and fully in 2006). In relation to pricing policy and due to economies of scale existence, Greek ship-owners tend to set prices which cover all operating costs. This is not socially acceptable as does not meet the condition for Pareto – efficient allocation of resources. Unfortunately, in GCS a pricing method based on AC lead to losses, as AC is lower than MC.

The “innovative pricing” was proposed for implementation in GCS. It contains applicable measures to increase revenues while maintaining (or increasing) the quality level of the companies of GCS. The price in this case minimizes the loss of wealth, raises user’s income and reflects the structures of cost and demand. Different passengers pay a different fare based on the characteristics of demand and operating costs of the services. The key point is the charge of a participation “fee” which covers the fixed cost of transport. If price discrimination is determined, the average fare will not necessarily raise. Increases in peak periods may be accompanied by price reductions (or discounts) in periods of low demand.

A uniform price structure is not optimal from a social standpoint, as it does not take into account the MC and demand. The uniform fares tend to be higher than fares based on MC. Passengers who are willing to pay more than the marginal operating costs and less than the actual fare, are discouraged to travel. This causes a loss of income and revenue. Passengers traveling in non-peak periods, or in routes of low demand, impose nearly zero MC. In these cases, ST can be applied.

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Bio-note

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PHASES OF ECONOMIC DEVELOPMENT IN AN ENDOGENOUS GROWTH MODEL WITH INNOVATION AND EDUCATION

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Abstract: *This paper analyzes the transitional dynamics of an endogenous growth model with physical capital, human capital and R&D in which both human capital and innovation drives long run growth. The model suggests that the developing economy follows different stages of development. The first phase is characterized by physical capital accumulation. At the second stage, human capital accumulation represents the main engine of long run growth. The third phase is identified by an increasing variety of intermediate good originating from innovation. However, innovation is not assured for poor economies. In this case, permanent support for innovation can lead a sustainable exit from poverty trap.*

Keywords: development, innovation, human capital, transitional dynamics.

JEL Classification: O3, O31, O33, O4**.**

1. Introduction

The determinants of sustainable economic growth are at the center of the very latest economic debates. Although the bulk of the theoretical literature has treated physical capital accumulation, knowledge formation and R&D-based technological progress as the three key drivers of economic growth. The first strand of analysis considers that physical capital accumulation and exogenous technological change account for much of increase in economic growth rates (Solow, 1956). The second strand of analysis assumes that capital accumulation is the main engine of economic development (Lucas, 1988). The third strand of analysis sees economic development as the result of technological innovation that result from intentional investment decisions made by profit maximizing agents (Romer, 1990 and Grossman and Helpman, 1991).

In this line, it is expedient mentioning that the most of theoretical contributions have treated R&D-based technological progress and knowledge formation-based growth as separately. As a notable exception, Funke and Strulik (2000) have triggered a vivid line of research by putting forward a unified growth model with physical capital, human capital and R&D. Funke and Strulik (2000) have assumed that economy passes through different phases of development. In the fully industrialized phase, innovation and education act jointly. Funke and Strulik (2000) present, therefore, a new theory of development in which the increasing pace of technological progress favors the demand for skilled labor in the industrial sector.

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Since then, the research by Funke and Strulik (2000) has opened the horizon to several extensions. Gomez (2005; 2008) has analyzed the equilibrium dynamics of this model. Sequeira (2008) has developed an endogenous growth model whose originality is to incorporate an erosive effect of human capital by the fact that technological progress generates a depreciation of a certain type of human capital. Gomez (2011) has presented an extended endogenous growth model in which he incorporated an externality in the R&D sector. This feature of the model proved the existence of an adjustable dynamic in which innovative activities precedes human capital accumulation. Iacopetta (2010) has established a unified endogenous growth model that can generate a growth path in which R&D precedes human capital accumulation. Finally, Iacopetta (2011) has presented a unified endogenous growth model based on long-run U.S. data.

With respect to this set of contributions, our model seeks to derive the equilibrium properties of an endogenous growth model in the spirit of Gomez (2005; 2011a; 2011b) and Funke and Strulik (2000). A particularity of this model is to incorporate international R&D spillovers via the imitation of new foreign technologies. The evolution of the number of patents depends, then, of the number of intermediate goods available at the world frontier. An emerging economy, can therefore make move ahead by assimilating international know and inventing new products.

The remaining of this paper is organized as follows. The next section presents the underlying unified growth model. Section 3 studies the transitional dynamics of the economy. In section 4, we analyze the equilibrium state, before concluding.

2. Set up of the model

Consider the following continuous time model with endogenous economic growth. The long run growth is determined by the interaction of three sectors: sector producing the final good, sector producing the intermediate good and R&D sector.

2.1. Individuals and education

We first describe the household optimization problem. The economy is inhabited by a constant population normalized to unity, of identical individuals who maximize the intertemporal utility function

$$U_t = \int_0^{\infty} e^{\rho t} C^{1-\theta}/(1-\theta)\partial_t \quad (1)$$

where $\rho > 0$ defines the time preference rate, $0 < 1/\theta < 1$ denotes the intertemporal elasticity of substitution and C_t defines the consumption.

The endowment of time, which is normalized to one, can be divided between spending time in education u_E , innovating u_I and producing u_P , $u_E + u_P + u_I = 1$

The human capital accumulation is given by

$$\dot{H} = b(u_E H)^{\varepsilon}\overline{(u_E H)}^{1-\varepsilon}, b > 0,\ 0 < \varepsilon < 1 \quad (2)$$

where $\overline{(u_E H)}$ expresses a specific externality that is associated with the average effective time spent in education. Therefore, we assume the presence of diminishing returns to efficient learning time in education at the private level, combined with an external effect that restores constant returns to scale at the social level.

The intertemporal budget constraint is written; after differentiation with respect to time

$$\dot{A} = rA + w(1-u_E)H - C \quad (3)$$

denotes the return per unit of aggregate wealth *A* and *w* denotes the wage rate per unit of human capital employed.

Let defines g_X the growth rate of X, $g_X = \dot{X}/X$. The representative agent maximizes their intertemporal utility (1) subject to their budget constraint (3) and the human capital accumulation (2). The first-order conditions give

$$g_c = (r - \rho)/\theta \quad (4)$$

$$r - g_w = b \quad and \quad u_E > 0 \quad (5)$$

in an equilibrium with education, or

$$r - g_w > b\varepsilon \quad and \quad u_E = 0 \quad (6)$$

2.2. Production and innovation

There is one final good, which is produced by a Cobb-Douglas technology. The inputs are physical capital *K*, human capital *H* and a continuum of intermediate goods indicated by $i \in [0, n]$. Production requires the consumption at each time of a quantity of each intermediate input such that the increase of their number raises overall productivity. This property is expressed by an index of differentiated inputs,

$$D_t = (\int_0^n x_i^\gamma \partial_i)^{\frac{1}{\gamma}} \quad (7)$$

which enters as a factor in the production function

$$Y_t = K_t^\beta D_t^\alpha (u_p H_t)^{1-\alpha-\beta} \quad (8)$$

Physical capital is used only in the production of the final good. To simplify the analysis, we assume a total depreciation of capital, $\dot{K} = Y - C - \int_0^n x_i$.

The market for final goods is composed of infinite numbers of firms acting in perfect competition and the final good price is normalized to unity. Profit maximization gives the factor demands

$$r = \beta \frac{Y}{K} \quad (9)$$

$$w = (1 - \alpha - \beta) \frac{Y}{u_p H} \quad (10)$$

$$p_i = \alpha x_i^{\gamma-1} \frac{Y}{D^\gamma} \quad (11)$$

where p_i is the price of intermediate good *i*.

The designs of complementary intermediate goods are produced in the R&D sector. *n* is used interchangeably for the number of intermediate goods and the stock of knowledge. Invention of new intermediates is assumed to develop according to

$$\dot{n} = \delta (u_I H) \overline{(u_I H)}^{\lambda-1} n^\phi \overline{(n)}^\sigma \quad (12)$$

where $\delta > 0, 0 \leq \phi < 1$, $0 < \lambda < 1$ and $0 \leq \sigma < 1$, $\overline{(u_I H)}$ defines as the average human capital devoted to innovation. The third term in Eq. (12) incorporates a duplication externality of research effort that reflects the idea that inexperienced researchers are working similar problems.

The fourth term in Eq. (12) indicates that the invention of new intermediates depends on the number of intermediate goods that are available on the world frontier. The parameter σ is assumed less than unity to capture the fact that the growth rate of path of technology at the

world frontier leads to a decrease in the marginal benefits for domestic imitation. We assume that the growth rate of $\bar{n}$ is exogenous and is given by

$$g_{\bar{n}} = \dot{\bar{n}}/n = \zeta, \quad \zeta > 0 \tag{13}$$

There is monopolistic competition in the R&D sector and one unit of *Y* produces one unit of intermediate goods x_i. Each firm, in this sector, owns an infinite patent for selling its variety x_i and maximizes operating profits $\Pi_i = (p_i - 1)x_i$. Facing the price elasticity of demand for intermediates $1/1-\gamma$, firms charge a constant markup price $p_i = 1/\gamma$.
Since both technology and demand are the same for all intermediate goods, the quantity supplied is the same for all goods, $x_i = x$, $p_i = p = 1/\gamma$. Hence, the market-clearing quantity is $xn = \alpha\gamma Y$ and firms' profits are

$$\Pi = \frac{(1-\gamma)\alpha}{n} Y \tag{14}$$

and $D = xn^{1/\gamma} = n^{1-\gamma/\gamma}\alpha\gamma Y$. Substituting this expression into the production function (8), yields

$$Y^{1-\alpha} = (\alpha\gamma)^{\alpha} K^{\beta} n^{\alpha(1-\gamma)/\gamma} \left(u_p H\right)^{1-\alpha-\beta} \tag{15}$$

Let denote v the present value of the stream monopoly profits from innovation, where $v = \int_t^{\infty} e^{-[R(\tau)-R(t)]}\, \Pi(\tau)\partial\tau$, with $R_t = \int_0^t r(\tau)\partial\tau$. Log-differentiating this expression gives the no arbitrage condition

$$g_v = \frac{\dot{v}}{v} = r - \frac{\Pi}{v} \tag{16}$$

Eq. (16) implies that the rate of return is equal to the dividend rate Π/v plus the capital gain$\dot{v}/v$. Finally, free entry into the R&D sector requires

$$w = \delta(\overline{u_l H})^{\lambda-1} n^{\phi} \bar{n}^{\sigma} v \quad \text{and} \quad u_l > 0 \tag{17}$$

in an equilibrium with innovation,

$$w > \delta(\overline{u_l H})^{\lambda-1} n^{\phi} \bar{n}^{\sigma} v \quad \text{and} \quad u_l = 0 \tag{18}$$

Before we proceed with the analysis, we shall take into account that $\overline{u_l H} = u_l H$. Let us denote $\chi = C/K$ the consumption to physical capital ratio and $\psi = H^{\lambda} n^{\phi} \bar{n}^{\sigma}/n$ the knowledge-ideas ratio. Claims to innovative firms and physical capital are the assets in the economy. Aggregate wealth is then $A = K + nv$. Using Eqs. (3), (9), (14) and (16), we get the economy's resource constraint $\dot{K} = (1 - \alpha\gamma)Y - C$, which can be expressed as

$$g_K = \frac{1-\alpha\gamma}{\beta} r - \chi \tag{19}$$

From Eq. (4) and using Eq. (17), we get

$$g_c = \left(\frac{1}{\theta} - \frac{1-\alpha\gamma}{\beta}\right) r + \chi - \frac{\rho}{\theta} \tag{20}$$

Some equations are needed to solve the model. Log-differentiating Eqs. (8), (9) and (15), yields

$$g_r = g_Y - g_K \tag{21}$$

$$g_w = g_Y - (g_{u_Y} - g_H) \quad (22)$$

$$(1-\alpha)g_Y = \beta g_K + \frac{(1-\gamma)\alpha}{\gamma} g_n + (1-\alpha-\beta)(g_{u_P} - g_H) \quad (23)$$

Eliminating g_Y and simplifying, we get

$$g_r = -\frac{1-\alpha-\beta}{\beta} g_w - \frac{\alpha}{\beta}\frac{1-\gamma}{\gamma} g_n \quad (24)$$

$$g_{u_P} = -\frac{1-\alpha}{\beta} g_w + \frac{\alpha}{\beta}\frac{1-\gamma}{\gamma} g_n + g_K - g_H \quad (25)$$

Finally Log-differentiating Eq. (12), yields

$$g_{g_n} = \sigma\zeta + \lambda(g_{u_I} + g_H) - (1-\phi)g_n \quad (26)$$

This formulation finds a positive relationship between the evolution of invention patent, R&D and technology adaption.

3. Equilibrium dynamics of the economy

In this section, we first analyze the intermediate development phases of a developing economy. Then, we consider the dynamics of the fully industrial economy with physical capital accumulation, knowledge formation and innovation.

3.1. Neoclassical growth model

The economy starts without knowledge formation and innovation ($u_E = u_I = 0$). Physical capital is then accumulated as the only growth generating mechanism. The dynamics of the initial neoclassical growth phase, in terms of r and χ variables, is given by the two-dimensional differential equation system

$$g_r = -\frac{(1-\alpha-\beta)(1-\gamma\alpha)}{\beta(1-\alpha)} r + \frac{1-\alpha-\beta}{1-\alpha}\chi \quad (27)$$

$$g_\chi = (\frac{1}{\theta} - \frac{1-\alpha\gamma}{\beta})r + \chi - \frac{\rho}{\theta} \quad (28)$$

Eq. (27) results from Eqs. (24) and (25), using Eq. (19) and taking into account that $g_{u_P} = g_n = g_H = 0$

Using Eqs. (27), (21) and (22), we find that, due to diminishing marginal returns to physical capital accumulation, the interest rate decreases while the efficient wage increases.

3.2. The knowledge economy

If $b\varepsilon > \bar{r} = \rho$, the economy reaches a point at which agents begin to invest in knowledge formation. Education time increases and, ultimately, the economy enters the second phase of development, without innovation ($u_E = 1 - u_Y, u_I = 0$).

The dynamics of the knowledge economy, in terms of r, χ and u_P, is described by the three-dimensional differential equation system

$$g_r = -\frac{1-\alpha-\beta}{\beta}(r - b\varepsilon) \quad (29)$$

$$g_\chi = (\frac{1}{\theta} - \frac{1-\alpha\gamma}{\beta})r + \chi - \frac{\rho}{\theta} \quad (30)$$

$$g_{u_P} = \frac{(1-\gamma)\alpha}{\beta} r - \chi - \varepsilon(1-u_P) + \frac{(1-\gamma)b\varepsilon}{\beta} \quad (31)$$

which is obtained from Eqs. (24) and (25), using Eq (5) to substitute g_w, Eqs. (19) and (2) to substitute respectively g_K and g_H and taking into account that $g_n = 0$.

From Eq. (29), we note that, since $(\partial g_r/\partial r < 0)$, the interest rate converges to $b\varepsilon > 0$ independently of the remaining dynamics of the system, while using Eq. (5); we note that the growth rate of the wage converges to zero.

3.3. Growth model with innovation

If $\rho \geq b\varepsilon$, the household does not train. In this case, the dynamic of the economy is entirely determined by innovation activities. If at the initial sate, the economy is sufficiently endowed with human capital, innovation is undertaken, but with decreasing returns on R&D investment. Consequently, innovation activities are unprofitable.

The system that drives the dynamics of the economy, in terms of variables $r, \chi,\ u_P$ and ψ can be obtained as:

$$g_r = -\frac{1-\alpha-\beta}{\beta} r - \frac{(1-\alpha-\beta)(\lambda-1)u_P}{\beta(1-u_P)} g_{u_P} + \langle \frac{u_P}{1-u_P} + \frac{1}{\gamma} - \frac{(1-\alpha-\beta)\phi}{(1-\gamma)\alpha} \rangle \times \delta(^1\psi - \frac{(1-\alpha-\beta)\sigma\zeta}{\beta} \quad (32)$$

$$g_\chi = (\frac{1}{\theta} - \frac{1-\alpha\gamma}{\beta})r + \chi - \frac{\rho}{\theta} \quad (33)$$

$$g_{u_P} = \frac{\alpha(1-\gamma)(1-u_P)}{\beta(1-u_P)+(1-\alpha)(1-\lambda)u_P} \langle r + \left(\frac{(1-\alpha)u_P}{(1-\alpha-\beta)(1-u_P)} - \frac{(1-\alpha)\phi}{(1-\gamma)\alpha} + \frac{1}{\gamma}\right) \delta(^1\psi - \frac{\beta}{(1-\gamma)\alpha}\chi - \frac{(1-\alpha)\sigma\zeta}{(1-\gamma)\alpha} \rangle \quad (34)$$

$$g_\psi = \sigma\zeta - \delta(1-\phi)(1-u_P)^\lambda \psi \quad (35)$$

The previous system is obtained as follows. First, log-differentiating the free-entry condition (17) yields $g_w = (\lambda-1)(g_{u_I} + g_H) + \phi g_n + \sigma\zeta$. Then, substituting g_v from Eq. (16), Π from Eq. (14), $w$from Eq. (10) and v from Eq. (17), we get

$$g_w = r + (\lambda-1)(g_{u_I} + g_H) - \frac{(1-\gamma)\alpha u_P}{(1-\alpha-\beta)u_I} g_n + \phi g_n + \sigma\zeta \quad (36)$$

From Eqs. (24) and (25), substituting g_w from Eq. (36), g_K from Eq. (19) and g_n from Eq. (17) and taking into account that $g_H = 0$, $u_I = 1 - u_P$, $g_{u_I} = -g_{u_P} u_P/1 - u_P$ and $g_n = \delta(1+u_p)^\lambda \psi$ we get Eqs. (32) and (34). Log-differentiating the knowledge-ideas ratio we get Eq (35).

3.4. The advanced industrialized economy

If $\lambda < 1$, the dynamics of the advanced industrialized economy, in terms of the variables r, χ, ψ, u_P and g_n, is described by the following system

$$g_r = -\frac{1-\alpha-\beta}{\beta}(r - b\varepsilon) + \frac{\alpha(1-\gamma)}{\beta\gamma} g_n \quad (37)$$

$$g_\chi = (\frac{1}{\theta} - \frac{1-\alpha\gamma}{\beta})r + \chi - \frac{\rho}{\theta} \quad (38)$$

$$g_{u_P} = \frac{\alpha(1-\gamma)}{\beta} r - \chi - b(1 - u_P - (\frac{g_n}{\delta\psi})^{1/\lambda}) + \frac{\alpha(1-\gamma)}{\beta\gamma} g_n + \frac{(1-\alpha)b\varepsilon}{\beta} \quad (39)$$

$$g_\psi = \sigma\zeta + \lambda b(1 - u_P - (\frac{g_n}{\delta\psi})^{1/\lambda}) - (1-\phi)g_n \quad (40)$$

$$g_{g_n} = \frac{\lambda}{1-\lambda}(\lambda\sigma\zeta + b\varepsilon) - \frac{\alpha\lambda(1-\gamma)(\delta\psi)^{1/\lambda} u_P}{(1-\lambda)(1-\alpha-\beta)} g_n^{1-1/\lambda} - g_n + \frac{\phi}{1-\lambda} g_n \quad (41)$$

To obtain this system, we have used that $u_E = 1 - u_P - u_I$ and $u_I = (g_n/(\delta\psi))^{1/\lambda}$. Eq. (37) results from Eqs. (24) and (5). From Eqs. (25) and (5), using Eqs. (19) and (2), we get Eq. (39). From $g_\psi = \sigma\zeta + \lambda g_H - (1-\phi)g_n$, using Eq. (2), we obtain Eq. (40). Finally, Eq. (41) results from Eqs. (26), (36) and (5), using Eq. (2).

If $\lambda = 1$, from Eqs. (36) and (5), using Eq. (17), we get

$$u_P = \frac{(1-\alpha-\beta)}{(1-\gamma)\alpha(\delta\psi)^{1/\lambda}}(\sigma\zeta + b\varepsilon + \phi g_n) \quad (42)$$

From $g_{u_P} = g_n - g_H$, using Eqs. (25), (19) and (5), we obtain

$$g_n = \frac{\gamma(\alpha(1-\gamma)r+(1-\alpha)b\varepsilon-\beta\chi)}{\beta\gamma-\alpha(1-\gamma)} \quad (43)$$

Thus, if $\lambda = 1$, the dynamics of the economy is described by the following system

$$g_r = \frac{1-\alpha-\beta}{\beta}(r - b\varepsilon) + \frac{\alpha(1-\gamma)}{\beta\gamma} g_n \quad (44)$$

$$g_\chi = (\frac{1}{\theta} - \frac{1-\alpha\gamma}{\beta})r + \chi - \frac{\rho}{\theta} \quad (45)$$

with u_P and g_n must be substituted respectively by Eqs. (42) and (43).

4. Balanced growth equilibrium

This section establishes the existence and the properties of the balanced growth path. The following two propositions provide our main results, which characterize the balanced growth equilibrium.

Proposition 1. Let $b\varepsilon > \rho$. The economy converges to a unique positive, steady state with positive long-run growth, in which the interest rate is

$$r^* = \frac{(1+M)\theta b\varepsilon-\rho+Z}{(1+M)\theta-1} \quad (46)$$

the ratio of consumption to physical capital is

$$\chi^* = (\frac{1-\alpha\gamma}{\beta} - \frac{1}{\theta})r + \frac{\rho}{\theta} \quad (47)$$

the long-run growth of intermediates is

$$g_n^* = \frac{M\lambda}{(1-\phi)[(1+M)\theta-1]}(b\varepsilon - \rho + Z) \quad (48)$$

the knowledge-ideas ratio

$$\psi^* = \frac{g_n^*}{\delta u_I^\lambda} \quad (49)$$

the share of labor devoted to production and innovation can be obtained from

$$u_P^* = 1 - u_I^* - \frac{g_H^*}{b} \quad (50)$$

$$u_I^* = \frac{(1-\gamma)\alpha g_n^*}{(1-\gamma)\alpha g_n^* + (1-\alpha-\beta)[(\lambda-1)g_H^* + \phi g_n^* + \sigma\zeta + b\varepsilon]}(1 - \frac{g_H^*}{b}) \quad (51)$$

the long-run growth of human capital is

$$g_H^* = \frac{(1-\phi)g_n^* - \sigma\zeta}{\lambda} \quad (52)$$

and the long-run growth of income, consumption and physical capital is

$$g_Y^* = g_C^* = g_K^* = \frac{\sigma\zeta}{M\lambda} + (\frac{1}{M} + 1)g_H^* \quad (53)$$

with $M = \gamma(1-\phi)(1-\alpha-\beta)/\alpha\,\lambda(1-\gamma)$and $Z = \sigma\zeta\theta/\lambda$

Proposition 2. The system reaches the balanced growth path if and only if the sufficient condition is met

$$\theta > \frac{1+M(1+\frac{\rho}{b\varepsilon})+\Phi}{(1+M)+\Phi} \tag{54}$$

with $\Phi = \frac{\sigma\zeta}{\lambda b\varepsilon}$

For the interior steady state to be feasible, we must have$u_P^* > 0, u_I^* > 0, 0 < u_P^* + u_I^* < 1$, $r^* > 0, \chi^* > 0$ and $\psi^* > 0$. Eqs. (48) and (52) show that condition $0 < u_P^* + u_I^* = b - g_H^*/b < 1$ is satisfied if and only if Eq. (54) holds. Since, from Eq. (54) and assuming $b\varepsilon > \rho$ we have $\theta > 1/1 + M$, Eqs. (48) and (46) entail that $r* > 0$ and $g_n^* > 0$. Furthermore, $u_P^* > 0$and $u_I^* > 0$ because $\varepsilon - g_H^* > 0$. Thus, Eq. (49) implies that $\psi^* > 0$. Finally, the ratio of consumption to capital can be expressed as $\chi^* = \frac{(1-\alpha\gamma)r^*}{\beta} - g_k^* > \frac{(1-\alpha\gamma-\beta)r^*}{\beta} > 0$ if the transversality condition is satisfied. Hence, the steady state is feasible.

From Eq. (53), we note that the long-run growth rates of income and consumption depend positively on the quality of education *b*. A higher *b* induces agents to spend more time in school generating an increase in the level of human capital. Therefore, the increasing pace of human capital formation implies an industrial demand for intermediate goods that stimulated R&D activities. The economy, moreover, grows fast.
From Eq. (51), we find that an increase in innovation productivity δ has a positive effect on the steady state shares of time devoted to studying and innovation. Thus, the acceleration of technological progress increases the industrial demand for human capital, which in turn stimulate human capital formation and thus further technological progress. Moreover, innovation share expands hand in hand with educational share.
The effect of externality associated to R&D on the long-run growth of the subsidy to R&D is illustrated in Eqs. (48) And (52). An increase in research externalities (an increase of ϕ) generates an increase in the long-run subsidy rate to R&D, while an increase in duplication externalities (an increase of λ) acts in the opposite way.
We suppose that $(1-\alpha-\beta) > 0$, following Gomez (2011b). From Eq. (53), we find that the imitation parameter σ and the R&D spillovers ϕ act positively on the long-run growth rates of income and consumption. A higher σ promotes technology adaption and facilitates the specialization in high quality by promoting the "learning by doing". As the adoption of superior technologies and absorption supplemented by incremental innovation, increase, as the economy grows fast. Nevertheless, the implementation of the advanced technology requires a sufficiently large intermediate good market and a sufficient skill level. Thus, a higher ϕ stimulates the growth of developing economies and speeds up convergence. As the technological progress increases, the growth rate of ideas increases generating an industrial demand for human capital that stimulated knowledge formation. Therefore, the economy evolves steadily.

5. Conclusion

In this paper, we have understudied the interaction between physical capital accumulation, knowledge formation, innovation and economic growth. The main novelty with respect to previous literature is that the invention of new intermediates depends on the number of intermediate goods available at the world frontier and that innovation is subject to

externalities in R&D associated with the duplication of research effort. First, we find that innovation and education share increase jointly along the dynamic transition. The economy starts without knowledge and innovation. Until the second phase of development, the education time increases steadily generating an industrial demand for intermediate goods. Therefore, the size of the intermediate good market and thereby the innovation time rise, first at a slow pace and sharply then, generating an increase in the expected returns on R&D investment. The economy enters the fully industrialized phase. The acceleration requirements of the industrialization process increase the demand for skilled labor, which in turn increased formal education, and thus technological progress. From that moment, the implementation of the superior technology contributed to economic growth. Then, we provide a sufficient condition to rule out the convergence of the economy to a unique steady state with positive long-run growth.

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GLOBALIZATION AND INDUSTRIAL DEVELOPMENT IN NIGERIA: A CURSE OR CURE?

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Abstract: *The question whether globalization and its corresponding impacts carry a blessing or curse in developing countries has been a controversial issue among both the scholars and the policymakers, against this background this study provided an empirical answer to the question whether globalisation is a curse or cure to industrial development in Nigeria between 1990 and 2019 within the framework of the Fully Modified Ordinary Least Squares (FMOLS) and Granger causality test. Consequently, the following principal findings emerged in this study. Firstly, both FDI inflows and trade openness which depict economic globalization had a negative relationship with industrial development respectively. Though, trade openness was significant while FDI inflows showed otherwise. In the same vein, a unidirectional causality ran from manufacturing value added to FDI inflows. However, no feedback relationship existed between trade openness and manufacturing value added. Therefore, this study submits that economic globalization is a curse to industrial development in Nigeria because the wave of economic globalization contributed a significant reduction in manufacturing value added in Nigeria in the last three decades. From these findings, the current wave of economic globalization could be a cure to industrial development in Nigeria, if only the policymakers in the country embark on policies that would drive the largest proportion of the inflows of FDI in the direction of manufacturing sub sector in the country. Similarly, all hands must be on deck by all the relevant stakeholders to ensure that manufactured products in Nigeria possesses value added quality to facilitate their competitiveness in the global market.*

Keywords: Globalization, Industrial Development, Trade Openness, FDI, Curse, Cure.

JEL Classification: F43; F62.

1. Introduction

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The wave of globalization has been continuously intensifying in shaking all the spheres of the global economy in the past few decades (Aderemi *et al.,* 2020; Kovářová, 2017; Kaya, 2010; Baldwin & Forslid, 2000). Because the integration of the global market in the 21st century has been an unprecedented phenomenon owing to the advent of digital technologies, rising trade liberalization and international financial flows.

However, industrialization is considered to be one of the strategic components in achieving long-term and sustainable development, in the case of developing economies its impact on employment creation and reduction of poverty cannot be undermined. Evidence has shown that the industrial revolution that characterized the Western Europe and the United States in the 19th and early 20th centuries has always been the reference point for scholars and policy analysts in advocating for industrial development as developmental framework in developing countries. In the recent times, the sporadic expansion of aggregate outputs in some emerging countries such as China, India and other `Asian Tigers` show that industrialization is a paramount condition for economic prosperity. Meanwhile, patterns of the Nigeria`s trade show that the country`s commodities lack value addition, commodity diversification, dominant proportion of primary goods and over reliance on developed countries for valued added products (World Bank, 2016). This is a clear indication that industrial development is operating at low ebb in Nigeria.

Succinctly put, industrial development in Nigeria has been a major concern for scholars in one hand, whereas multiplier effects of external factors on the development of manufacturing sector in Nigeria has long remained a subject of debate in the literature on the other hand. Due to the various events that have unfolded in the global market, the earlier writers have conceptualized globalization as unavoidable curse and fortune to developing countries (Rodrik, 1999; David, 1999; Salimono, 1999; Awake, 2002; Garry, 1998; Gondwe, 2001; Dollar, 2001). But further efforts to unravel the linkage between globalization and industrial development in Nigeria has largely received little or no attention in the literature, especially in the most recent times. The focus of the larger bulk of recent studies in Nigeria was the nexus between globalization and economic growth (Imandojemu *et al*., 2021; Letswa *et al*., 2018; Okpokpo, Ifelunini and Osuyali, 2014; Akor, Yongu, and Akorga, 2012). However, few studies such as Ebong, Udoh and Obafemi (2014), Toyin (2017) and Binuyo *et al*. (2017) which examined impact of globalization on industrial development in Nigeria were observed to be deficient in terms of measurement of industrial development variable and technique of analysis. In order to improve the existing studies in the country, this current study employed manufacturing value added in measuring industrial development, in which to the best of knowledge, no study has utilized in Nigeria. In view of the above, this examined impact of globalization on industrial development from 1990 to 2019, using Nigeria data. As a departure from the existing studies, it is instructive to stress that the novelty of this study lies in the fact it both employed a better measurement of industrial development and most updated recent data in which no study has incorporated in the literature.

The rest of this work is structured as follows; having provided the background information and established the problem of the study in the introduction, section two presents the adequate and updated review of past studies. Also, section three contains methodology, discussion of results, summary and policy implication of the study.

2. Literature Review

The ongoing rise in interdependence among the global economies alongside people migration which arises as results of digital technology, flows of investment, cross-border trade in goods and services, and the integration of markets, trade and investments with few barriers to slow the flow of products and services between nation have made globalization one of the most popular issues of concerns, especially how it affects industrial development which refers to social organization in which industries and especially large-scale industries

are dominant, among both the scholars and policymakers in the 21st century. Globally, public policy changes and communications technology innovations have sped up globalization to an unprecedented pace, free market economic system through fiscal policies and trade agreements, removal or reduction of tariffs have been integrated by government over the last 2 decades. However, recent studies by (Onwuka & Eguavoen, 2018; Uwadiegwu, 2015) show that the driving force of globalization process are technology, policy and competition, this exposes the domestic economies to the forces of the global market. Meanwhile, the authors argued that globalization had not benefited Nigeria owing to monocultural export, huge debt profile and inability of the country to attract substantial foreign investments. This implies that reduction in debt profile and diversification of export base in conjunction with a rise in development cooperation with other economies will aid industrial development in a developing nation like Nigeria. Similarly, unequal effect of globalization has preponderantly distorted third world economic growth and development, therefore to eliminate the negative effect of globalization which is vehicle for economic development of Nigeria and other 3rd world countries, there is the urgent need to explore the positive side of globalization which is in tandem with global best practices in economic recovery (Dappa & Thom-otuya, 2010). In a research conducted by (Odo, Agbo, & Agbaji, 2020), the study discovered that whereas globalization may have improved the economies of advanced democracies, the domestic economy received marginal benefits, this marginal benefit enjoyed by developing economies is undermined by weak technical base, unhealthy macro-economic environment and poorly diversified economic base. This suffice to asserts that to attain even industrial development in a developing nation like Nigeria, there is a need for strong, healthy macro-economic and diversified economic base. Also, it is amazing that, the moderate performance of the capital market has not actually translated into a remarkable growth of the industrial sector in Nigeria. Akindele, Jogunola, and Aderemi (2019) applied DOLS and Granger causality techniques to explore the linkage between globalisation and real estate development in Nigeria between 1990 and 2016. The authors posited that globalisation exerted a positive and significant impact on real estate development in the country. Also, FDI Granger caused real estate development in the country. A Cointegration Approach was employed by (Agbarha & Peter, 2017) to explore the relationship between major globalization indicators and economic growth in Nigeria, the result showed that current FDI and one period lagged FDI, one period lagged exchange rate, current balance of payment and two period lagged openness of the economy to the outside world have a positive and significant impact on the level of economic growth in Nigeria. Industrialization is said to be a hallmark for modern economic growth and development but the Nigerian industrial sector has suffered from decades of low productivity and currently in state of coma. In the same vein similar study reveals that foreign direct investment had an inverse relationship with economic growth in Nigeria (Imandojemu, 2021). Similarly, cointegration tests and the Short and Long Run Dynamics Autoregressive Distributed Lag (ARDL) test was employed by (George-Anokwuru, 2018) it was discovered that import is negatively related to Gross Domestic Product and significant effects on industrial growth, whereas export increased growth of the Nigerian economy. Other recent studies on the effects of globalization on economic growth in Nigeria reveals that over dependence on crude oil exports, low export of locally produced goods among others are the impediments to the even globalization experience in Nigeria (Okpokpo, Ifelunini, & Osuyali, 2014; Feridun, Olusi, & Folorunso, 2006).

Furthermore (Adofu & Okwanya, 2017; Uwadiegwu, 2015; Binuyo, Oluwadare, Adeoye, Olanrewaju, & Obiakor, 2017) have tried to examines the effect of trade openness and total factor productivity on industrial output in Nigeria, while using Vector Autoregressive (VAR) analysis to measure the effect of trade openness and total factor productivity on industrial output in Nigeria, the outcome of the study shows that that trade openness has a positive increasing effect on industrial output in Nigeria while the effect of total factor productivity on industrial output is found to be insignificant. There is the need to avert globalization of

poverty in Nigeria as the foregoing studies posit that Nigeria is in the verge of complete collapse of her industrial sector if the Nigerian government do not rise to safe her from the precipice of collapse by aiding the industrial sector in terms of tax holidays, tax relief, exemptions among others.

3. Methodology

The relationship between globalization and industrial development in Nigeria has been examined in this study. Achieving this objective required that an ex-post facto research design is considered appropriate because the study explores the viable relationship, and as well describes how globalization predicts variation in industrial development in Nigeria. Consequently, the study used annual data which was extracted from the World Development Indicators. The scope of the study was between 1990 and 2019. 1990 was exclusively chosen as the base year because the adoption of the popular SAP in Nigeria in 1987 sparked off the sporadic inflows of foreign capital into the economy from the early 1990s.

Model Specification

In building empirical model for this study, two of the relevant "KOF Globalization Index" enunciated by Dreher, Gaston and Martens (2008) serves as a guide for this study. However, "KOF Globalization Index" categorizes globalization into three phenomena namely economic, political and social. Whereas, the economic dimension of globalization, which is the central focus of this paper emphasizes international capital flows via FDI and trade openness. Therefore, in adapting for this study, an insight was drawn from the works of and Parisa and Hashem (2014), Aderemi *et al.* (2020), and Olowookere *et al*. (2021) by eliminating variables that do have any link with this study. The functional form of the model is illustrated as follows;

Industrial Development = f (Globalisation)

IDM = f (FDI, TRO) (I)

Introducing some control variables to model (1), the classic Cobb-Douglas production function of the model could be enunciated as

$$IDM = FDI^{\theta_1} TRO^{\beta_2} GOE^{\Omega_3} EXC^{\theta_{21}} GFCF^{\beta_{22}} \quad (2)$$

Introduction of the natural logarithm to model (2) in order to satisfy the conventional linearity assumption of the OLS transform the model to a linear equation as follows;

$$LogIDM_t = a + \theta_1 LogFDI_t + \beta_2 LogTRO_t + \Omega_3 GOE_t + \theta_{11} LogEXC_t + \beta_{22} LogGFCF_t + \mu_t \quad (3)$$

Where:

IDM is used to denote industrial development. This is measured by manufacturing value added as percentage of GDP, which its unit is in percentage. FDI is proxied by FDI inflows which is in million dollars. TRO is trade openness measured as addition of imports and exports as percentage of GDP. Its unit is in percentage. GOE is total government expenditures in billion dollars. EXC is exchange rate, which measures the value of the country`s currency vis-à-vis dollar. GFCF is gross fixed capital formation as percentage of GDP. u is error term. t represents the period of the analysis. Meanwhile, it is expected that the parameters have positive sign.

4. Results and Discussion

Table 1: Descriptive Statistics of Annual Data Series (1990 -2019)

Descriptive statistics	**IDM**	**EXC**	**FDI**	**GOE EXP**	**GFCF**	**TRO**
Mean	12.67290	121.6748	1.730667	4.300933	28.43333	35.94583
Median	11.19200	127.2300	1.575000	4.474000	26.05000	37.62500
Maximum	20.92700	306.9210	5.790000	9.448000	53.10000	53.28000
Minimum	6.553000	8.038000	0.500000	0.911000	14.10000	-5.935000
Std. Dev.	4.660987	88.82786	1.177985	3.011154	12.21913	11.62859
Skewness	0.439744	0.587829	1.942353	0.373899	0.474313	-1.465005
Kurtosis	1.640073	2.781034	7.020928	1.685217	1.985835	6.768675
Jargue- Bera	3.278627	1.787649	39.07350	2.859820	2.410525	28.48483
Probability	0.194113	0.409088	0.000000	0.239330	0.299613	0.000001
Sum	380.1870	3650.245	51.92000	129.0280	853.0000	1078.375
SUM. Sq. dev	630.0192	228821.3	40.24179	262.9443	4329.907	3921.498
Observation	30	30	30	30	30	30

Source: Authors' calculation (2021)

One of the crucial conditions necessary for the application of econometric technique is the normal distribution of series in a given study. In view of the above, the estimated results of descriptive statistics of the various relevant variables have been reported in Table 1. Firstly, MVP which is manufacturing value added as percentage of GDP from 1990 to 2019 had 6.553% and 20.927% as minimum and maximum values respectively. The mean value of this variable is 12.67% while the standard deviation is 4.66%. This shows that the variable is moderately dispersed from its mean because it has a standard deviation which is lower than the mean value. Similarly, other variables such as EXR, FDI, GEP, GFCF and TO shared identical behavior with the MVP. This implies that all the series were moderately dispersed from the mean. Meanwhile, with the exception of TO, all other series were positively skewed.

Table 2: Unit Root Test

Variables	**ADF TEST**						
	Level	**Prob.**	**1st Dif.**	**Prob.**	**2nd Dif.**	**Prob.**	**Decision**
IDM	-2.967767	0.7008	-2.976263	0.1785	-2.976263	0.0000	I (2)
EXC	-2.967767	0.9883	-2.971853	0.0072			I (1)
FDI	-2.967767	0.0338					I (0)
GOE	-2.967767	0.6390	-2.971853	0.0004			I (1)
GFCF	-2.967767	0.2334	-2.971853	0.0002			I (1)
TRO	-2.967767	0.3654	-2.976263	0.0008			I (1)
VARIABLES	PP TEST						
	Level	Prob.	1st Dif.	Prob.	2nd Dif.	Prob.	Decision
IDM	-2.967767 - 2.967767 -2.967767	0.6812	-2.971853	0.0009			I (1)
EXC	-2.967767	0.9867	-2.971853	0.0105			I (1)
FDI	-2.967767	0.0281					I (0)
GOE	-2.967767	0.5790	-2.971853	0.0004			I (1)
GFCF	-2.967767	0.2132	-2.971853	0.0002			I (1)
TRO	-2.967767	0.4122	-2.971853	0.0002			I (1)

Source: Authors' calculation (2021) %5 level

The essence of estimating a unit root test is linked with the need to verify stationarity status of the various employed data at different forms. And as such, risk of running into nonsense or spurious results in a study is mitigated through this test. Therefore, the Augmented Dickey Fuller (ADF) and Phillip Peron test (PP) were simultaneously utilized to test whether the data possesses a unit root or not. Table 2 shows the estimated results as follows; FDI inflows is stationary at level which means it is I (0) data. But EXC, GOE, GFCF and TRO are stationary after first differencing which means they are I (1) data. And IDM becomes stationary after second differencing which means it is I (2) data. Therefore, the utilized data possesses different orders of integration, this could spur a sort of divergence among the variables of interest in the short run. However, this divergence has the possibility of returning to equilibrium in the long. Hence, the Johannsen cointegration test is required in this regard to establish the existence or otherwise of long run convergence of the variables of the interest.

Table 3: Johansen Co-integration Test (Trace Statistics) and (Maximum Eigen value)

Hypothesized No. of CE(s)	**Eigen value**	**Trace Statistics**	**P- Value**	**Max- Eigen Statistics**	**P-Value**
None*	0.873877	129.7924	0.0000	57.97383	0.0002
At most 1*	0.693708	71.81852	0.0343	33.13003	0.0612
At most 2	0.479162	38.68849	0.2729	18.26486	0.4732
At most 3	0.411169	20.42363	0.3946	14.82926	0.3010
At most 4	0.179426	5.594371	0.7428	5.537037	0.6730
At most 5	0.002046	0.057334	0.8107	0.057334	0.8107

Source: Authors' calculation (2021)

While establishing the existence or otherwise of long run convergence of the variables of the interest in this work, Table 3 above shows the estimated results of the long run equilibrium relationship between globalization and industrial development in Nigeria within the context of Johansen Cointegration Test. It was revealed from the above findings that there was presence of at most three (5) cointegration vectors in the estimated model. This confirms that globalization and industrial development have a long run convergence in Nigeria.

Table 4: Fully Modified Ordinary Least Square (FMOLS)

Regresors	Coefficient	T- statistics	Prob. Value
LogEXC	-0.022611	2.675825	0.0135
LogGFCF	0.151141	2.017584	0.0554
LogGOE	-0.595712	3.006023	0.0063
LogTRO	-0.118355	3.150376	0.0045
LogFDI	-0.128702	0.407115	0.6877
R- Squared	0.91		

Dependent Variable: LogIDM
Method: Fully Modified OLS
Source: Authors calculation (2021)

Table 4 shows the estimates of the long run relationship between various variables of globalization and industrial development in Nigeria using the technique of the Fully Modified Ordinary Least Squares. It could be deduced from the table that it was only LogGFCF that had the expected sign, while all other variables showed otherwise. Meanwhile, the R-squared is 0.91, which implies that EXC, GFCF, GOE, TRO and FDI jointly accounted for about 91% of the systematic variations in IDM. The implication of this is that the model is relatively good for this empirical analysis. Furthermore, exchange rate had a significant negative relationship with industrial development. A unit change in exchange rate would

induce a reduction in manufacturing value added by 0.02 unit in the country. Similarly, government expenditure had an inverse but significant relationship with industrial development. A unit change in expenditure by the government induces a reduction in manufacturing value added 0.5unit. Conversely, gross fixed capital formation and industrial development had a significant direct relationship. This implies that a unit change in this variable induces a rise in manufacturing value added by 0.15unit. Furthermore, the economic globalization depicted by both FDI inflows and trade openness had a negative relationship with industrial development respectively. Though, trade openness was significant while FDI inflows showed otherwise. Therefore, a unit change in trade openness induces a reduction in manufacturing value added in Nigeria.

By and large, it could be submitted in this study that globalization leads to the dwindling of industrial development in Nigeria. The reasons for this result, firstly might be as a result of the largest proportion of the inflows of FDI in the direction of oil and gas sector in the past decades in the country. In the same vein, manufactured products in Nigeria might lack value added quality which could render them uncompetitive in global market. It therefore imperative to state that economic globalization is a curse to industrial development in Nigeria, because the latest wave of economic globalization contributed to a significant reduction in manufacturing value added in the country. The finding in this study validates the propositions of earlier authors such Awake (2002), Garry (1998), Gondwe (2001), Dembele (1998), Saibu and Akinbobola (2014) who held the views that globalization is curse to developing countries. Also, some other studies such as Onwuka & Eguavoen (2018) Uwadiegwu (2015) are in tandem with the submission of this study.

Table 5: Pairwise Granger Causality Test

Null Hypothesis	**F-Statistics**	**Prob.**	**Decision**	**Causality**
ER does not Granger Cause IDM	2.16759	0.1373	Accept	None
IDM does not Granger Cause ER	0.22259	0.8021	Accept	
FDI does not Granger Cause IDM	0.22952	0.7967	Accept	
IDM does not Granger Cause FDI	3.57748	0.0444	Reject	unidirectional
GFCF does not Granger Cause IDM	0.53666	0.5918	Accept	
IDM does not Granger Cause GFCF	4.84596	0.0175	Reject	Unidirectional
GOE does not Granger Cause IDM	0.18520	0.8322	Accept	
IDM does not Granger Cause GOE	3.07650	0.0655	Accept	
GFCF does not Granger Cause ECR	6.01243	0.0079	Reject	Unidirectional
ECR does not Granger Cause GFCF	0.40169	0.6738	Accept	
TRO does not Granger Cause ECR	1.01254	0.3789	Accept	
ECR does not Granger Cause TRO	4.48358	0.0227	Reject	Unidirectional
TRO does not Granger Cause GFCF	1.08027	0.3561	Accept	
GFCF does not Granger Cause TRO	4.50772	0.0223	Reject	Unidirectional

Source: Authors calculation (2021)

Despite the fact that a co-integrating relationship has been established between globalization and industrial development in this study, the authors made further efforts to analyze the feedback effect of various variables of interest utilizing Pairwise Granger Causality technique. Table 5 shows that a unidirectional causality flows from manufacturing

value added to FDI inflows. However, no feedback relationship exists between trade openness and manufacturing value added. This implies that industrial development in Nigeria is a necessary condition before globalization could partly contribute fortunes to the country.

Moreover, a unidirectional causality flows from industrial development to gross fixed capital formation. Whereas, gross fixed capital formation Granger causes exchange rate, and a unidirectional feedback flow from exchange rate to trade openness. Finally, gross fixed capital formation Granger causes trade openness. This implies that the long run convergence among the variables of interest earlier established in Table 3 is validated by the estimated results of Granger causality.

5. Conclusion and Policy Recommendation

The question whether globalisation is curse or cure to industrial development between 1990 and 2019 has been investigated within the framework of Fully Modified Ordinary Least Squares (FMOLS) and Granger causality test. In the light of the above, the following principal findings has been emerged in this study. Firstly, exchange rate had a significant negative relationship with industrial development. Government expenditure had an inverse but significant relationship with industrial development. But, gross fixed capital formation and industrial development had a significant direct relationship. Also, both FDI inflows and trade openness had a negative relationship with industrial development respectively. Though, trade openness was significant while FDI inflows showed otherwise. Therefore, economic globalization a curse to industrial development in Nigeria because the latest wave of economic globalization contributed to a significant reduction in manufacturing value added.

In the same vein, a unidirectional causality ran from manufacturing value added to FDI inflows. However, no feedback relationship existed between trade openness and manufacturing value added. This implies that industrial development in Nigeria is a necessary condition before globalization could partly contribute to fortunes to the country.

Moreover, a unidirectional causality ran from industrial development to gross fixed capital formation. Whereas, gross fixed capital formation Granger caused exchange rate, and a unidirectional feedback ran from exchange rate to trade openness. Finally, gross fixed capital formation Granger caused trade openness. Therefore, from these findings, this study recommends that before the current wave of economic globalization could be a cure to industrial development in Nigeria, the policymakers in the country should embark on policies that would drive the largest proportion of the inflows of FDI in the direction of manufacturing sub sector in the country. Similarly, all hands must be on deck by all the relevant stakeholders to ensure that manufactured products in Nigeria possesses value added quality to facilitate their competitiveness in the global market.

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DO ENTREPRENEURIAL DYNAMICS AND EMPLOYMENT INFLUENCE ECONOMIC GROWTH? EVIDENCE FOR ROMANIA

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Abstract: *The literature on the relationship between entrepreneurship, firm formation and economic development often describes entrepreneurship as a complex phenomenon, led by individuals, embedded in a broad economic and societal context, which, in regional terms, influences the quality and results of the entrepreneurial process. From a micro-economic perspective, the region is shaped by the myriad of laborious and innovative actions of entrepreneurs, looking for opportunities, taking risks, starting businesses and generating economic and social associations. Competition, trust, networks, mentalities, the education system, public policies, all are ingredients that can provide opportunities for many actors at the local level (institutions, businesses, population, etc.) and thus, for the region as a whole to thrive. Often these elements can offer the opportunities of economic convergence between regions and countries. On the other hand, we found that the potential of entrepreneurship to generate benefits and an impetus for the economic growth of regions were not fully researched and understood, despite suggestive empirical evidence and a rich literature in regional studies. In this article we analysed, at the level of the 8 development regions of Romania, the relation between the firm's formation and the evolution of the Gross Domestic Product, respectively the relation between employment/active population and the evolution of the Gross Domestic Product. We did not find clear evidence that the pace of setting up new businesses has a certain effect on economic growth or employment, but we found that in some regions, better equipped in terms of infrastructure, qualification and diversity of human capital, entrepreneurial dynamics could moderately influence the positive evolution of these macroeconomic indicators.*

Keywords: firm's formation, discontinuity; GDP; active population; Romania, development regions.

JEL classification: O18, L26, R11.

1. Introduction

In the literature of the last decades, entrepreneurship has gained a well-defined position in economic theory, assigning it a critical role in economic growth. It can be considered a fundamental, renewable resource, but depending on investment in education or quality of governance, its performance being uneven and dependent on certain characteristics of

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human societies, and unpredictable in time and space. Entrepreneurship is often linked with the prosperity of a society, but the concept and connection are somewhat vague, the definitions of experts, from different fields and periods of time, being diverse and challenging. In the literature on this topic, entrepreneurship is a complex phenomenon, led by individuals, but embedded in a broader economic and societal context, and in spatial terms, the regional context determines the quality and results of the entrepreneurial process. Theory and practice revealed a variety of challenges, areas of study and action for researchers, practitioners, and decision makers. It is a field in which industrial organization, cultural geography, locations theory, business economics and technological innovation create strong and constantly changing links. From a macroeconomic or global perspective, the region is a strategic element in a process of global development, meanwhile, from a micro-economic perspective, the region is shaped by innovative actions of entrepreneurs who seek opportunities, undertake risks and initiate business, stimulating new economic and social relations.

Nowadays, the main concerns of regions and local communities refer to the discovery of new ways of encouraging and supporting local development, by the incentivizing of entrepreneurship and the setting up new firms (or the support of existing ones). Literature considers that free initiative, entrepreneurship, innovation and the energy of setting up large numbers of small and medium-sized enterprises (SMEs) are an essential force in ensuring economic growth, balanced development of regions, mitigating the crisis of rural communities and unemployment, increasing revenues for local and national budgets, enhancing creativity and avoiding the depopulation of small communities (Acs & Armington, 2004).

On the other hand, this solid trust in the potential and the nuances of entrepreneurship in solving worldwide economic and social problems has generated a dispute between those who support the entrepreneurial dependence by environment (an entrepreneurship influenced by education, culture, social support systems, technology, the presence of human capital) and those who consider that entrepreneurial behavior is highly individualized and is able to overcome the social and regional conditioning in which it appears. The mainstream of academics, practitioners and supporters of free initiative, but especially the representatives of local and regional communities, agree that favorable economic, social and cultural conditions must be created (Davidsson, 1995; Aoyama, 2009), and that the presence of human capital (Acs and Armington, 2004), the availability of financial resources (Audretsch & Keilbach, 2004), (Usman et al, 2019), the capacity to learn and nurture creativity (Florida, 2007), will lead to the flourishing of entrepreneurship and the creation of new SME's, and thus will commit to the development of communities and regions. Even so, by understanding entrepreneurship as being a highly contextual phenomenon we cannot ignore the individualistic features of the entrepreneur and its ability to shape the economic and social environment in which they develop. Carried by a highly popular wave that assigns entrepreneurship and the SME sector as having universal solutions to modern world issues, stimulated by the huge financial resources allocated to the cohesion and socio-economic convergence of the regions (as in the case of the EU), scholars and policy makers ignore, or tacitly accept, a series of threats. Some of them stem from the extremely diverse nature of social and economic inequalities. Others are based in the unique and contextual nature of entrepreneurship and, that is possible that private initiative and the evolution of entrepreneurship to occur and manifest themselves in different directions and generate unequal and unsatisfactory results between regions (Fritsch & Mueller, 2008) between urban areas, or between developed and developing countries respectively.

2. Brief theoretical overview on entrepreneurship and regional development

Theories about the role of the regional context and regional entrepreneurial and innovation systems have been rapidly adopted in recent years, both in scientific areas and in political and economic decisions, strengthened by the contributions of Michael Porter (1990), (2000) on the determinants of competitive advantage in firms and nations, and, respectively, by regional theories on the advantages of location and industrial districts (Krugman, 1991; Becattini, 1990). Porter's model (1990) argues that the most important factors shaping the competitive advantages of nations and regions are: 1. The presence of related and support industries, 2. The availability and quality of factors of production, 3. Domestic demand and market opportunities 4. The structure of the economy (cooperation between firms, intra-industry rivalry, the wider economic landscape of the national or regional economy).

Although Porter's model was developed to explain the competitive advantage of some nations over others, in recent decades it has also been used to analyse regional economic structures, combined with the externalities of Marshallian industrial districts (labour, collaboration between similar companies along the value chain) (Becattini, 1990) and dynamic externalities (learning and knowledge) (Audretsch, 2003).

Porter's contribution is to urge us to look beyond individual industrial sectors (as defined by NACE codes) to understand regional economic dynamics, and that interactions between sectors matter for regional economic growth. In other words, the theory developed around these concepts insists on the dynamic role of the national and regional economy and emphasizes the chance of creating and exploiting the synergy between industrial sectors, knowledge dissemination, synergies in productions and learning effects.

Some questions arise: what kind of regional externalities are most important for entrepreneurship to contribute to regional development, and how can we distinguish to strengthen the positive effects and temper the negative consequences, how to turn the entrepreneurial context from a passive opportunity provider, into an active agent of development (Acs, et al., 2014; Johannisson, 1993)? How can we determine companies to approach and make connections to specialized resources, such as qualified people, companies and institutions, support structures (Szerb, et al., 2013), beyond the access to vital resources (financial capital, customers, distribution channels, human capital, essential services, etc.)? The diversity and availability of specialized resources can shape the support provided to entrepreneurs and can differentiate between intra- and inter-regional performance.

Most studies highlight the key role of personal initiative and motivation in business creation and development, but also that the entrepreneurship is dependent upon the wider economic and social context (Acs, et al., 2014; Badulescu, 2010). In regional terms, researchers have identified numerous factors, such as income levels, education and qualifications, infrastructure, legislation, social cohesion etc. which can both increase or diminish the effects and importance of personal initiative (Fritsch, 2008; Acs, et al., 2014, Fritsch & Wyrwich, 2017). Understanding the role and benefits that entrepreneurship activities have upon the economy and society also requires a multi-dimensional approach, which can also capture certain qualitative aspects, such as creativity, innovation, intensive use of technology, value creation and growth potential, environmental and institutional factors etc. (see Figure 1). Starting from the idea that there is a certain lag between when an enterprise is created and uncovering the effects on productivity and regional GDP increase, Dejardin (2011), in a study on Belgian regions, claims that the net firms' entry could play an important role in explaining regional economic growth. Also, he points out that the most important and visible effects appear in the service sectors and are less visible in the manufacturing (production) sectors (Dejardin, 2011). Moreover, Fritsch (2008) has introduced a dynamic aspect explaining these influences, proving that ripple effects do not refer only to a time lag between the creation of an enterprise and recognizing its outcomes.

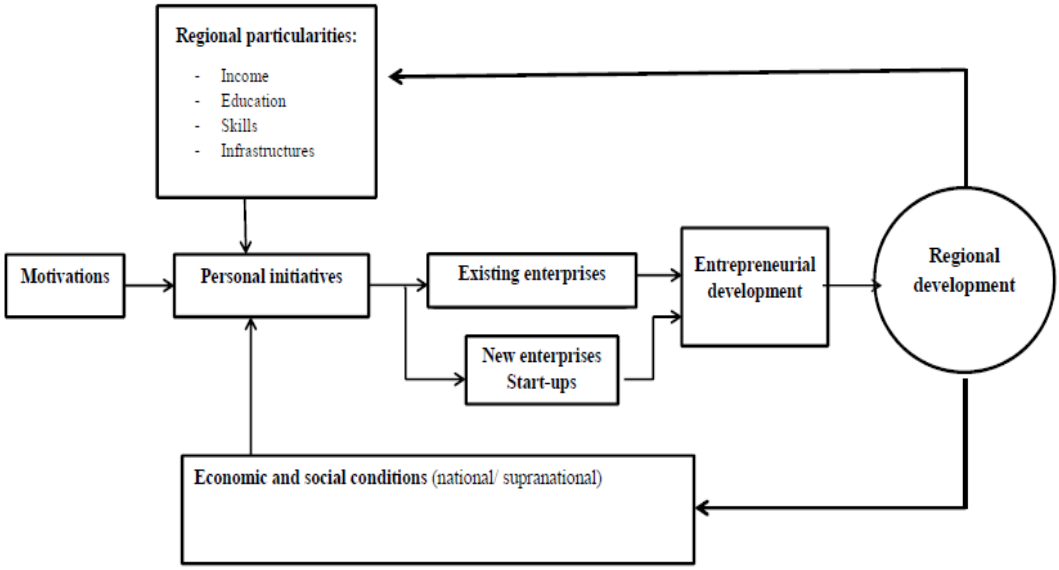

Figure 1: Interaction between private initiative, national factors and regional particularities in regional and local development
Source: own elaboration based on Fritsch and Wyrwich (2017) and Acs and Armington (2004).

Another challenge for regional or national entrepreneurial dynamism concerns understanding the relationship between new business creation and growth: either as a source or as a consequence of economic growth. Although much of public policy, common perception and a part of economic theory support the idea that setting up of new companies supports economic growth, Shane (2008) and Meza and Southey (1996) claim that there aren't enough arguments to support the idea that the creation of new enterprises generates economic growth, and that "rather, economic growth probably causes people to start businesses" (Shane, 2008, p. 2). Their research, conducted on a large number of countries and over great lengths of time, suggests that "firm formation" tends to be quite modest and even declines as countries become more economically prosperous. Thus, the authors have stated that there is no long-term statistical correlation between the formation rate of new enterprises and the increase of number of employees in a given territorial profile, but a relatively constant ratio among regions between the number of enterprises and the territorial population. In other words, there is a slowing down of the rate of forming new enterprises in more developed regions, together with a more sustained pace in regions with fewer newly created enterprises.

3. Regions and entrepreneurial dynamics: objectives, challenges and strategies

The analysis of entrepreneurial dynamics takes into consideration two different concepts: the analysis of figures pertaining to business formation, growth, churn and survival, and, respectively, the information regarding competitiveness, i.e. how we understand and measure productivity, innovation potential and the degree of openness of new enterprises (CREC, 2017).

There are a variety of objectives pursued by regions and local communities in economic development policies. Some regions focus on simple quantitative targets, such as increasing the number of entrepreneurs, start-ups, and jobs created, while others on precise objectives, outlined by a certain profile of the company (companies) / jobs / or entrepreneur (frequently "creative") desired in the respective area. Finally, there are quantifiable "output" regional objectives - production, deliveries of goods and services in / from that region.
Although all these objectives can be rational and achievable, it is recommended for these objectives to be defined and adjusted according to the expectations and resources allocated and to be more results-oriented. Also, the vitality of entrepreneurial ecosystems (national, regional, community) depends on other elements, such as funding for research and development in universities, available investment capital, number and qualification of people with higher technical education, patents or technological licenses obtained in (local) universities or research centres, etc., which are associated with a certain type of entrepreneurial activity and better anticipate the qualitative results that are pursued (Stangler & Bell-Masterson, 2015).
Regions, be them rural or urban, present themselves with certain concerns. First of all, regions fear that they will be ignored or that they will be granted a secondary importance. Secondly, high "death" rate of companies (even in high-edge development sectors), especially in the first two years of existence, raises the problem of long-term viability for a vast majority of jobs. Regions and decision-making factors should not concentrate exclusively on attracting only high-tech or well-known companies. Economic diversity can diminish the impact of an economic recession (that could be devastating for the regions only focused on singular/unique industries) and ensure complementary and diverse employment conditions. Entrepreneurial performance and economic prosperity are based on a general continuity of successes, successes that are built upon long term logical and healthy economic principles. We must accept the fact that entrepreneurial or corporate success is not permanent, by rather temporary and irregular (Gavrilut et al., 2019). We must be aware that each economy is cyclical, and that turbulences, expansions, contractions and the disruption of industries will always exist, and that the most affected component is and will be employment. In the case of entrepreneurs, economic measures must lead to the regaining of trust in themselves as entrepreneurs and to rediscover their entrepreneurial spirit. Quick recovery and regaining of growth following each episode of a crisis thus requires attention and preparedness and these should be part of the concerns of political decision makers and of representatives of communities.

4. Regional outlook on Romania

In Romania, at 1st of July 2020, out of 1.08 million companies, up to 1,02 million are to be considered active (Romanian National Trade Register Office, 2021), approximately 53 active companies for each 1000 individuals (National Institute of Statistics (Romania), 2021a). Compared to the EU average or ECE countries, Romania scores well regarding entrepreneurial efficiency, young business entrepreneurs, Total Early-stage Entrepreneurs (TEA) or entrepreneurial employees' rate, but scores low in respect to innovative capacity (Dézsi-Benyovszki, et al., 2014; Badulescu and Cadar, 2016). This proves that it is not only the number of enterprises that matters, but also, their quality, the sectors in which they operate, their innovative potential, the net results, and last but not least, their geographic distribution. Romania, alongside Croatia, Hungary, Lithuania and Poland currently position themselves as being efficiency driven economies. Approximately 31% of the entrepreneurial actions tend to be focused towards the transformational sector, and roughly a quarter of entrepreneurs use new technologies (Dézsi-Benyovszki, et al., 2014). Both on the short and long term, efficiency as regards the economics of regions is necessary, but a transition from an efficiency-based economy to an innovation-based economy is vital; what is more,

developments in the higher education sector and the proper functioning of the labor market are elements that have to be dealt with before achieving the aforementioned transition. Even so, in recent years, we have seen that some regions or counties from Romania have developed and evolved at higher rates than other regions. This in turn should lead to increased labor force churn in these areas, given an increased income potential.

5. Methodology, results and discussion

Starting from the idea that the dynamics of the emergence and discontinuation of firms as well as of the active population should be reflected in the dynamics of the GDP (Simut et al., 2019), we have tried to statistically demonstrate the existence and the meaning of these relations in the case of the 8 development regions (EU-NUTS-2) of Romania. The data was obtained from the official web pages of the Romanian National Institute of Statistics (for the active population, price indices, GDP) and the Romanian National Trade Register Office (for registrations and discontinuations of enterprises), for the years 2004-2018 (see Tables 4 and 5 in Annexes). To test the hypothesis, we have used the Pearson correlation coefficient and the Pearson correlation ratio.

The study of the correlation between enterprise registrations and GDP (Table 1) indicates the existence of strong (and almost functional) negative correlations between the company registrations and the GDP, both regional and national Romanian level. The weakest (negative) relation refers to the South West region (-0.0101), followed by the North-West region (-0.1643). At least apparently, the results do not confirm our initial assumption that the new firms' formation influences GDP growth. Table 4 and Table 5 (Annexes) also show that 2005 was a year of "optimism" as regards the setting up of new firms throughout the studied period, both at regional and country level. As exception, we mention the Bucharest-Ilfov Region (in 2007), and the South West Region respectively (in 2012). We do consider that the large number of registered companies is not reflected in an immediate increase in GDP level, this at least in part due to the fact that these new registrations are actually firms at the beginning of an (yet to be efficient) economic activity, often marked by the lack of experience of the entrepreneur, having a reduced activity, few or no employees. Thus, their impact on GDP would occur only a few years following their registration. There is also the possibility of data distortions, where the place of registration is different from the main activity location etc.

Table 1: The analysis of the correlations between the number of registered and discontinued companies, the active population, and the GDP, by region and country total (2004-2018)

Dependent variable: *Gross Domestic product- GDP*						
Period: 2004-2018 (annual data)						
Simple linear regression						
Region	**Independent variable**					
	Number of registered companies (NRC)		Number of discontinued companies (NDC)		Employment (EMP)	
	r	R-squared	R	R-squared	r	R-squared
Bucharest-Ilfov (B)	-0.4418	0.1952	0.1899	0.0361	0.6624	0.4388
Center (C)	-0.7122	0.5072	0.1953	0.0381	-0.6566	0.4311
North-East (NE)	-0.6412	0.4111	-0.0693	0.0048	0.3239	0.1049
North-West (NW)	-0.1643	0.0270	0.1289	0.0166	-0.0783	0.0061
South (S)	-0.3944	0.1556	0.0206	0.0004	-0.7919	0.6271
South-East (SE)	-0.6715	0.4509	0.0329	0.0011	-0.8250	0.6806
South-West (SW)	-0.0101	0.0001	0.2328	0.0542	-0.7014	0.4920
West (W)	-0.4948	0.2448	0.1378	0.0190	-0.6854	0.4698
Total	-0.5172	0.2675	0.1138	0.0130	-0.5148	0.2650

Source: own elaboration based on National Institute of Statistics (Romania), 2021b)

The study of the correlation between discontinued companies and GDP (Table 1) shows the existence of positive, but weak links between discontinued companies and GDP, both regional and national levels. The strongest (relative) association can be found in the South West Region (0.2328), followed by the Center region (by 0.1953). The statistical data (National Institute of Statistics (Romania), 2021b) pinpoints that 2010 was the year with the highest number of discontinuations, both at national and regional level, exceptions being the Bucharest-Ilfov and South-East regions (where this year was, in both cases, 2006). Even so, 2010 still remains a year of significant firms' discontinuation in the Trade Registry throughout the analysed period. The existence of a direct correlation, albeit relatively weak, can be attributed to the fact that that the owners of the non-performing or inactive firms have decide to close them down, either for fiscal reasons or because of the opportunity or need. Except for several tax or legislative measures that can be documented, we are cautious when considering opportunistic, personal or circumstantial reasons as being the genuine motives for the closure peak 2010. We remain at the idea that the "natural" discontinuation of enterprises, far from denoting a negative phenomenon or the sign of an imminent economic collapse, can lead to a better knowledge of the economic environment, of the real number of active firms that contribute to the development and evolution of the GDP. In other words, these discontinuations are, in large part, a removal of the excess of inactive, insignificant economic, formal firms (many established in periods of economic euphoria, by economically unexperienced individuals).

When studying the correlation between the active population and the GDP (Table 1), we have observed contradictory links both regional and national levels. For the Bucharest-Ilfov Region we have noticed a strong, almost functional link between the active population and

the GDP, with a value of 0.6624, followed by the North East Region, with a strong but yet weaker link, with the value of 0.3239. The results for the other regions and country total suggest that there are weak, opposite correlation between the active population and GDP. We could presume either that the Bucharest-Ilfov and North East regions attract more of the active population resources from other regions, or that the structure of the active population (considering their respective qualifications and occupations) is more advantageous for the Bucharest-Ilfov and North East regions. However, further proof of these explanations is necessary. The weakest, and also negative, link between the active population and GDP is found in the North West region (- 0.0783).
In order to increase the significance of the results that determine the impact that the dynamics of the firms' registration and discontinuation as well as the impact of the dynamics of the active population on the GDP in Romania's regions, we will investigate the stationarity, using the Augmented Dickey Fuller test.

Table 2: Unit root test results (ADF test)

ADF (level) - p-value								
	B	**C**	**NE**	**NW**	**S**	**SE**	**SW**	**W**
GDP	0.96	0.98	0.66	0.99	0.91	0.46	0.98	0.95
NRC	0.27	0.33	0.21	0.13	0.25	0.20	0.07	0.38
NDC	0.01	0.01	0.02	0.01	0.04	0.00	0.05	0.01
EMP	0.03	0.97	0.13	0.52	0.66	0.97	0.70	0.91
ADF (first difference) - p-value								
GDP	0.02	<0.10	0.10	<0.10	0.01	0.03	<0.10	0.07
NRC	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01
NDC	-	-	-	-	-	-	-	-
EMP	-	0.05	0.01	0.05	0.05	0.04	0.03	0.02

Source: authors' estimates using Eviews

Augmented Dickey-Fuller test results indicate that the null hypothesis is rejected at the 5% level of significance after the first difference for most of the variables in all region. Because all these variables have a unit root and are stationary at the first difference, we will used log transformation.

Table 3: The estimation of multiple linear regression in each region

Dependent variable: *Gross Domestic product- GDP*								
Period: 2004-2018 (annual data)								
Multiple linear regression								
	B	C	NE	NW	S	SE	SW	W
Intercept	-	60.42 (0.00)	17.96 (0.08)	-81.71 (-2.05)	95.98 (0.00)	66.28 (0.00)	60.46 (0.02)	67.12 (0.00)
NRC (p-value)	-1.72 (0.00)	-2.40 (0.00)	-2.50 (0.00)	-1.88 (-2.80)	-0.70 (0.10)	-1.88 (0.00)	-	-2.50 (0.00)
NDC *(p-value)*	-	-	-	-	-	-	0.21 (0.10)	-
EMP *(p-value)*	4.09 (0.00)	-3.79 (0.05)	2.37 (0.09)	15.64 (3.00)	-10.97 (0.01)	-5.37 (0.00)	-7.61 (0.04)	-4.86 (0.00)
R-squared	0.63	0.77	0.55	0.72	0.52	0.74	0.43	0.78
DW	0.74	1.37	1.35	1.44	0.53	1.26	0.56	1.61
White (*p-value*	1.09 (0.39)	1.24 (0.35)	0.68 (0.64)	1.23 (0.36)	0.33 (0.84)	0.72 (0.59)	0.42 (0.78)	0.67 (0.62)
JB (*p-value*.)	5.03 (0.08)	0.49 (0.78)	3.85 (0.14)	0.40 (0.81)	1.30 (0.52)	1.38 (0.50)	1.39 (0.49)	0.73 (0.69)

Source: authors' estimates using Eviews

The results obtained from applying the multiple linear regression model also show that the NRC (*Number of registered companies)* negatively influences the GDP in each region, while the NCDs (*Number of discontinued companies)* in the South-West regions have a positive impact on GDP. In what concerns the testing of the fundamental hypothesis regarding the errors of the model, we can conclude that the homoscedasticity of the residual variable hypothesis is confirmed, as the probability related to the Fisher statistic is higher than 0.05. Also, the independence of the residual variable hypothesis is confirmed in five regions, since the Durbin Watson statistic is greater than the critical value $d_2 = 1.26$ and lower than $4-d_2 = 2.74$. Because the error independence hypothesis is not verified, to eliminate the phenomenon of autocorrelation we will use in the following studies the Cochrane-Orcutt method. The Jarque-Berra test confirmed the normality hypothesis, as the associated probability of accepting the null hypothesis is larger than 0.05.

6. Conclusions

In order to understand more clearly how firms' dynamics and entrepreneurship contributes to economic and societal development, it is important to recognize the quality of entrepreneurial actions and behaviors in national, regional, community, urban contexts etc. The focus on regions has several explanations - first of all, most of (entrepreneurial) enterprises are set up, operate, develop and creates networks locally or regionally. By default, they take over (and, reciprocally, induce) local or regional contextual influences. Second, significant variations in industrial structures and differences in economic achievement between regions can also be understood through regional firms' concentration and entrepreneurial performance. In this paper we have tried to analyze, in the case of development regions (NUTS 2) of Romania, to what extent, the dynamics of firms 'setting-up and discontinuation, should be reflected in the dynamics of GDP.

Across Romanian regions, with respect to registrations and discontinuations of companies, even if scores tend to be quite similar, we didn't find a homogenous framework, that all

regions are similar and more or less of same attractiveness, performance, innovation and preparedness levels. In this paper we have aimed to address how firm formation and discontinuity is related to national and regional development, as well as the impact of these entrepreneurial developments on the active population and net investments in the economy. We have found that between the formation of new enterprises and GDP dynamics, strong, direct relationships cannot be proven, thus we cannot unequivocally voice out that the setting up of new businesses stimulates GDP growth. There are also weak and unconvincing correlations between the pattern of firm discontinuation and the evolution of GDP. We may consider that new enterprises have limited prospects that could not influence GDP, especially in their first few years of existence. In the case of discontinuations, by analysing the specific periods in which they had more accelerated rhythms and by interpreting this in connection with changes in the fiscal and legal frameworks, we can better explain the evolution of this indicator. Consequently, the correlations between SME dynamics and GDP dynamics are quite questionable (Gavrilut et al., 2019). We have noticed that there are relatively strong links between entrepreneurial dynamics, GDP and the employed population in some regions (already better placed in terms of economic and social development), which makes us advance the hypothesis that some regions will take advantage of the entrepreneurial dynamism in times of economic growths. Typically, we will see in performing regions an improvement in the structure of the active population as regards qualifications, as well as a higher share of dynamic entrepreneurs with higher education, while in other regions, despite their numbers, enterprises will have mediocre rhythms of growth, and dynamism and entrepreneurial initiative will be uncertain.

Certainly, the potential of entrepreneurship in creating economic and societal benefits and an impetus for the regions' economic growth has not been fully researched and understood, notwithstanding suggestive empirical evidence and a rich literature in regional studies. We consider that, from the perspective of economic development, a multidimensional understanding of entrepreneurship is certainly more appropriate facing new contemporary challenges. In other words, research must go beyond empirical investigations, which use simple dimensions of entrepreneurship such as self-employment rate, SMEs' creation rate, firms with individual private capital ratio, business churn, etc., most of them being one-dimension indicators, focused on identifying the population employed (or interested in engaging) in "entrepreneurial" activities. Multidimensional approaches must also focus on the qualitative aspects of entrepreneurship, such as creativity, innovation, knowledge and intensity of technology, value creation, or the orientation towards high growth potential. These approaches take into account different environmental factors, the efficiency and quality of the institutional framework, the quality of education, entrepreneurial traditions and the predisposition to association, etc. More researches, going beyond the quantitative coordinates and focus on qualitative and upgrading aspects, referring the structural trends of the SME sector, are needed.

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Annexes

Table 4: Gross Domestic Product (GDP), by regional and national level, 2004-2018 (billions of RON, current prices)

Regions	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Bucharest–Ilfov	53.3	69.4	81.1	102.7	141.5	131.1	133.0	147.1	158.7	171.4	179.0	197.8	207.6	232.8	256.5
Center	29.0	32.8	39.9	50.5	60.7	60.5	60.3	62.1	67.5	70.2	73.3	78.8	86.6	96.9	108.3
North-East	28.8	32.5	38.1	46.1	57.2	57.1	56.6	56.5	61.2	65.1	67.2	71.5	77.2	88.8	98.7
North-West	29.6	34.1	41.2	51.2	61.5	61.4	60.4	61.1	67.4	71.3	76.6	81.7	90.1	104.8	114.6
South	32.2	36.7	44.1	52.8	67.4	69.4	65.7	73.1	70.7	77.3	86.9	86.6	93.7	100.9	112.1
South-East	29.5	33.0	39.1	46.0	55.8	56.1	56.3	61.7	64.4	71.6	75.3	76.2	79.9	87.9	97.7
South -West	21.6	23.5	28.3	34.0	41.9	42.3	41.9	41.9	46.2	47.8	48.4	52.1	55.3	63.9	73.2
West	24.6	28.4	35.0	42.1	53.4	52.6	53.4	55.2	57.3	60.2	61.4	67.4	74.2	80.8	89.3
Total	248.7	290.5	347.0	425.7	539.8	530.9	528.2	559.2	593.7	635.5	668.6	712.6	765.1	85.7	95.1

Source: National Institute of Statistics (Romania), 2021b. TEMPO ONLINE. Available at: http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table, [Accessed at 18.08.2021]. Note: RON- National Romanian currency

Table 5: Number of new company registrations, for regional and national Romanian level, during 2004-2018

Region	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Center	29.2	28.1	27.2	31.8	30.1	22.3	21.1	22.8	22.8	23.2	22.5	23.9	22.6	28.0	25.1
North-East	18.3	19.5	16.4	18.1	17.7	14.0	14.8	15.2	14.2	14.0	11.3	12.8	11.7	15.1	14.7
North-West	17.3	21.6	16.5	18.0	18.8	15.5	15.5	17.0	15.6	15.6	11.9	13.6	12.2	15.3	15.7
South	22.2	22.9	19.8	23.0	21.7	16.4	18.4	19.9	20.3	20.6	16.1	17.2	16.3	22.9	23.0
South-East	16.0	17.7	14.8	16.4	17.4	14.4	14.5	16.1	14.5	14.4	11.6	12.9	12.4	15.8	17.0
South -West	16.3	19.3	14.8	16.0	16.8	13.6	14.0	15.3	13.6	13.3	11.0	12.9	11.7	14.3	14.5
West	10.5	12.1	9.6	9.8	10.7	8.9	10.0	11.8	13.1	11.7	7.5	9.4	8.9	11.5	11.1
Total	14.6	16.2	13.7	14.0	13.2	10.9	10.7	12.1	11.6	12.0	9.8	10.5	10.2	13.3	13.9
Center	144.3	157.4	132.8	147.1	146.5	116.0	119.0	130.2	125.6	124.8	101.6	113.2	106.0	136.6	135.5

Source: Romanian National Trade Register Office, 2021. Statistics. Available at: https://www.onrc.ro/index.php/ro/statistici, [Accessed at 16.08.2021].