Relationship Between Economic Growth and E-Commerce: Evidence from Brics Countries

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Abstract - In recent years, technological advancements and digitalization have significantly transformed the global economy, with e-commerce emerging as a key driver of economic activity. This study explores the relationship between e-commerce and economic growth in the BRICS nations Brazil, Russia, India, China, and South Africa. These countries, collectively representing a large portion of the global population and GDP, have experienced varying degrees of digital transformation, with e-commerce playing an increasingly important role. This present research work examines the impact of e- commerce on economic growth by analyzing indicators such as GDP growth, internet access, e-commerce sales, and employment generated by digital enterprises. Utilizing annual data from 2000 to 2022, this study aims to determine whether e-commerce fosters economic growth or whether economic expansion fuels the growth of digital markets. The findings are intended to provide valuable insights for policymakers, business leaders, and academics seeking to understand the dynamics between digital trade and economic development in emerging markets, while highlighting the challenges and opportunities faced by BRICS nations in the 21st century.

Keywords: E-Commerce, Economic Growth, BRICS.

I. INTRODUCTION

In recent years, the global economy has experienced a significant transformation propelled by technological advancements and digitalization. E-commerce has emerged as a pivotal catalyst of economic activity, transforming industries and affecting trade, consumption, and investment patterns globally. As economies shift towards digital environments, the significance of e-commerce in fostering economic growth has attracted considerable focus, particularly in developing nations where swift adoption of digital technologies presents considerable growth opportunities. The BRICS nations— Brazil, Russia, India, China, and South Africa—constitute a distinctive and varied assembly of emerging market economies. These nations collectively represent a substantial portion of the global population and GDP. In the last ten years, these nations have undergone differing degrees of digital transformation, with e-commerce emerging as a progressively significant sector in their economies. The increase in internet access, mobile connectivity, and digital payment systems in these countries has created an advantageous environment for the expansion of online enterprises and digital platforms. This study seeks to examine the correlation between economic growth and e-commerce in the BRICS nations, evaluating the impact of e-commerce platform proliferation on overall economic advancement. This research aims to determine whether e-commerce acts as a catalyst for economic growth or if economic expansion propels the growth of the digital marketplace by analyzing key indicators such as GDP growth, internet access rates, e-commerce sales, and employment produced by digital enterprises. This study's findings will offer significant insights for policymakers, business leaders, and academics seeking to comprehend the relationship between digital trade and economic performance in emerging markets. This study emphasizes the varied challenges and opportunities encountered by the BRICS nations, while elucidating the broader ramifications of e- commerce for long-term economic development in the 21st century.

II. PREVIOUS STUDIES

The influence of e-commerce on economic growth has garnered significant interest in academic literature, especially in emerging economies such as the BRICS nations (Brazil, Russia, India, China, and South Africa). E-commerce is regarded as a crucial element of digital transformation, providing substantial economic prospects by enhancing market access, lowering transaction costs, and promoting innovation. The relationship between e-commerce and economic growth is intricate and shaped by numerous factors, such as infrastructure, policy, and the degree of digital adoption. This review consolidates essential research that investigates the relationship between economic growth and e-commerce, concentrating on the BRICS countries.

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1.1 E-Commerce and Economic Growth

E-commerce is acknowledged as a significant driver of economic expansion, particularly in developing economies. Choi et al. (2017) emphasize that e-commerce can foster economic growth by improving business efficiencies, lowering entry barriers for SMEs, and broadening access to domestic and international markets. Their study posits that e- commerce can enhance productivity, innovation, and trade, thereby significantly contributing to GDP growth, especially in developing nations. The connection between e-commerce and economic growth encompasses not only direct contributions to GDP but also the improvement of the overall business environment. Juma and Mwasalu (2019) investigate the beneficial impacts of e-commerce on economic inclusivity, demonstrating that digital platforms provide avenues for economic participation that were formerly unattainable. This is especially pertinent in BRICS nations, where significant segments of the population reside in rural or underserved regions. Sharma et al. (2020) similarly observe that the expansion of e-commerce platforms has promoted economic integration, enhanced access to services, and fostered entrepreneurship in numerous developing regions.

1.2 E-Commerce Growth in BRICS Countries

E-commerce has emerged as a crucial driver of economic growth in BRICS nations, albeit with varying experiences among them. In China, e-commerce is regarded as a fundamental component of the nation's economic strategy. Zhang et al. (2019) demonstrate that China's e-commerce platforms, including Alibaba and JD.com, have revolutionized the retail and logistics industries, significantly impacting GDP growth. This swift growth is ascribed to advantageous policies, robust digital infrastructure, and heightened consumer expenditure propelled by e-commerce platforms. India has experienced significant growth in e-commerce, especially within the retail sector. Rai and Singh (2018) contend that the rise in internet penetration and mobile usage has been instrumental in the expansion of the e-commerce market in India, fostering GDP growth and the emergence of new economic sectors, including online services, e-finance, and logistics. Conversely, Brazil has encountered a distinct array of challenges. Despite the expansion of the country's e-commerce market, de Oliveira et al. (2020) observe that growth rates have lagged behind those of other BRICS nations, attributed to factors including inadequate internet penetration in rural regions and challenges associated with logistics and payment systems. Notwithstanding these challenges, the Brazilian government has implemented policies to promote digital entrepreneurship and e-commerce development, which have started to yield favorable outcomes. Russia and South Africa exemplify distinct cases. Rogerson (2020) indicates that while e-commerce in Russia is expanding, it is hindered by inadequate infrastructure and restricted internet access in remote areas. Sey et al. (2020) contend that in South Africa, although e- commerce has stimulated growth in urban regions, substantial obstacles to broader adoption persist, such as inequitable access to broadband internet and deficiencies in digital skills.

1.3 Digital Infrastructure and E-Commerce in BRICS Countries

Digital infrastructure is essential for the advancement of e-commerce. Brynjolfsson and McAfee (2014) assert that robust internet connectivity, dependable payment systems, and stringent cybersecurity measures are crucial for promoting e-commerce. Within the framework of BRICS nations, the accessibility of digital infrastructure is a crucial factor influencing e-commerce success. Sahoo and Das (2019) emphasize the significance of mobile technology in India, where the widespread availability of inexpensive smartphones has granted millions of citizens internet access, facilitating the expansion of e-commerce. In China, considerable investments in logistics and technology have positioned e-commerce as a major catalyst for economic growth. Nonetheless, nations such as South Africa and Russia continue to encounter significant obstacles in extending internet access to rural communities, thereby impeding the overall efficacy of e- commerce nationwide. Pal and Chatterjee (2017) assert that logistics networks and digital payment systems are essential to the operation of e-commerce platforms. China's robust e-commerce infrastructure has facilitated its dominance in e-commerce expansion. Conversely, in Brazil and South Africa, logistical obstacles and inefficiencies in payment systems have hindered the extensive adoption of e-commerce.

1.4 E-Commerce and Employment Generation

E-commerce has demonstrated the capacity to create employment, especially in areas such as logistics, marketing, and software development. Ghosh and Mallick (2018) examine the impact of e-commerce expansion in India and China on job creation, highlighting its effects not only within digital platforms but also in ancillary industries like supply chain management and digital marketing. The employment impact can be especially transformative in nations with substantial youth demographics, such as India and Brazil. Silva and Almeida (2021) identify that Brazil's e-commerce sector has emerged as a significant source of employment, particularly in urban regions, where there is an increasing demand for digital services, including e-commerce management, web development, and logistics. The job creation effect is regarded as a crucial element in the overall economic influence of e-commerce.

1.5 Challenges to E-Commerce Growth in BRICS Countries

Notwithstanding the growth potential, e-commerce in

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BRICS nations encounters numerous challenges. Bandyopadhyay and Chatterjee (2019) examine how insufficient digital literacy, inadequate infrastructure, and elevated transaction costs impede the growth of e-commerce in nations such as Russia and South Africa. Regulatory obstacles, including the absence of comprehensive e-commerce policies, impede the expansion of digital platforms (Matook et al., 2020). Furthermore, Oliveira and Silva (2018) underscore the significance of governmental policies in facilitating the expansion of e-commerce. Although nations such as China and India have embraced advantageous policies, including diminished tariffs on digital imports and investment in digital infrastructure, other BRICS countries, notably Brazil and South Africa, have fallen behind in executing comprehensive e-commerce strategies, thereby constraining the overall economic impact.

III. METHODOLOGY

This study aims to investigate the correlation between e-commerce and economic growth in BRICS nations. Based on data availability, the countries incorporated in the model are Brazil, Russia, India, China, and South Africa. We utilize annual data spanning the years 2000 to 2022. The variables utilized in the analysis examine the relationship between e-commerce and economic growth, with their sources enumerated in Table 1 below.

Table 1. Variables and Sources

Notations	Variables	Description	Sources
Y	Economic Growth	Economic Growth Rate (annual %)	World Development Indicators
P	Population	Population Growth Rate (annual %)	
F	Fixed Telephone Users	Fixed Telephone Subscriptions per 100 Inhabitants	International Telecommunication Union
M	Mobile-Telephone Users	Mobile-cellular Telephone Subscriptions per 100 Inhabitants	

Stationary tests are considered as a prerequisite analysis to obtain unbiased, effective and consistent parameter estimators in time series and panel data analyzes. In this respect, it is important to examine the stability of the series over time before statistical analysis (Tatoğlu, 2013). In case of working with non-stationary time series, a fake regression problem may be encountered and the results obtained obtain with regression analysis may not reflect the truth (Granger & Newbold, 1974). We apply three different panel unit root tests, which are Levin Lin Chu (LLC), Im Peseran Shin (IPS) and Augmented Dickey Fuller (ADF), to test the stationarity of the variables. Table 2 shows the results of unit root tests that estimated for all selected variables with trend, without trend and none. It can be seen from the results displayed in Table 3, null hypothesis (H0), which mean series are not stationary, are rejected with all of the three tests; so all the variables are found to be stationary at level. Hence, it is used the level values of all variables to estimate the panel VAR model. It is an important is- sue to decide appropriate lag-order in VAR estimation. There are different information criteria available for choosing a more parsimonious model, and we have applied the Schwarz (1978) information criterion (SC), the Akaike (1974) information criterion (AIC) and the Hannah-Quinn (1979) information criterion (HQC).

Estimate a VAR (1) model (using one lag):

$$y_{1t} = c_1 + \alpha_{11} y_{1,t-1} + \alpha_{12} y_{2,t-1} + u_{1t}$$

$$y_{2t} = c_2 + \alpha_{21} y_{1,t-1} + \alpha_{22} y_{2,t-1} + u_{2t}$$

Where:

- y_{1t} *and* y_{2t} *are the two time series variables at time t.*
- c_1 *and* c_2 *are constants for each equation.*
- α_{ij} *are the coefficients for the lagged variables.*
- u_{1t} *and* u_{2t} *are the error terms.*

2. Data Analysis

Table 2. Unit Root Tests

	LLC			IPS		ADF		
	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	Intercept	Trend and Intercept	None
y	-2.40689* (0.0080)	-3.69086* (0.0001)	-1.3827 (0.0834)	-1.11449 (0.1325)	-0.79446 (0.2135)	17.4912 (0.1320)	15.865 (0.2060)	17.4483 (0.1335)
f	0.52376 (0.6998)	-1.89510* (0.0290)	-3.01052* (0.0013)	1.18229 (0.8815)	0.12832 (0.5511)	8.71537 (0.7270)	15.0740 (0.2374)	23.5059 (0.0237)

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m	-2.15933* (0.0154)	-4.1753 (0.3381)	0.14349 (0.5570)	0.23235 (0.5919)	0.14434 (0.5574)	9.95271 (0.6201)	11.0143 (0.5277)	4.74020 (0.9661)
p	-3.32599* (0.0004)	-9.25884* (0.0000)	-1.2366 (0.1081)	-3.65133* (0.0001)	-6.69658* (0.0000)	39.0760 * (0.0001)	57.4206 * (0.0000)	12.6715 (0.3974)

Note: * indicates the significance at 5% level. The values in the brackets represent probability.

Table 3 shows the VAR lag-length results:

The results presented in Table 3 indicate that the Akaike information criterion identifies an appropriate lag length of 5, whereas the Schwarz and Hannah-Quinn information criteria suggest a lag length of 3. Consequently, based on these findings, Table 4 displays VAR model estimations utilizing a lag length of 2. Impulse response functions examine the response direction of an endogenous variable to a one standard deviation shock in another variable within the system. It is essential to analyze impulse response functions and variance decomposition to investigate the sources of changes in the variables utilized in the analysis. The graphs below illustrate the outcomes of the impulse response functions for all nations:

Table 3. VAR Estimation Results

	Y	*M*	*F*	*P*
C	7.449653 (2.29702) [3.24319]	17.66488 (5.36545) [3.29234]	0.732823 (0.49546) [1.47907]	0.021233 (0.01598) [1.32912]
y(-1)	0.346877 (0.11412) [3.03967]	-0.037913 (0.26656) [-0.14223]	-0.033927 (0.02461) [-1.37834]	0.000562 (0.00079) [0.70783]
y(-2)	0.014934 (0.10981) [0.13601]	0.052263 (0.25649) [0.20376]	-0.004379 (0.02368) [-0.18491]	-0.001040 (0.00076) [-1.36206]
y(-3)	0.099473 (0.10379) [0.95840]	-0.337965 (0.24244) [-1.39403]	-0.009041 (0.02239) [-0.40385]	-1.19E-05 (0.00072) [-0.01648]
m(-1)	-0.105611 (0.05103) [-2.06951]	1.337748 (0.11920) [11.2225]	0.019024 (0.01101) [1.72824]	-0.001036 (0.00035) [-2.91851]
m(-2)	0.089418 (0.08665) [1.03193]	-0.346129 (0.20240) [-1.71009]	-0.027824 (0.01869) [-1.48867]	0.002226 (0.00060) [3.69289]
m(-3)	-0.033714 (0.05403) [-0.62397]	-0.103858 (0.12621) [-0.82291]	0.005610 (0.01165) [0.48140]	-0.001240 (0.00038) [-3.30098]
f(-1)	0.298623 (0.53315) [0.56011]	0.165693 (1.24534) [0.13305]	1.708714 (0.11500) [14.8585]	0.004024 (0.00371) [1.08523]
f(-2)	-0.554642 (0.92819) [-0.59755]	-1.360243 (2.16810) [-0.62739]	-0.708721 (0.20021) [-3.53991]	-0.010868 (0.00646) [-1.68353]
f(-3)	0.250026 (0.47999) [0.52090]	1.160735 (1.12117) [1.03528]	-0.019006 (0.10353) [-0.18357]	0.006755 (0.00334) [2.02343]
p(-1)	-1.117082 (12.9163) [-0.08649]	69.51760 (30.1704) [2.30417]	-1.661909 (2.78602) [-0.59652]	2.273742 (0.08983) [25.3111]
p(-2)	13.62657 (24.8064) [0.54932]	-102.8800 (57.9437) [-1.77552]	1.831521 (5.35069) [0.34230]	-1.828641 (0.17253) [-10.5992]
p(-3)	-13.50951 (13.4150) [-1.00705]	29.40591 (31.3352) [0.93843]	-0.408678 (2.89358) [-0.14124]	0.537820 (0.09330) [5.76441]
R^2	0.543253	0.977044	0.995843	0.998795

Note: The values in the brackets represent probability.

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Figure 1 illustrates the reaction of economic growth to standard deviation shocks in economic growth, fixed telephone subscribers per 100 inhabitants, mobile-cellular telephone subscribers per 100 inhabitants, and population growth over a duration of 10 periods. The reaction of economic growth to a one standard deviation shock is positive but diminishing. This significant effect persists until the conclusion of the final month. The influence of mobile-cellular telephone subscriptions for economic growth is negative and diminishing until the conclusion of the fourth period. Subsequently, this adverse effect intensifies and dissipates in the final period. The effects of fixed telephone subscription shocks are uncertain, initially. A minor positive effect was observed at the conclusion of the fourth period. Finally, the response for economic growth to an individual growth shock is initially positive until the fourth period, after which it becomes negative and declines.

Figure 1. Response of Economic Growth to Shocks

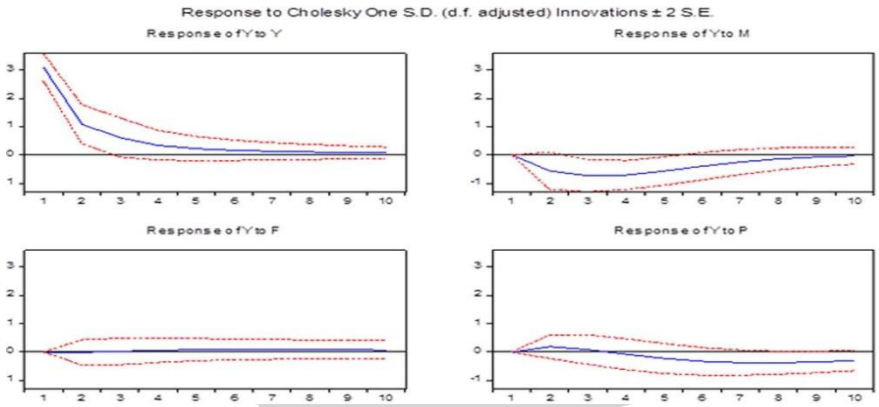

Figure 2 illustrates the reaction of mobile-cellular telephone users to standard deviation shocks in economic growth, fixed telephone subscriptions every 100 people, mobile-cellular telephone subscriptions per 100 inhabitants, and population growth, respectively. The effect of economic growth shocks on mobile-cellular telephone subscriptions is negative over a ten-period duration. The adverse effect diminishes until the fifth period and subsequently escalates between the fifth and tenth periods. Mobile-cellular telephone subscriptions experience a positive shock initially, followed by a sustained positive effect that diminishes at the onset of the second period. The effect of fixed telephone subscriptions diminished negatively until the fifth period. This diminishing effect was lost at the commencement of the fifth period. The effect of population growth shock on mobile-cellular telephone subscriptions is positive and progressively increasing until the fifth period, followed by a decreasing trend between the fifth and tenth periods.

Figure 2. Response of Mobile-cellular Telephone Subscriptions to Shocks

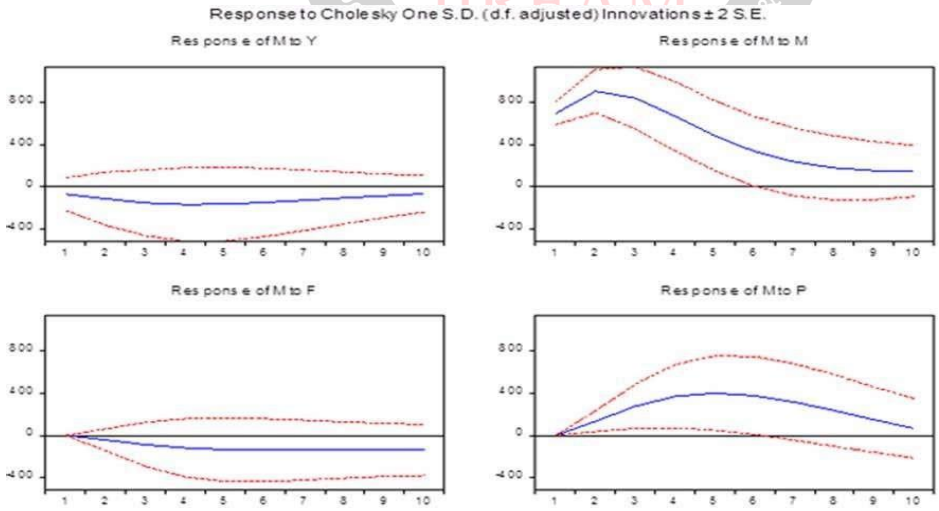

Figure 3 illustrates the reaction of fixed telephone users to standard deviation shocks in economic growth, fixed telephone subscriptions every 100 inhabitants, mobile-cellular telephone subscriptions every 100 inhabitants, and population growth, respectively. The economic growth shock exerts a minimal positive influence on fixed telephone subscriptions till the third period. At the commencement of the third period, this beneficial effect transforms into a detrimental one until the conclusion of the tenth period. The effect of a shock in fixed telephone subscriptions on mobile-cellular telephone subscriptions is positive over a ten-period duration. Fixed telephone subscriptions are positively influenced by an

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inherent shock. The effect of a shock on population growth is ambiguous in the initial two periods, followed by a minor negative impact that persists in a diminishing manner.

Figure 3. Response of Fixed Telephone Subscriptions to Shocks

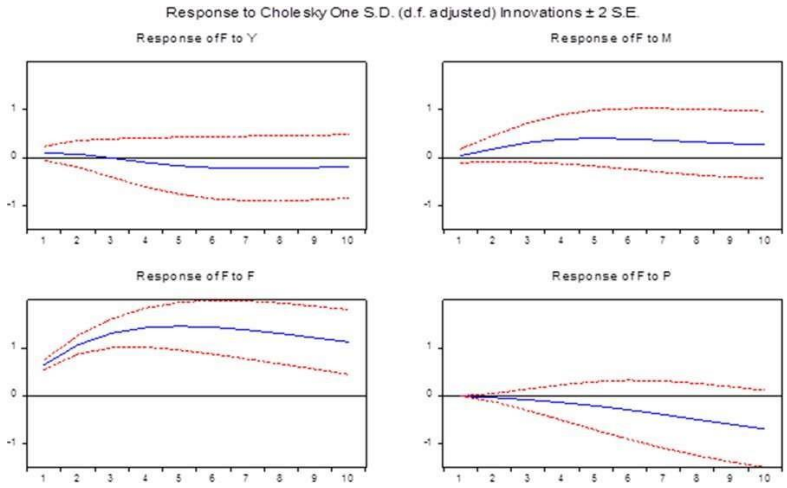

Figure 4 illustrates the population growth response to standard deviation shocks in economic growth, fixed telephone subscriptions per 100 inhabitants, mobile-cellular telephone subscriptions per 100 inhabitants, and population growth itself. The effect of the economic growth shock on population growth is ambiguous during the initial four periods, followed by a negligible negative impact at the onset of the fourth period. The response of population growth to shocks in mobile-cellular telephone subscriptions is negative and diminishing. The diminishing effect is absent in the sixth period. The impact of fixed telephone subscription shocks on population growth remains indeterminate until the conclusion of the second period. Subsequently, a minimal positive effect is noted, which persists until the conclusion of the tenth period. Ultimately, the population growth response to shock is positive and progressively increasing until the sixth period, after which the growth effect diminishes between the seventh and tenth periods. The variance decomposition elucidates the effects of variables on rates of change, whereas impulse-response function analysis pertains to the sign, duration, and magnitude of changes in variables. Variance decomposition illustrates the extent to which changes in the dependent variable are attributable to its own shocks and the shocks of other variables. The tables below present the findings of the variance decomposition analysis for all variables in the system:

Figure 4. Response of Population Growth to Shocks

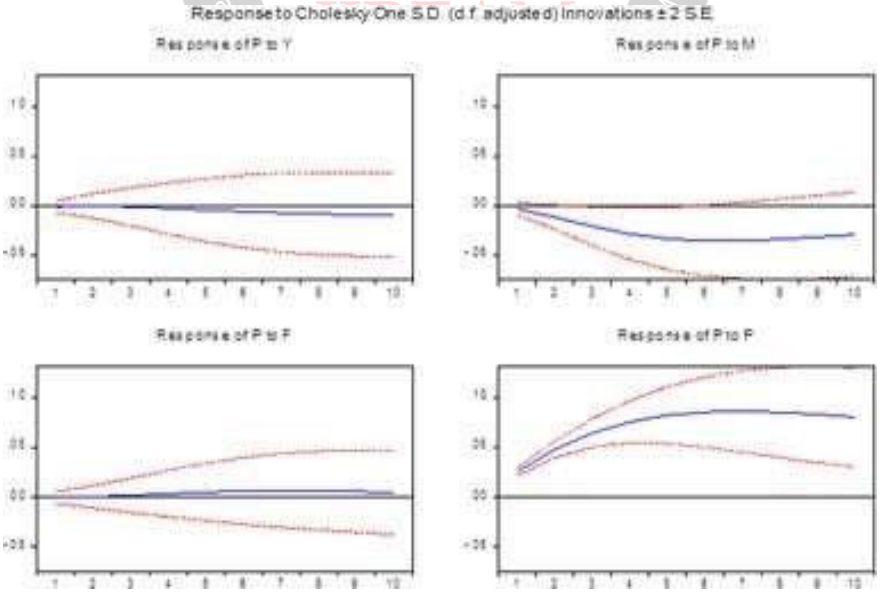

Table 5 presents the findings of variance decomposition analyses for economic growth. The primary source of changes in economic growth is attributed to itself, accounting for 100% in the initial period. This impact diminishes over ten intervals. In the fifth period, the alteration in economic growth is attributed to its own change by approximately 87%; whereas this effect is noted to be around 82% in the tenth period. The results in Table 6 indicate that mobile-cellular subscriptions are the second most significant variable influencing changes in economic growth from the second period onward. Mobile-cellular telephone subscriptions account for approximately 2.82% of changes in economic growth during the second term, but this

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effect diminishes progressively until the tenth period. In the tenth period, approximately 14% of the variations in economic growth are attributed to mobile-cellular telephone subscriptions, while population growth accounts for 5% of these variations, and fixed telephone subscriptions contribute about 0.34%. These results indicate that mobile-cellular telephone subscriptions are a significant driver of economic growth.

Table 5. Variance Decomposition Results for Economic Growth

Period	y	m	f	p
1	100.0000	0.000000	0.000000	0.000000
2	96.85573	2.812826	0.000838	0.330603
3	92.57358	7.052375	0.006375	0.367673
4	88.93671	10.63186	0.036211	0.395228
5	86.40888	12.72645	0.091038	0.773626
10	81.03555	13.61033	0.349249	5.004870

The variance decomposition test results for the mobile-cellular subscription variable, presented in Table 6, indicate that approximately 99% of the changes in mobile-cellular subscriptions are attributable to shocks within the variable itself, while around 1% is due to fluctuations in economic growth in the first term. Fixed telephone subscriptions as well as population growth do not influence changes in mobile- cellular subscriptions. The explanatory ratio of changes in mobile-cellular subscriptions relative to its own dynamics diminished to 97% in the second period and attains the long-run equilibrium value of approximately 74% in the tenth period. The results in Table 6 indicate that the second most significant variable explaining changes in mobile-cellular subscriptions is population growth, beginning from the second period. In the tenth term, the variations in mobile-cellular subscriptions arise from population growth at approximately 18%, economic growth at around 4%, and fixed telephone subscriptions at about 3.56%. Consequently, these results indicate that the primary variable elucidating mobile-cellular telephone subscriptions among the examined variables is population growth.

Table 6. Variance Decomposition Results for Mobile-cellular Telephone Subscriptions

Period	y	M	f	P
1	1.018853	98.98115	0.000000	0.000000
2	1.345855	97.21609	0.140043	1.298009
3	1.937684	93.28793	0.450500	4.323883
4	2.534358	88.32791	0.864921	8.272814
5	3.040762	83.50672	1.319660	12.13285
10	4.065210	74.32569	3.561577	18.04752

The outcomes of the variance decomposition test involving fixed telephone subscriptions are displayed in Table 7. Analysis of the decomposition results in Table 7 reveals that the predominant source of variation in fixed telephone subscriptions is self-induced shocks, accounting for 97%.In the second period, this impact diminishes to 96%, and in the final period, it attains an equilibrium value of 85%. Secondary sources indicate that fixed telephone subscriptions have experienced an 8% increase, while mobile-cellular telephone subscriptions have risen by approximately 6% in the last term. The impact of economic growth is minimal, approximately 1.5%.

Table 7. Variance Decomposition Results for Fixed Telephone Subscriptions

Period	y	M	f	P
1	1.938967	0.405512	97.65552	0.000000
2	0.931396	2.365056	96.62152	0.082025
3	0.440692	4.046717	95.27860	0.233990
4	0.438823	5.135631	93.94439	0.481157
5	0.658598	5.699230	92.75917	0.882999
10	1.463703	5.471754	85.59932	7.465224

Table 7 shows the results of variance decomposition results for population growth. According to results reported in Table 8, the main source of changes in population growth is itself with about 98% in first period. This impact decreases

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between first and last terms and reaches long term equilibrium about with 87%. Mobile-cellular telephone subscriptions is the second main factor that explain changes in population growth with 1% in first period and with 11% in last period. Economic growth and fixed telephone subscriptions have very small effect on population growth for chosen countries in chosen period. In respect of this, mobile-cellular telephone subscriptions is an important source ofexplaining the changes in population growth.

Table 8. Variance Decomposition Results for Population Growth

Period	y	M	F	P
1	0.026870	1.001336	0.000429	98.97137
2	0.017629	3.976110	0.020786	95.98547
3	0.012399	6.872159	0.076461	93.03898
4	0.040582	9.097114	0.153822	90.70848
5	0.090613	10.60360	0.237183	89.06860
10	0.460698	11.95527	0.408399	87.17564

IV. RECOMMENDATIONS

The boundaries between nations have diminished due to the globalization that has accelerated since 1980, resulting in numerous positive and negative innovations stemming from this process. The innovations resulting from globalization are significant factors cited in economic literature to elucidate the disparities in economic growth among nations. The study's results indicate a correlation between economic growth and e-commerce in the long run, with mobile-cellular telephone subscriptions being a significant factor influencing economic growth variations in BRICS nations. The findings indicate that nations aiming to enhance their economic growth rate should prioritize policies that augment e-commerce volume. It is crucial to focus on innovations that promote economic growth via e-commerce.

V. CONCLUSION

A multitude of studies have sought to elucidate the factors contributing to varying growth rates between developed and developing nations in economic literature. The variables most frequently utilized in these studies include labour, physical and human capital, investments, and technology. Recent studies indicate that the rising volume of e-commerce, coinciding with the globalization expansion of the 1980s, positively influences the economic growth levels of countries, along with these shared variables. This paper examines the relationship between economic growth, a prevalent issue in both developed and developing nations, and e-commerce from 2000 to 2016 through panel VAR analysis. According to recent literature, we utilize mobile-cellular and fixed telephone subscriptions as indicators of e- commerce. The study examines the effects of shocks in economic growth, mobile cellular telephone subscriptions, fixed t

elephone subscriptions, and population growth within the group of countries comprising Brazil, Russia, India, China, and South Africa. Findings indicate that the influence of e- commerce on economic growth is statistically significant, and policies aimed at enhancing e-commerce volume substantially contribute to the economic growth of nations. The findings from the impulse response functions and variance decomposition analysis indicate that the influence of e-commerce may vary across different e-commerce indicators. Initially, the effect of mobile-cellular telephone subscriptions on economic growth is negative and diminishing; subsequently, this adverse impact intensifies and ultimately vanishes. The effects of fluctuations in fixed telephone subscriptions are initially ambiguous. A minor positive effect was observed at the conclusion. Variance decomposition analysis indicates that although the majority of fluctuations in economic growth originate from internal factors, mobile-cellular telephone subscriptions, a key determinant of e-commerce, significantly contribute to the variations in economic growth within our sample. Thus, it can be asserted that a substantial correlation exists between e-commerce and economic growth in the selected countries. Consequently, it is imperative to establish suitable e-commerce policies to enhance economic growth, and it is advised that nations aspiring to achieve sustainable economic development allocate additional resources to their e-commerce infrastructure.

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