

International trade, Intellectual property right and Economic development in Nigeria: Is there any link?

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Abstract: *This study explored on the nexus between trade (TRD), intellectual property right (IPR) and level of economic development (LDEV) over the period 1991 - 2018 using an Autoregressive distributed lag ARDL approach. The results suggest a long-run relationship between international trade, intellectual property right and level of economic development. The results also revealed that while the export component of the IPR exerted no impact on LDEV, TRD on the other hand, showed a temporary positive effect on the level of economic development possibly due to the instability in the macroeconomic environment and her overdependence on imported goods. Interestingly, FDI exerted a positive and significant effect on the level of economic development in the country. These results corroborate the outcome of the causality test, which revealed a uni-directional causality that runs from FDI, TRD to the level of economic development. In contrast, there seems to be a causal effect from the level of economic development to import component of the IPR to total productivity factor to inflation, respectively. The study concludes that both trade and intellectual property right are not capable of influencing economic development within the study period due to weak IPR protection and mono-product nature of the country. Based on the above, the study recommends that the government should provide an enabling environment that will further attract foreign investment in the country. Also, formulate a well developed institutional framework that will promote intellectual property right and finally diversify the economy into other sectors that are promising in order to avoid external shocks that can emanate from relying on a single sector of an economy.*

Keywords: *Intellectual property right, Economic development, ARDL, Trade, INF, Nigeria*

JEL Classification:

C87; E31; F18; F43; O34

Contribution/Originality: This study contributes to the existing literature due to the answer it provides to the questions of whether international trade and innovation via intellectual property rights has been able to stimulate economic development in Nigeria. This paper is different from the others because it will broaden the coverage of the few studies that have combined the effect of these variables on economic development in Nigeria and developing economies at large.

1. Introduction

Advocates of international economics believe that an optimum is realizable when there are no restrictions in the movement of goods, services, ideas, innovations, copyrights and people amid free and open trade. Amazingly, intellectual property right (IPR) are introduced into different domestic countries to protect the creative works of innovators, regulation of the health and safety standards, among others. Subsequently, impeding the size of the trade, particularly those in the World Trade Organization (WTO), even though its members are in different stages of development. They are thereby making the dividends accruable from it to differ from country to country. Little wonder, why several economists oppose the introduction of IPR into trade agreements; hence, the reason for prevalence system imbalances.

Past studies in developing and developed economies have evaluated the relationship between international trade and economic growth. Though, a number of these studies have indeed shown that there is a positive relationship between international trade and economic growth across the globe (Dollar & Kraay, 2004; Frankel & Romer, 1999; Freund & Bolaky, 2004) except for few studies which claim otherwise (Musila & Yiheyis, 2015; Vlastou, 2010). The reason for the above-mixed findings may not be far-fetched from the econometric techniques utilized, the sample of countries, the level of development, the extent to which the economy is technology-driven and the indicator used as a proxy for international trade/trade openness among others to mention a few which range from opening ratios; tariff barriers; the exchange rate and opening indicators among others. Besides, this may be owing to the role international trade plays in the economy of the participating countries.

The above, justify the reason why no wonder the justification by many economists that international trade is an instrument for growth to (Adewuyi, 2002). Aside from the aforementioned, evidence from the literature shows that countries that are actively involved in international trade tend to benefit more than the ones that participate less and hence perform the dual role of transforming the economy and showcasing the social attributes of the participant country around the world mainly by the developing economies as pinpointed by (Ivus, 2010).

It is in this way that past studies have shown how trade has contributed to the gross domestic product (GDP) of some countries especially those from emerging economies like Japan, China, and Korea among others. Both theoretical and empirical studies have shown how trade has contributed a huge chunk to the overall GDP of their countries through a rigorous, efficient and precise involvement. In the same vein, development economists have also emphasized that trade is the tendency to accelerate the growth process of the economies of nations via the provision of foreign earnings which in turn fosters economic growth both in the long and short run.

Evidence abounds from the above that only a few research have evaluated the nexus between international trade, intellectual property rights (IPRs) and economic development across the globe, especially in developing economies in which Nigeria is inclusive. In contrast, some studies on the nexus between sub-components like; IPR and trade; IPR and growth respectively subsist. For instance, a study by De Soto (1990, 2000) argued that intellectual property rights are an essential economic institution in the sense that they serve as an engine of economic growth in a country. Although, this relationship may be more robust in the developed economies and weak in developing ones, according to Kim et al., (2012).

Intellectual property alludes to the innovation (manifestations of thoughts) which incorporates innovations, scholarly and imaginative works, and images, names, and pictures utilized in commerce, for example in the trade as put by Vlastou (2010). Intellectual property rights, among others, incorporate responsibility for, including titles and deeds. Protected innovation rights additionally incorporate licenses, copyrights, brand names and free and unbiased lawful frameworks. The inquiry that rings a bell is the motivation behind why licensed innovation right is essential. There are a few convincing explanations behind ensuring the protected innovation rights connected to development. Right off the bat, since, the advancement and prosperity of mankind lay on the degree to which it can make new things, particularly in the zone of innovation and culture on somewhat point of view to make reference to a couple. The following is the lawful security of the new manifestations, which thus empowers the use of included assets, subsequently prompting further advancement. Thirdly, it is because the promotion and protection of intellectual property right tend to stimulate the rate of economic growth, creates new jobs and industries and enhances the quality and enjoyment of life at large which is the perspective this study will rely mostly on.

Therefore, an efficient establishment and a secured intellectual property rights give people the motivating forces to advance and produce something of significant worth as opposed to improving themselves by means of some wasteful strategy, for example, lease looking for movement, burglary, subjective appropriation and tax assessment to

make reference to a couple. Persistent financial development through advancement, human capital arrangement, and lower exchange costs is restrictive on the presence of enforceable property rights. Additionally, contemplates have demonstrated that intellectual property right advances the economic development of the beneficiary nations through heterogeneous roads specifically as buttressed by (Delgado, 2014). IPR should display a positive relationship on financial development regardless of whether they owe from advancement or expanded developments as pinpointed by (Romer, 1990; Rivera-Batiz & Romer 1991) and all the more as of late as indicated by (Hasan & Tucci, 2010).

Conversely, an ongoing report by Seher and Dagdemir (2020) portrays that the connection between intellectual property right and economic development is not so clear. The above is on the grounds that the way IPR protection sway on growth rates varies from nation to nation. However, contingent upon their degree of development. Accordingly proposes that there is a blended inclination with respect to the connection between the factors. The suggestion is that the result of certain investigations shows a positive relationship and the others negative. Of the investigations that demonstrated a positive relationship incorporate examinations like (Falvey 2004; Thompson and Rushing, 1999). Additionally, Rapp and Rozek (1990) and all the more as of late investigation by Musinguzi & Rapha (2019) find that IPR protection has a significant positive effect on growth.

To verify the above mentioned, Gould and Gruben (1996) in their study underlined that despite the fact that IPR – growth nexus is sure, its basic determinant is a component of whether the economy is open or closed. The later is on the grounds that IPR insurance influences growth in open versus closed economies in an unexpected way. Additionally, their examination, buttressed that IPR assurance can have a marginally more significant effect on development in open economies than in shut ones. Put in an unexpected way, the scrutiny by Thompson and Rushing (1999) displayed that reviews which fuse the total factor productivity (TFP) in their growth model reinforces the role played by the IPRs by means of its effect on TFP and the other way around. All the more critically, a study by Shin et al. (2016) found that IPRs changes have the propensities to encourage worldwide trade, in spite of the fact that; they have not helped in advancing exports of developing nations, among others. The last classification is the probe of Park (1999) which portrays a negative connectedness among IPR and economic growth.

Shockingly, Chen and Puttitanun (2005), in their examination, contend that IPR assurance impacts on developing nations since it can support inventive household exercises through patent application and advancements. The previously mentioned is on the grounds that household developments have a U-shaped relationship with Gross National Products (GNP) and IPR. The investigation of Chen and Puttitanun (2005) was additionally buttressed by Maskus (2000) and by Seher and Dagdemir (2020) where they affirm

the conceivable presence of an experimental U-shaped bend among IPRs and per capita GNP. Funnily, Chen and Puttitanun (2005) further focused that IPR security does not affect economic growth autonomously or legitimately, but instead its collaboration with factors, for example, exchange receptiveness, national competitiveness, IPR Index, human capital, FDI and government strategy to specify a couple, makes it to yield the expected result. It is in accordance with the affirmations of Chen and Puttitanun, (2005) and Leaner (2009) that this study expects to research the nexus between international trade, intellectual property right and economic development if there is any utilizing Nigeria information and conditions around her strategies and institutions.

Furthermore, on the grounds that the few available studies researched on the effect of either international trade or IPR or both on economic development. Astonishingly, this study intends to determine the impact of the above mentioned variables on economic development because previous study have failed to identify how trade and intellectual property can impact on the quality of life of the populace, reduce poverty and accelerate standard of living which is component of development. The utilization of Nigeria as a case study is incredible for some reasons. One is on the grounds that Nigeria is known as the giant of Africa as far as her economy is concerned. Second is on the grounds that Nigeria is still particularly dependent on the English Laws. For example, the use of Trademarks Act of 1965, which was designed after the Trademarks demonstrations of 1938 in spite of the fact that these laws have been surpassed by present day advances and monetary headway, which is vital to growth. Thirdly because only a few or no studies have combined these three variables in Nigeria.

This study will be structured as follows: Section 2 provides a review of the literature. Section 3 describes the data and empirical methodology adopted in the study. Section 4 reports the estimation results. Finally, section 5 concludes and proffers policy implication on the paper.

2. Literature Review

In particular, Krueger (1978) argued that trade liberalization has the potential to move forward specialization in sectors that have economies of scale via contributing to improving the efficiency and productivity in the long-run. The trade - economic growth nexus has got a lot of consideration both in the theoretical and empirical writing during the most recent five decades. There is no uncertainty that one of the most satisfactory measuring sticks for estimating international trade relies upon whether the economy is closed or an open one. Henceforth, trade openness is a basic pointer of international trade in like manner. Be they as it might, there is no accord on whether more prominent transparency of exchange triggers economic growth. Albeit an investigation by (Gozgor

and Can, (2016) pinpoints that nations that are effectively engaged with international trade will be in general advantage more than the ones that participate less. Proof from the theory of comparative advantage posits that, if one country desires to go into trade with another the latter will produce goods in which it has a comparative advantage; although, other economists have further extended this theory. Specifically, Krueger (1978) contended that trade liberalization in sectors that have economies of scale by means of adding to improving the effectiveness and productivity in the long-run.

In a similar vein, economists for example, Schumpeter (1912) in his review have related market concentration and innovation, and patent rights since they regularly empower the foundation of monopoly ventures. Therefore, nail down that an imperative aspect of the patents and intellectual property, all in all, relies upon rivalry or antitrust policies. Additionally, works relating to IPRs cannot be finished without insinuating the conventional economic rationale set forth by Arrow (1962) in regards to the protection of IPRs as far as the inadequate appropriability of information. Put differently; he likewise depicts that IPRs has the second-best answers for the issues made by the "semi open great" nature of information. To the degree that IPRs upgrade appropriability, to foster investment in Research and Development (R&D) and information creation.

Besides, the endogenous growth models emphasized a positive relationship between international trade via trade openness and economic growth vis-à-vis the international diffusion of advanced technologies as popularized by some researcheres (Coe & Helpman, 1995; Grossman & Helpman, 1991a; Romer, 1994). Their study pinpoints that, countries with a further extent of receptiveness tend to appreciate innovations produced in cutting edge economies, and this capacity drives them to develop better than their partners with a lower level of transparency. Besides, Edwards (1993) raised another purpose of contention that the expense of imitation is a basic factor that similarly matters in the economic growth nexus. Conversely, Almeida and Fernandes, (2008) contended that exchange transparency may now and then be disadvantageous to financial development. The above happens in a circumstance when a nation spends significant time in the creation of products in which innovative work exercises are not the center.

Taking the contention above from an empirical point of view, proof from the literature uncovered that there are blended and clashing sentiments with respect to the nexus among trade and economic growth over the globe. Specifically, some studies Baldwin, 2003; Rodriguez & Rodrik, (2000) opine that there is a positive connection between international trade and economic growth. Then again, studies like Vamvakidis (2002) and Ulaşan (2015) confirms a weak relationship among trade and economic growth. To help the discoveries from the above study, Rigobon and Rodrik (2005) in their investigation finds affirmed a critical negative effect of trade on economic growth while the

study by Fenira (2015) affirms a weak connection between international trade and economic growth. All the more as of late in Uganda Isaac and Ibrahim (2019), researched the impact of international trade streams on economic growth. Shockingly, the discoveries of their investigation uncovered that there is solid positive connection among exports and economic development, however the coefficient of imports to economic growth nexus is generally little.

Strikingly, Kim, Lin, and Suen (2012) raised remarkable proof, by opining that economies with high income, low – inflation and non-agricultural reliant advances economic growth more than nations with the otherwise features. In a similar vein, a study carried out utilizing the same sample from both developing and developed nations by Were (2015), displayed that universal exchange shows a positive and noteworthy impact on economic growth rate. Notwithstanding, the acclaimed impact is unimportant in developing nations, including African. From China, Hye, Wizarat, and Lau (2016), in their investigation, indicated that international trade has a positive relationship with development both in the long and short run.

Observably, no difference exists among studies carried out in Sub-Saharan African, which Nigeria is inclusive with respect to the above connections. For instance, a study by Chang and Ying (2008) and Azeez, (2014) uncovered a positive development impact of trade on air freight for an example of Economic Commission for Africa (ECA) nations. Conversely, a study by Gries, Kraft, and Meierrieks (2009) explored the instance of 16 Sub-Saharan African nations, and their outcomes find that there are no critical connections among the factors for the majority of the example. Furthermore, their study also provides evidence that economic growth causes international trade through the mechanism of openness in Ethiopia, Gabon, Kenya, Mauritius, Senegal, Sierra Leone, and Togo, though, a feedback causal relationship subsists for Cameroon, Cote d'Ivoire, Nigeria and Rwanda. While, on the contrary, no causal relationship exists between trade and growth for Burundi, Ghana, Madagascar, South Africa, and the Gambia.

Against the above, a study by Vlastou (2010) finds that international trade indirectly affects economic growth. Additionally, the outcomes set up a causal relationship running from international trade to growth was similarly settled. This study was trailed by that of Polat et al., (2015) who likewise locate that international trade by means of transparency blocks economic growth in South Africa. More recently, studies by Brueckner and Lederman (2015) investigated this relationship; however, the results depict that trade fosters growth both in the short and long run. In Nigeria, authors like Babatunde (2017) investigated trade- growth nexus. The result revealed that trade impacts on economic growth, both positive and negatively in the economy while Studies

by (Lawal & Kamtochukwu, 2017; Muhammed & Benedict, 2014) shows that there is a long-run relationship among the variables of interest.

On the studies that investigate the relationship between intellectual property right and economic growth; evidence shows that several authors have showcased this in the theoretical literature; though, the results are with mixed feelings. For instance, in Hwang et al. (2016), their study revealed that the economic effects of IPRs protection differ from one country to another based on the level of economic development attained. In consonance, with the above, the studies by Grossman and Helpman (1991) stressed the consequences of imperfect IPRs protection on technical progress (technology) via economic growth through insinuating imitation which in turn dampens innovation. To buttress the aforementioned, Gnanngnon (2018) pinpoints that intellectual property encourages research and development (R&D), creation and innovation. Hence emphasizing that the link through which IPR protection passes through growth is through innovation knowing quite well that innovation is pivotal to the economic growth of any country. Thereby suggesting that the avenue through which IPR protects innovation determines the extent of economic growth realized.

In contrast, study by Karami, Taghavi and Ghaffari (2019) investigated on market capital, IPRs and economic growth of OPEC member countries. Their results suggest that international trade and international tourism as proxy for market capital are relevant in explaining per capita GDP growth irrespective of the fact that the coefficients are low, though international trade, has stronger impact on per capita GDP than international tourism, While surprisingly, IPRs does not trigger the growth of per capita GDP concurrently. In a similar but related study, Kamilia (2019) evaluated the effect of entrepreneurial activity on technological innovation in emerging and developing countries. Surprisingly the findings revealed that total entrepreneurial activity decreases the level of innovation. In addition, opportunity driven entrepreneurship stimulates international patenting. In total, their findings show that entrepreneurship can only be significant only in countries that encourage free trade and possess the capacity to control corruption.

Furthermore, a study by Falvey et al., (2004) opines that IPR - growth rate nexus is positive and significant. Gould and Gruben (1996) in a related but different study (cross-section growth) also find that IPR has a significant positive impact on growth. The study went further to suggest that IPR exhibit a more significant effect on growth in economies that are open than the ones that are closed. In a little different way, Thompson and Rushing (1999) evaluated this relationship measuring technology as a ratio of growth of real GDP per capita over Total factor productivity (TFP), and they conclude that IPR has a positive impact on TFP in countries that are relatively rich

which in turn impacts positively on output growth. Arguably, Filippetti and Archibugi, (2015) and Awokuse and Yin, (2010) observe that developing countries tend to benefit more from a higher inflow of technology transfer than the developed ones. Interestingly, study by Flores and Perez (2019) examined the factors which stimulates innovation activity in Latin America. Their results suggest the existence of a positive and significant relationship of equilibrium.

Not forgetting that, better innovation can emanate through enhanced technologies which can attain through a diverse avenue such as domestic innovation; involvement in international trade; FDI via the transfer of technologies, investment; Licensing; imitation and piracy. Furthermore, an investigation by Falvey et al., (2004) opines that IPR - development rate nexus is sure and critical. Gould and Gruben (1996) in a related yet unique study (cross-area development) additionally find that IPR has a critical positive effect on growth. The study went further to propose that IPR shows a more noteworthy impact on development in economies that are open than the ones that are closed. In a little unique manner, Thompson and Rushing (1999) assessed this relationship estimating innovation as a proportion of development of genuine GDP per capita over Total factor profitability (TFP), and they reason that IPR positively affects TFP in nations that are generally rich which thus impacts decidedly on yield development. Apparently, Filippetti, Archibugi, (2015) and Awokuse and Yin, (2010) see that creating nations will in general advantage more from a higher inflow of innovation move than the grew ones. Interestingly, research by Flores and Perez (2019) analyzed the components which invigorates development action in Latin America. Their outcomes propose the presence of a positive and critical relationship of balance.

Those mentioned above was refuted by critics who believe that once IPR protection is accelerated, the resultant impact is that it ends up in enhanced costs that has the potential to distort alternative and eventually reduces welfare. The above results were conjointly supported by the study of Yang and Maskus (2009) that pinpoints that stronger IPRs in developing countries would enhance technology transfer vis-à-vis licensing and reducing the incremental cost of firms therefore increasing their competitiveness within the international markets.

A sizeable range of researches within the literature have focussed on the link between IPRs and international trade across completely different countries. for example, a study by Fink, Primo and Braga (1999) found a negative however insignificant relationship between IPRs and international trade more notably in technology product like machinery, telecommunications and electrical facilities to say some. The above was additionally reinforced by the work of Plasmans and Tan (2004) who in their study examined the link between weak IPRs and powerful imitation ability in China as a barrier to foreign

exports to China. Astonishingly, the results disclosed that substantial patent rights enhance foreign exports to China in high – technology and patent-sensitive industries. At a similar time, more rigorous IPRs protection encompasses a weak impact on low technology and trademark-sensitive industries underneath the condition that China does have sturdy ability of imitation. Within the same vein, study by Nguyen, Thanh and Christophe (2018) explored the impact of economic openness and institutional quality on patents. Amazingly, their results showed that, although institutional quality appears as a vital driver for [patents applications, FDI flows and trade openness have totally different influences. especially, higher inward FDI flows have a positive result on the number of patents whereas trade openness may need a negative result on patent. Notably, study by Willoughby and Mullina (2019) buttresses that exploitation of endogenous technology is a very important factor for national economic development. In distinction, study by Betul (2020) on the result of foreign trade on innovation in BRICS-T countries. His results showed that aside from the fact that the variables are co-integrated within the long-run; exports exhibit a positive impact on innovation. While, inputs and FDI adversely affected innovation. Similarly, a bi-directional link was found between export and innovation whereas on the contrary a uni-directional relation was detected between FDI and imports.

In a similar however slightly different perspective, Ferrantino (1993) researched the link between IPRs and trade by examining the pattern of exports regarding national membership in IPR treaties exploitation U.S. aggregates. Astonishingly, their results discovered a weak link. In distinction, Maskus and Penubarti (1995) investigated this nexus between the variables by measuring IPRs in conjunction with bilateral trade on an industry level, and they found a robust direct correlation between manufacturing exports of OECD countries and also the strength of patent rights in large and small developing countries. The above outcome confirms the study by Smith (1999) within the U.S. Following a distinct line of argument, Shin et al. (2016) found that IPRs could act as supported export barrier to trade. They supported evidently that recent IPRs reforms have expedited international trade; but, they need not help in promoting exports of developing countries. beyond the aforesaid, a study by PWC (2020), examined the impact of intellectual property (IP) infringement on businesses and Nigerian economy. The study unfolds that prejudicial infringement is harmful to the economic prospect of the country in many ways that embody her inability to realize full economic potential and has place varied lives in danger.

Based on the above theoretical and empirical review of the literature, we tend to discover that there is no given clear cut concerning relating to the link that exists among IPRs, trade and economic process, respectively. Similarly, there is no specific theoretical model that past studies want to answer the question whether IPRs and trade affect

economic growth. It is in light-weight of this that this current study intends to through empirical observation investigate whether or not there exists a correlation among this development of interest.

3. Data set and Methodology

This study mainly examines the link between intellectual property, international trade and economic development in Nigeria. We also include the real exchange rate and inflation in order to evaluate the stance of the macroeconomic environment in the external sector. While foreign direct investment was included in our model to verify the benefits inherent when an economy is open. We employed secondary data sourced from World Bank indicator (WDI), National Bureau of Statistics (NBS) and Central Bank of Nigeria (CBN) respectively. Data for international trade, exchange rate, foreign direct investment, trade openness, total productivity factor were all sourced from the CBN Statistical Bulletin. Information for inflation The NBS provided data for inflation. Data for the level of economic development meant to quantify the quality of life. Moreover, it was attained from the averages of GDP annual growth rate, inequality, health (life expectancy), unemployment rate and secondary school enrollment and WDI provided the data. For instance, we generated inequality from the outcome difference of wealth rate-poverty rate, i.e. $(100 - \text{poverty rate})$ in order to ensure that, it is all-encompassing. Similarly, due to unavailability of data on intellectual property right index, computer, communications and other services (% of commercial service exports) and computer, communications and other services (% of commercial service imports) were used to proxy the exports and imports components of intellectual property right or capital exports and imports. Due to restriction in getting these data, we confined our study to 1991 - 2018. Also, variables such as trade openness are used to proxy the integration of Nigeria into the world economy; the sum of exports and imports measures trade as a share of GDP; exchange rate, i.e. the ratio of dollars to the naira exchange rate.

In our analysis, we conduct an ARDL bound co-integration test to ascertain if there is a long-run relationship among the chosen variables. This co-integration test has some form of superiority over the classical co-integration test, which includes Engle and Granger (1987), Johansen (1991), among others. ARDL as an approach can be applied regardless of whether the series is $I(1)$ or $I(0)$ or when the series has a combination of $I(1)$ and $I(0)$ variables. The second advantage of ARDL is that it accommodates the series to have different optimal lags length, which tends to be impossible when using the conventional co-integration test. The third is that ARDL can be used when the size of the observation is small. Finally, the use of ARDL can help to summarize the use of multiple (simultaneous) equations into a single reduced form equation. Simplistically, the conditional error correction of the ARDL approach is specified as follows:

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$$\begin{aligned} \Delta LDEV_t = & \hat{\alpha}_0 + \sum_{i=1}^p \psi_{1i} \Delta LDEV_{t-i} + \sum_{i=1}^p \vartheta_{2i} \Delta LIPRE_{t-i} + \sum_{i=1}^p \delta_{3i} \Delta INF_{t-i} + \sum_{i=1}^p \eta_{4i} \Delta EXR_{t-i} \\ & + \sum_{i=1}^p \varphi_{5i} \Delta LIPRM_{t-i} + \sum_{i=1}^p \Omega_{6i} \Delta LFDI_{t-i} + \sum_{i=1}^p \zeta_{7i} \Delta LTRO_{t-i} + \sum_{i=1}^p \zeta_{8i} \Delta LTRD_{t-i} + \lambda ECT_{t-1} + \varepsilon_t \dots (2) \end{aligned}$$

ly, if the null hypothesis, $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$ is not accepted, we can conclude that there exists a co-integrating relationship between the variables. The implication is that the estimated F-statistics must be higher than both the lower and upper bounds as buttressed by Pesaran, Shin & Smith (2001). Once co-integration is established, then we would go ahead to analyze both the coefficients of the short and long run respectively. Next is to determine the long run and short-run causality between LDEV, LIPRE, LIPRM, LTRD, INF and EXR in more detail. Ideally, econometrics theory revealed that in Granger's causality framework, the past values of variables of interest could cause future values, but the reverse may not be accurate. To do this, we estimate a VEC model and incorporate the error correction term as the long-run relationship. Consequently, the below dynamic VEC model is estimated to test the long and short-run causal effects between the variables under consideration.

$$\Delta Y = \alpha_i + \sum_{i=1}^k \psi \Delta Y_{t-i} + \sum_{i=1}^k \delta_j \Delta Y_{t-j} + \lambda_1 ECT_{t-1} + \mu_t \dots (3)$$

From equation (3), represents the stochastic error term which contains a zero mean and homoscedastic variance. The optimal lag length of the above model is based on AIC. Granger causality can be verified based on the AIC criteria in several ways, according to Oh and Lee (2004). For instance, the coefficient of the ECT is an avenue where we can use to determine the long-run Granger causality among the variables, while on the other hand the short-run coefficient can be used as a yardstick to determine short-run causality.

4. Results and Discussions

Table 1 shows the results of the unit root of the variables employed in the study. Not forgetting that most of the time, series variables are non-stationary. It connotes that their means and variance are not in any way constant over time such that, the covariance between say two points does not only depend on the lag between the two periods as suggested by elementary econometric accordingly. After doing the Augmented Dickey- Fuller (ADF) test, the results revealed that all the variables are differenced stationary. Meaning that they were not stationary at level but became stationary after first differencing.

Table 1. Results of the Unit root test

Variables	t-statistics	Critical value	Order of Integration	t-statistic	Critical Value	Order of Integration
EXR	-0.8507	-2.9763	NS	-3.6879	-2.9810	S
LDEV	-1.9572	-2.9763	NS	-9.9564	-2.9810	S
LFDI	-1.7678	-2.9763	NS	-5.9027	-2.9810	S
LIPRE	-1.4288	-2.9763	NS	-4.7097	-2.9810	S
LIPRM	-2.6501	-2.9763	NS	-5.1605	-2.9810	S
LTRD	-2.0916	-2.9763	NS	-5.7405	-2.9810	S
LTRO	-2.4645	-2.9763	NS	-6.1773	-2.9810	S
INF	-1.9171	-2.9763	NS	-5.0151	-2.9810	S

Source: Authors computation from E- views

Consequent upon the results of the unit root test, where it was revealed that all the variables were stationary after first differencing. The study proceeds by testing for the existence of a long-run relationship among the variables. In order to accomplish this, the study employed Autoregressive distributed lag (ARDL) bounds co-integration test as against the conventional Johannsen co-integration approach, which is unique when all the variables are in order one integration. The reason for utilizing the ARDL approach is not far-fetched from the size of the observations. Which stands as one of the pre-requisite for adopting the ARDL approach among others. Irrespective of whether the variables are either integrated of order one, zero or mixed. The results of the bounds co-integration test are as reported in Table 2. The results revealed that there is a long run (L.R.) linear relationship between the variables under consideration. The above is because the F-statistics of 27.039 is higher than both the lower and upper bounds at 10% and 5% respectively.

Table 2. Results of Bounds Co-integration test with critical value

Significance	I(0) Bound	I(1) Bound
10%	1.95	3.06
5%	2.22	3.39
2.5%	2.48	3.70
1%	2.79	4.10

Null hypothesis: There is no long run relationship
F-stat =27.039 K=8

Source: Authors computation from E- views 9

The study further verified the authenticity of the long-run relationship affirmed above in Table 2, by checking the value of the coefficient of the error correction term (coint Eq (-1)) keenly in Table 3. Interestingly, we found that the coefficients were right and

statistically significant at 1% level. Consequently, depicting that there is a convergence among the variables under consideration.

Table 3. Results on the short run relationship between TRD, IPR and LDEV in the short run

Dependent Variable. <i>LDEV</i>				
Selected Model: <i>ARDL (1,1,0,0,1,1,1,1,1)</i>				
Cointegrating form: (<i>Short run Coefficients</i>)				
<i>ΔLFDI</i>	0.1020	0.0308	3.3115	0.0069
<i>ΔLIPRE</i>	-0.0010	0.0113	-0.0846	0.9341
<i>ΔLIPRM</i>	0.1258	0.0382	3.2913	0.0072
<i>ΔLTFP</i>	-0.4765	0.2176	-2.1897	0.0510
<i>ΔLTRD</i>	0.0892	0.0394	2.2649	0.0447
<i>ΔLTRO</i>	-0.0881	0.0384	-2.2895	0.0428
<i>ΔLINF</i>	-0.0033	0.0011	-2.9267	0.0138
<i>ΔLEXR</i>	-0.0001	0.2176	-2.1897	0.8657
<i>CointEq(-1)</i>	-1.0138	0.0996	-10.172	0.0000

Source: Authors computation from E- views 9

Table 4. Results on the relationship between TRD, IPR and LDEV in the long run

Dependent Variable. <i>LDEV</i>				
Selected Model: <i>ARDL (1,1,0,0,1,1,1,1,1)</i>				
Co-integrating form: (<i>long run Coefficients</i>)				
<i>LFDI</i>	0.3202	0.0472	6.7832	0.0000
<i>LIPRE</i>	-0.0009	0.0112	-0.0847	0.9341
<i>LIPRM</i>	0.1242	0.0452	2.7437	0.0191
<i>LTFP</i>	-1.3553	0.1716	-7.8992	0.0000
<i>LTRD</i>	-0.0053	0.0233	-0.2283	0.8236
<i>LTRO</i>	0.0312	0.0482	0.6466	0.5312
<i>INF</i>	-0.0026	0.0009	-2.8718	0.0152
<i>EXR</i>	0.0015	0.0003	5.2240	0.0003
<i>C</i>	-4.2055	0.9920	-4.2396	0.0014

Source: Authors computation from E- views 9

Table 3, reports the link between international trade, intellectual property right and economic development within the short run. The results show that the coefficient of FDI, IPRM and TRD are completely associated with the extent of economic

development within the short run. The above merely implies that a 1 percent rise in FDI, IPRM and TRD results in 102, 126 and eighty-nine in the level of economic development.

Specifically, the constant of TRD conforms to the study of Rigobon and Rodrik (2005). In the same vein, contradicts the study by Were (2015) United Nations agency posited otherwise. Still within the S.R., the coefficients of TRO and INF negatively affects the extent of economic development. Though, precarious, due to fact they are statistically insignificant. Moreover, this portrays that the additional associate economy is hospitable to the international trade setting, the additional the profit such a firm will derive from international trade and investment opportunities.

Disappointingly, despite the degree of openness of the Nigerian economy to the global market, yet, it has been ineffective in accelerating export-based trade, and level of economic development at large, and this is often in line with findings of Fernandes (2008) that pointed that trade openness might typically be inexpedient to economic growth. The above is also because of her over-reliance on foreign product and services, and this contradicts study by Yanikkaya (2002). In distinction, the coefficient of LIPRE exerts a negative, however insignificant relationship with the extent of economic development both within the short and long run; thereby, supporting the study by Shin et al., (2016) where they realize that, though IPRs help in facilitating international trade, it does not promote exports of developing countries as well as Nigeria. Hence, connoting that Nigeria has not been innovative in her industrial IPR. Also, the country has presumably been enshrouded with an over reliance on the importation of foreign-made product and services. Within the variety of electronics and telecommunication gadgets, among others. It has, pinpointed that the extent of IPR protection via innovation determines the degree of economic process and development that may be existent in the short run.

In the long run, FDI, LIPRM and EXR exerted a positive and significant relationship on the level of economic development. Specifically, the coefficient of FDI supports the study by (Filippetti & Archibugi, 2015) where they posited that developing countries which Nigeria is inclusive benefit more from a more significant inflow of technology transfer than the developed ones. Interestingly, this supported by the study of Anwer & Sampath (1999). Consistently, the outcome of the coefficients of LIPRM revealed weak IPR protection in the country and in line with study by Gnanon (2018). While the results of non-trade / macroeconomic variables such as (Inflation and exchange rate) dampens competitions of the external sector according to studies by Yanikkaya (2002), this was further buttressed by the coefficients of INF and EXR which revealed that the macroeconomic environment is not stable and consequently decreases the level of economic development. The results conform to the study by Gokal & Danifo (2004). Also, because an economy with high inflationary pressure erodes the purchasing power

which will, in turn, depletes aggregate demand and also the increasing cost of production on the supply side and consequently deteriorates the level of economic development, interestingly, this conforms to the studies by (Chude & Chude, 2013; Checharita & Rother, Chen & Puttitanun, 2005) among others.

Furthermore, the coefficient of total factor productivity unconcealed a negative and vital impact on the extent of economic development, therefore, contravening the results of the study by Grossman & Helpman (1999) that pointed out that the implications of IPRs protection on technical progress via technology foster economic development of a country. More apparently, the parts of the export of the intellectual property right damage the extent of economic development in Nigeria. The above means the country's industrial IPR via domestic innovations has not been adequate therefore the rationale for low or in-consequential exports of manufacturing product (i.e. electronics and communication gadgets) and has, in turn, depleted our foreign exchange because of the implications of exchange rate depreciation that successively makes imports to be cheaper and exports expensive. Furthermore, this corresponds to the studies by (De Soto, 2000; Hu & Png, 2013).

The study conducted a causality test to determine the variable that causes another. Amazingly, the results of the causality test unconcealed a uni-directional causality between international trade, foreign direct investment, IPR imports to the extent of economic development, severally with none feedback the other manner round in Nigeria which is in accordance with the study of Betul (2020). The above implies that FDI, LIPRM, TRD, and TRO causes the extent of economic development. Within the same vein, the level of economic development causes inflation and TPF, severally. The latter implies that LDEV triggers both INF and TPF positively. Which means that as the level of the country's development increases, there is a tendency that it will cause an increase in total productivity factor (new technology) due to a rise in innovation. In the same vein, an increase in the level of development tends to increase inflationary pressures if not adequately regulated.

The appropriateness of the above results was guaranteed via the conduct of a series of diagnosis check, which includes the Serial Correlation L.M. Test, Normality test, among others. The result is as bestowed in Table 6. The results pass the serial correlation test, heteroscedasticity test, normality test, respectively. They are consequently portraying that the model was well specified.

Table 6. Results of Diagnosis test

Test	F-statistic	Probability
Breusch - Godfrey (Serial correlation LM test)	1.6170	0.2055
Breusch-Pagan-Godfrey(Heteroskedasticity Test)	1.1989	0.7622
Jarque-Bera (Normality Test)	0.1554	0.9252

Source: Adopted from E-views 9

5. Conclusion and Policy implication

The study investigated if there exists a nexus among international trade, intellectual property right and economic development in Nigeria. The study used an Autoregressive Distributed lag Approach. The results disclosed a long-term linear relationship among international trade, intellectual property right and economic development in Nigeria. Specifically, the results unveiled that international trade has a vital impact on the extent of development within the short-term but insignificant in the long-term. Similarly, intellectual property right has a negative however insignificant impact on economic development in the long-term. Also, the results confirmed that, despite the degree of trade openness within the economy, it has not trigger the export-based part of the intellectual property right and level of economic development at large, presumably, due to the country's overreliance on foreign merchandise and services within the short-term and long-run. Furthermore, the results showed that a stable economic environment is key in fostering growth in international trade, and economic development at large.

Consequently, the study concludes that international trade and intellectual property right do not impact on the level of economic development in Nigeria at the end of the day. Furthermore, the study acknowledged that FDI fosters the extent of economic development both in the short run and in the long run. Also, they confirmed that a stable economic surroundings is critical for international trade and intellectual property right to trigger economic development in Nigeria.

Based on the above, the study recommends that the government ought to give an enabling environment that may attract additional foreign investment in the country. Moreover, the government ought to formulate and guarantee a well developed institutional framework which will promote intellectual property right. Besides, they must diversify the economy into different promising sectors. Despite the superb results, the study had some limitations. Crucial of all is that the inaccessibility of data from some important African countries which are helpful in the study; which might have attracted the utilization of some recent and sturdy technique for an additional comprehensive and broader policy implication such PARDL and NARDL.

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