

THE GLOBAL AND AFRICAN CONTEXTS OF NIGERIAN RESIDENT PATENTING STATUS

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Abstract

The subject of patent is increasingly becoming important for discourse in these days of creativity and innovative behavior. With growing information and technology, and as innovation is invariably becoming major driver of economic growth, it is not odd to expect that the number of patent applications in a given jurisdiction should bear some relationship with the population size and level of economic prosperity as measured by gross domestic product (GDP). This paper attempts to understand the existence or otherwise of such correlation among the three variables across 48 countries of the world having at least, 400 resident applications in the year 2020 as per the records of World Intellectual Property Organization (WIPO). The global outlook was later compared with that from leading 20 African countries having authenticated records with WIPO for the same year 2020. The outcome of these two statistical analyses are thereafter mirrored against the realities of Nigerian economy and patenting system. Besides, the potentials of her domestic (residents') registered patents translating into economic value is also brought under searchlight. Findings revealed that the number of patent application by Nigerian patents neither reflect the global nor African level of correlation with the twin variables of population size and nominal output of gross domestic product, mainly due to her lopsided economic base on precarious mineral resource (crude oil) whose future is apparently, bleak. Thus, the economy does not appear to have been technologically geared for sustainable growth. Equally precarious is her deposit system of patent registration which does not portend reliable potentials for value realization from the grants. A diversification of the Nigerian economy along agriculture and manufacturing investments anchored on innovative practices that would unearth her comparative advantage is therefore advocated. The patenting system would also need to be overhauled, perhaps, commencing with her full identification with the African Regional Intellectual Property Organization (ARIPO) for cost-efficiency in patent search and examination.

Keywords: Correlation, economic value, gross domestic product, residents' patents, population size.

1.0 Introduction

Patent refers to exclusive right given by national statute within a given jurisdiction, for owners of an invention to prevent third parties (except by permission) from using, making, selling, distributing or importing products associated with the invention, over a limited period of time, usually about 20 years. The patentee would, in exchange fully disclose details of such invention to the public. Compared to other intellectual property (IP) rights like trademark, copyright and trade secret, patent is arguably the most expensive IP protection obtainable, which also takes the longest processing period. And of course, it is also the most celebrated, though unfortunately, not necessarily the most valuable (Stonefield, 2011 and Feldman & Feldman, 2020). Beyond the high cost of patent application, processing and periodic maintenance, patent itself is predicated on existence of an invention or innovation that might have cost a fortune to create. In other words, patent has a relatively high cost profile, sometimes involving large investment of time, labour and capital (directly and indirectly, including several abortive expenses on trials and prototypes) to come up with presentable invention or process.

Thereafter, patent application and processing would gulp considerable amount of money and time before securing legal protection over a maximum of 20-year term within which the same right must be maintained/renewed at regular intervals, being annual in some jurisdictions.

Patents are acquired as protection over creative efforts, especially with a view to enjoying the economic benefits thereof unchallenged. Ideally, patents would only be sought if the commercial returns from the underlying invention outweighs the cost of pursuing the patent, including associated time, efforts and periodic maintenance fees payable (Intellectual Property Office of Ireland, 2021). There could be exemptions, however. For instance, in China, WIPO reported 1.4 million patent filings in 2019 alone with inventive activities linked to sundry motives like pursuit of government subsidy, job promotion and building of reputation by individuals, universities and institutions (He, 2021). Thus, of China's million-figure annual patent applications, less than 5% of them have been practiced. In fact Lei, Sun and Wright (2012) observed a pattern of Chinese domestic patent applications between 1986 and 2007 that always peaked around December and with more of such year-end applications being shared as co-inventors. This in comparison with the steadier pattern of foreign filings, they interpreted to mean a political patenting strategy by way of some administrative pressure to meeting annual quotas.

Similarly, modern economies expect that the number of patents or at least, number of application for patents among residents in a country (residents' patent application - RPA) should not be totally non-proportional to either or both size of population or GDP of the country concerned (Raghupathi & Raghupathi 2017 and De Carvalho, Beijo & Salgado, 2020). For instance, McKinsey Global Institute (2015) partly attributed Chinese high annual patenting to her large population and market size. Nevertheless, the innovative culture that underpins search for patent protection would often develop in a society that is production-oriented. Thus, nothing much may be expected in terms of RPA from a nation like Nigeria that has lost her industrial strength to years of poor governance, infrastructure decay and a shift to importation, relying almost solely on crude oil as source of foreign earnings. Chete et al (2016) observed disconnect between innovation and industrial development in Nigeria even at the height of her investments in the manufacturing sector. Also, the various research and tertiary institutions have largely become shadows of themselves, with meagre funding.

This paper seeks to measure the level of influence exerted by population size and nominal GDP on RPA on both global and African scales, towards understanding the position of Nigeria in context. It also examines the potentials of her domestic (residents') registered patents translating into economic value within the available statutory framework.

2.0 Methodology

This paper has two parts to it – measurement of influence of population and GDP on RPA on one hand, and the potential economic worth of Nigeria's RPAs on the other. For the first part, recourse was made to secondary data sources on population size, gross domestic product and patent application among residents (RPA), as scooped from the records of World Bank, United Nations and World Intellectual Property Organization (WIPO), among others. Global analysis was based on the 48 countries attested by WIPO as having minimum 400 RPA in 2020 vis-à-vis top 20 African nations on RPA list for same year. Multi-variate regression was adopted at 5% level of significance, with underlying null hypothesis that there is no significant relationship between the pairs – RPA and population and RPA and GDP.

The second part of the study focuses on relevant contents of the operative patent statute in Nigeria against the backdrop of the cost implications of inventions, including the objectives of seeking patent protection.

3.0 Findings and discussions

3.1 RPA with Population and GDP factors

Table 1 presents the trend of RPA in Nigeria between 2011 and 2020, mirrored against corresponding pattern of population and nominal GDP figures, with years 2014 and 2015 skipped as the RPA figures thereof could not be ascertained. In Table 2, statistical analysis of the data revealed that only population with p-value of 0.011808 exerts significant influence on RPA with that of GDP being above the threshold level for 5% level of significance.

Table 1: Nigeria RPA with population and GDP figures 2011-2020

Year	Population	GDP (\$'billion)	RPA
2011	162,805,077	404.99	64
2012	167,228,794	455.5	42
2013	171,765,816	508.69	50
2016	185,960,241	404.65	85
2017	190,873,244	375.75	100
2018	195,874,683	397.19	382
2019	200,963,599	448.12	439
2020	206,139,589	432.29	410

Source: *macrorends.net*, *World Intellectual Property Organization*

Table 2a: Nigeria's Summary Output

Regression Statistics	
Multiple R	0.867095
R Square	0.751853
Adjusted R Square	0.652594
Standard Error	105.3034
Observations	8

Table 2b: ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	167988	83994	7.574671	0.030674
Residual	5	55444	11088.8		
Total	7	223432			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-1889.36	713.5464	-2.64784	0.045544	-3723.59	-55.1288	-3723.59	-55.1288
Population	9.86E-06	2.55E-06	3.866018	0.011808	3.31E-06	1.64E-05	3.31E-06	1.64E-05
GDP (\$'billion)	0.604252	0.980878	0.616032	0.564834	-1.91717	3.125678	-1.91717	3.125678

Source: *Excel data Analysis*

As at year 2020, Nigeria was the largest African nation with a population of about 206 million people, followed only by Ethiopia having approximately 115 million and Egypt's estimate of 102 million while South Africa is estimated at 59 million (Worldometer, 2022).

In terms of gross domestic product (GDP), the data is somewhat conflicting but in both ways, Nigeria remained indisputably at the top. For instance, National Bureau for Statistics (2022) reported a figure of ₦72.39 trillion in 2021 but Statista.com (2022) put its dollarized value at \$514.05 million, which towers much above that of other leading African nations like Egypt (\$394.28 million), South Africa (\$329.53 million) and Algeria (\$151.46 million). However, for purpose of analysis, the 2021 data from the International Monetary Fund would be adopted, which put Nigeria's nominal GDP at \$441.541 billion, South Africa's approximately \$418 billion and that of Egypt as \$402.388 billion.

From Table 3 for Africa, in 2020, Ethiopia and Uganda are two typical countries that could not convert their large population to either economic productivity or innovative output. On the other hand, Egypt and South Africa outperformed Nigeria in patenting, though the latter has both higher population and bigger economy. Seychelles has a population of less than 100,000 and filed 3 patent applications in 2020 (representing 30 per million population) as most innovative, followed by Egypt (9.65) and South Africa (9.14). Nigeria's 1.99 occupies the 10th position among the 20.

Table 3: 2020 Data on leading African countries with residents' patent applications

Country	Population	GDP	Res. patent appl.	RPA per million population
Nigeria	206.1	432.3	410	1.99
Ethiopia	115.0	107.6	6	0.05
Egypt	101.3	363.1	978	9.65
Congo DR	89.6	48.7	72	0.8
South Africa	59.3	335.4	542	9.14
Kenya	53.8	101.0	341	6.39
Uganda	45.7	37.6	13	0.28
Algeria	44.7	145.2	163	3.65
Sudan	43.8	21.3	153	3.49
Morocco	37.0	112.9	250	6.76
Angola	32.9	58.4	85	2.58
Mozambique	31.3	14.0	26	0.83
Ghana	31.1	68.5	12	0.39
Madagascar	27.7	13.1	6	0.22
Zambia	18.4	18.1	16	0.87
Burundi	11.9	2.8	2	0.17
Botswana	2.4	15.1	2	0.83
Mauritius	1.3	10.9	6	4.62
Cape Verde	0.56	1.7	1	1.79
Seychelles	0.1	1.1	3	30

Sources: World Bank (2022), National Population Clock, Worldometer, World Intellectual Property Organization

Table 4 indicates that the twin variables of GDP and population size can explain approximately 88% of the determinants of RPA among the 20 African countries.

Table 4: African Summary Output

<i>Regression Statistics</i>	
Multiple R	0.879355
R Square	0.773265
Adjusted R Square	0.74659
Standard Error	125.6858
Observations	20

Next, we would consider the global perspective as contained in Table 5. Here, though China is clearly ahead in figures of RPA, South Korea's approximately 284 people per RPA depicts being most innovative while North Korea average output of 384 per billion dollar GDP is evidently, most innovation-efficient.

Table 5: Top 48 countries with resident patent applications (RPA) in year 2020

S/N	Country	2020 Population (UN estimates)	2020 GDP (\$'billion)	2020 RPA	RPA Per million population	Average population /RPA	Patent appli. per \$'billion GDP
1	China	1,439.3	14,722.7	1,344,817	934.4	1,071	91.3
2	USA	331.0	20,936.6	269,586	814.5	1,228	12.88
3	Japan	126.5	5,064.9	227,348	1,797.2	556	44.89
4	South Korea	51.3	1,630.5	180,477	3,518.1	284	110.7*
5	Germany	83.4	3,806.1	42,260	506.7	1,974	11.1
6	Russia	145.9	1,483.5	23,759	162.8	6,143	16.0
7	India	1,380.0	2,623.0	23,141	16.8	59,524	8.8
8	France	65.3	2,603	12,771	195.6	5,112	4.9
9	UK	67.9	2,707.7	11,990	176.6	5,663	4.4
10	Iran	84.0	191.7	11,396	135.7	7,369	59.4
11	Italy	60.5	1,886.4	10,061	166.3	6,013	5.3
12	Turkey	84.3	720.1	7,920	94.0	10,638	11.0
13	North Korea	25.8	18.0	6,937	269.0	3,717	385.4**
14	Brazil	212.6	1,444.7	5,280	24.8	40,323	3.7
15	Canada	37.7	1,643.4	4,452	118.1	8,467	2.7
16	Poland	37.8	594.2	4,010	106.1	9,425	6.7
17	Australia	25.5	1,330.9	2,368	92.9	10,764	1.8
18	Netherlands	17.1	912.2	2,198	128.5	7,782	2.4
19	Austria	9.0	429.0	2,124	236.0	4,237	5.0
20	Singapore	5.9	340.0	1,778	301.4	3,318	5.2
21	Sweden	10.1	537.6	1,764	174.7	5,724	3.3
22	Israel	8.7	402.0	1,642	188.7	5,299	4.1
23	Finland	5.5	271.2	1,588	288.7	3,464	5.9
24	Spain	46.8	1,281.2	1,431	30.6	32,680	1.1
25	Switzerland	8.7	748.0	1,384	159.1	6,285	1.9
26	Ukraine	43.7	155.6	1,361	31.1	32,154	8.7
27	Indonesia	273.5	1,058.4	1,309	4.8	208,333	1.2
28	Saudi Arabia	34.8	700.1	1,294	37.2	26,882	1.8
29	Denmark	5.8	355.2	1,261	217.4	4,600	3.6
30	Mexico	128.9	1,076.2	1,132	8.8	113,636	1.1

31	Vietnam	97.3	271.2	1,021	10.5	95,238	3.8
32	Malaysia	32.4	336.7	989	30.5	32,786	2.9
33	Egypt	102.3	363.1	978	9.6	104,166	2.7
34	Argentina	45.2	383.1	930	20.6	48,544	2.4
35	Norway	5.4	362.0	880	163.0	6,135	2.4
36	Thailand	69.8	501.8	863	12.4	80,645	1.7
37	Belgium	11.6	515.3	862	74.3	13,459	1.7
38	Romania	19.2	248.7	817	42.6	23,474	3.3
39	Kazakhstan	18.8	169.8	803	42.7	23,419	4.7
40	Portugal	10.2	231.3	695	68.1	14,684	3.0
41	Czechia	10.7	243.5	673	62.9	15,898	2.8
42	Iraq	40.2	167.2	635	15.8	63,291	3.8
43	South Africa	59.3	301.9	542	9.1	109,890	1.8
44	Philippines	109.6	361.5	476	4.3	232,558	1.3
45	Hungary	9.7	155.0	428	44.1	22,676	2.8
46	Hong Kong	7.5	346.6	423	56.4	17,730	1.2
47	Nigeria	206.1	432.3	410	2.0	500,000	0.9
48	Greece	10.4	189.4	400	38.5	25,974	2.1
* Most innovative ** Most innovation-efficient *** Least innovative & least innovation-efficient							
Source: World Bank (2022), Worldometer, World Intellectual Property Organization							

Table 6: Global Summary Output

<i>Regression Statistics</i>	
Multiple R	0.750208
R Square	0.562813
Adjusted R Square	0.543382
Standard Error	139.6053
Observations	48

Table 6 shows that some 75% relationship exist in the pattern of RPA vis-à-vis the two independent variables of population size and GDP. Also, the ANOVA tables (Table 7) revealed a p-value less than 0.001 for both variables as against benchmark of 0.05 indicating very strong basis to reject the null hypothesis of no significant relationship between the pairs – RPA and population and RPA and GDP (Abhigyan, 2020). In other words, both population size and nominal GDP level exert strong influence on the number of RPA from each country, at the global scene. Similarly, the correlation between the sets of population and RPA and of GDP and RPA have been calculated to be each positive, significant and closely aligned (0.654486 and 0.656252 respectively).

Table 7: Global ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	1129048	564524.1	28.96536	8.22E-09
Residual	45	877033.3	19489.63		
Total	47	2006081			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>
Intercept	-21.6183	22.54078	-0.95907	0.342646	-67.0178	23.78118	-67.0178
Population	0.316444	0.085802	3.688077	0.000606	0.14363	0.489258	0.14363
GDP (\$'100 billion)	2.428213	0.665837	3.646856	0.000686	1.087148	3.769278	1.087148

Source: Excel data analysis

Looking at the corresponding results for Africa in Table 8 however, only GDP exhibit a corresponding picture of p-value providing strong basis for rejection of null hypothesis. Rather, the p-value for population size (0.059461) is greater than 0.05, meaning that there is low evidence against the null hypothesis and accordingly, at 5% level of significance, population size of African countries does not exert appreciable influence on RPA. Corresponding correlation between population and RPA and between GDP and RPA at the African level were respectively 0.520699 and 0.847854, both being positive and statistically significant as well, but much less aligned than the global picture.

Cursory examination of African countries in the dataset revealed Nigeria as having a population figure more than twice of Egypt but recording less than half her RPA of 978 and her population that is more than thrice that of South Africa generated much less RPA of 410 as against the latter's 542. Indeed, some structural features of the population should be responsible for this distortion. However, Nigeria's GDP still indicate highest figure (though with less remarkable margin), compared to those of Egypt and South Africa, thereby becoming apparent that economic drivers in these three leading African countries are incongruent. Indeed, Nigeria has for many decades, remained a mono – product economy, relying on exportation of crude, unprocessed petroleum resources. The absence of value additive activities to this mineral exploitation, including near – collapse of manufacturing sector meant there are little opportunities for innovation that could birth RPA. Also, while Ethiopia has second largest population figure within the African continent, it has a ridiculously low RPA of 6. Thus, within the Africa context, high population does not translate to higher potential for innovation.

Table 8: African ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	915861.1	457930.6	28.98862	3.33E-06
Residual	17	268547.4	15796.91		
Total	19	1184409			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	34.33662	39.52822	0.868661	0.397131	-49.0606	117.7339	-49.0606	117.7339
Population	-1.8977	0.939583	-2.01973	0.059461	-3.88005	0.084643	-3.88005	0.084643
GDP	2.20589	0.359496	6.136055	1.1E-05	1.447418	2.964361	1.447418	2.964361

Source: Excel data analysis

3.2 Patent and Economic Value

3.2.1 General

Apart from very low rate of inventive activities in the country as largely evident from scanty patent applications, the status of residents' patents granted under the Patents and Design Act is also of much concern. For lacking necessary personnel and other resources to embark on pre-registration searches and examination for patentability, the Patent Office have adopted the deposit system whereby the validity of issued patents are left to be proven by the owner upon challenge from third parties. Section 4.2a, b, and c) made it clear that the Patent Office would not examine an application for patentability, clarity and completeness in description of underlying invention, and existence or otherwise of a prior application or a foreign application with prior claim over the same invention. In fact, section 4 subsection 4 expressly states "Patents are granted at the risk of the patentee and without guarantee of their validity"

In an ideal jurisdiction, Holzer (2006) had observed that a registered patent may not be revoked or invalidated on grounds of non-compliance with formal or statutory requirements but could nevertheless be found invalid on grounds of substance, whereas under the Nigerian system, Section 9 recognizes that a patent issued under the operative Act may fail the tests of patentability, clarity and completeness in the description of underlying invention and subsequent discovery of the existence of prior application or granted patent in such invention. On the other hand however, patent applications in Nigeria from non-residents may not suffer similar fate where original application had earlier been made in the applicant's resident country and necessary searches and examination undertaken. Nevertheless, WIPO (2014) had recognized that several factors may influence patenting system to be adopted in any jurisdiction, with expected policy guide of the need to strike appropriate balance between social gains from a patent system and the social costs for its maintenance. In particular, it noted that the choice of an alternative level of patent search and examination from either of formality examination only, formality examination and prior art search, and formality examination, prior art search and substantive search is central to allocating costs among patent applicant, third parties (in validity and infringement claims), the patent office and the judicial (interpretation and prosecution) system. Perhaps, it should be understood that patenting in Nigeria has not been undergoing the rigorous stage of substantive examination that are found in many other countries with the following as plausible justifications:

- i) The number of applications are yet to justify viable investments in human and technological resources for detailed scrutiny for patentability;
- ii) Nigerian economic environment has not matured enough to facilitate significant generation of inventive activities and subsequent need to deploy patented rights;

- iii) Introducing substantive examination would make patent fees so high that many of the hitherto scanty prospective applicants could be further discouraged;
- iv) The ensuing long processing time for patents tends to further serve as disincentive for few resident applicants; and
- v) The country is yet to appropriately fund the various research and tertiary institutions from which many patentable inventions ought to be sourced and accordingly, there could be no reasonable basis for substantial funding of this stage of registering the outcomes thereof. Nevertheless, not scrutinizing granted patents is tantamount to holding patent rights that may not be worth more than its paper certificate value. This is neither in the interest of patentees nor the national economy concerned. There is therefore, a need to find a way around this dilemma. Meanwhile, between 1925 and 1970 (ten years into her independence), Nigerian patents had to be processed in Great Britain, chiefly for reasons not unrelated to the foregoing, vide the hitherto operative statute (Patents Ordinance No. 17 of 1900 and subsequent proclamation Ordinances 27 of 1900, 12 of 1902 and 30 of 1916, later amended to become Registration of UK Patents ordinance No. 6 of 1925) until the enactment of indigenous Patents and Designs Act, 1970 (now recognized as Patents and Designs Act, CAP P2 LFN 2004)

3.2.2 Patent search and examination: how valuable?

Generally, searches are conducted on an invention before applying for patent or at the application stage to determine whether an invention is truly new, non-obvious, practicable and useful within its industrial community. It is done to ensure the 'invention' is not a reproduction of prior art and capable of passing validity test should it be legally challenged. There are therefore different types of searches, with ip.com (2021) identifying five; viz: patentability (or novelty) search to ensure it is actually novel and non-obvious; freedom to operate (FTO) search on how similar the invention or product is to pre-existing ones so as to determine likelihood of infringement, and if necessary thereafter, to design around existing patents to avoid such risk; state of the art (or product clearance or patent landscape) search with a view to reviewing literature on identifying competitors and existing products to be circumvented; invalidity (or validity) search aimed at establishing legal strength of a patent in instances of infringement claim; and lastly, evidence of use search in which the patentee seek to examine if the product of other businesses are infringing on his patent rights . Definitely, diligence and comprehensive searches at different stages of the invention and patenting system would:

- i) Save unnecessary expenditure, time and efforts on activities that would eventually prove to fall within existing state of art. A germane example is Kodak which inadvertently fell prey to infringing twelve of Polaroid instant photography patents simply for not carrying out state of the art search before investing her millions of dollars on research. Polaroid won a judgement sum of \$925 million from Kodak (Zhang, 2012).
- ii) Prevent potential infringement risk that could arise over the impending patent;
- iii) An invention can be improved upon through prior knowledge of state of art and subsisting technology in the field and/or industry; and
- iv) Understanding prior art gives ample room for drafting effective claims and description around which they derive

3.2.3 Substantive patent examination

In patenting, there is the formality examination to confirm an application has complied with basic patentability criteria of novelty, presence of inventive steps in reaching the invention, its industrial applicability or usefulness as well as other sundry requirements of the enabling statute or Patent Office concerned. This is often an administrative exercise that have not critically dissected the innate and technical qualities of the invention. On the other hand, substantive patent examination requires technical analysis by experts in the field in which the invention relates. This certainly takes longer time and often attracts additional cost usually passed to the patent applicant, either as part of initial processing fees or as optional/additional charge.

Angola is a typical African nation where substantive examination of patent is being practiced (Moreira, 2021). The activities here usually involve:

- i) Re-examining prior art within the field to ensure there are no duplication of inventions or claims, which process could be facilitated if such had been properly covered during preliminary search or by the applicant himself, before approaching the Patent Office;
- ii) Examining claims to identify the subjects covered, their clarity and how they relate to the description of the invention; and
- iii) Identifying and ensuring absence of subjects excluded from patentability within or around the scope of the invention and claims, especially in the areas of public order and morality.

Some benefits of substantive patent examination include:

- i) Opportunity offered applicant to amend the patent application by way of editing out conflicting claims, review of descriptions, drawings etc to achieve patentability of otherwise, invalid patent application;
- ii) It reduces the likelihood of issuing out an invalid patent; and
- iii) Most importantly, by scrutinizing validity and patentability before the grant, technical and socio-economic feasibility of the patent is being established as prelude to potentially viable economic exploitation.

3.2.4 Inventors' responsibility to carry out search and examination

An interesting dimension to this subject is on whether the burden of patentability tests should be on the Patent Office since it probably, only add economic value to the inventor. This can be viewed from two perspectives. First, the value addition is not just to the inventor but the national economy as well as the society as a whole. Besides, patents facilitate disclosure of inventions to the society at large thereby making it easy to use same as stepping board to other inventive activities for speedy technological advancement. Spulber (2014) demonstrated that the real benefits of patenting is not the economic reward to inventors but rather the foundation role it provides for efficient functioning of market for inventions, which among others, 'stimulates competition by offering exclusion, transferability, disclosure, certification, standardization, and divisibility'. The Australian (2010) also acknowledged impersonal economic benefits of a patent system to include 'promoting innovation, encouraging investment, economic growth, knowledge sharing and efficient use of resources'.

Table 9 exemplifies the elements of costs involved in procuring patent as protection over inventive or innovative product, as compared to the potentials of reaping economic benefit therefrom.

Table 9: Cost- Value scenario of registered patents

Cost variables	Value variables
i) Creation of invention (which could entail months of man-hours, abortive expenses on trial models, material procurement, validation tests etc)	i) Exclusive use of invention
ii) Patent drafting and document preparation	ii) Ability to make legal claims (limited by non-validation of patent at registration stage)
a. Preliminary search of prior art	iii) Right to license (Also restricted as validity of patent has no statutory authentication)
b. Engagement of legal hands	
c. Technical design and engineering detailing	
d. Production of 3d models and prototypes	
e. Actual drafting of application, including extraction of patent claims	
iii) Patent filing/processing and publication	
iv) Patent renewal/maintenance fees	
v) Search and examination fees*	

Note: *This is the only cost element skipped with deposit system of patent registration in Nigeria

3.2.5 Why not join ARIPO for cost-effective examination?

African Regional Intellectual Property Organization (ARIPO) is the English-speaking umbrella for African nations to team up together to facilitate the registration and governance of IP rights among member nations. Financial and human resources were to be pooled together to make more affordable, the process of registration and administration to foster creativity and innovation for economic, industrial and technological advancements through exploitation of IP resources like patents and trademarks. ARIPO was formed in December 1976 by Lusaka Agreement and as at December 2020, it had a membership of 20 excluding only Nigeria from among the Anglo-phone West African countries. Though Nigeria has already signed the African Charter for free Trade (AfCFTA), only an observer status is maintained with ARIPO. Under the Harare Protocol, patents application through ARIPO undergo substantive examination comprising tests for patentability in terms of whether the patent is:

- i) New; vi) Not within excluded subject-matter; and
- ii) Involves inventive steps; vii) Not part of a prior art
- iii) Industrially useful;
- iv) Clear and complete in its description to be reproducible by peers;
- v) Clear and relevant on claims vis-à-vis the description earlier presented;

Incidentally, under ARIPO, substantive examination must be separately requested for and attracts examination fee. Besides, it is reported to always take about 2 to 3 years (Fillun & Decketts Limited, 2021). This further confirms that patent right is not only expensive but also cumbersome and with protracted processing period. Nevertheless, it has to undergo all these stages to have meaningful reliability, validity and marketability.

In other words, by not fully joining ARIPO, Nigeria continues to jeopardize the fortunes of IP rights (especially Patents) issued to her residents - not taking advantage of expanding technology and the pooled resources at ARIPO for 'search services, publications and awareness creation' (Uche, 2021). Nigeria invariably, has not joined ARIPO because of her delay in signing AfCFTA. Though the agreement has already been signed, as noted by Akinkugbe (2018), Nigeria still needed to consult key stakeholders like the labour union and manufacturers association on the implications of fusing into single African market with free movement of goods, services, people and investment across 55 countries.

Table 10 presents a summary from the foregoing analysis.

Table 10: Summary of findings

Variable	Global	African	Nigeria
Population influence on RPA	Significant	Insignificant	Significant
GDP on RPA	Significant	Significant	Insignificant
Substantive patent search/examination	Varied	ARIPO and OAPI- enabled search and examination by 90% African countries	Deposit system, no substantive search/examination

4.0 Conclusion and recommendations

Nigeria has been found to have sub-optimal performance in inventive and innovative activities, as demonstrated by the low figures of RPA vis-à-vis the sizes of her population and GDP, using both African and global yardsticks. Added to this is the non-valorized patenting system which makes her residents' patents potentially less valuable. The Nigerian economy, over some past decades have been precariously hinged on crude oil export with modern agriculture and manufacturing in comatose due to several factors traced to poor governance. Thus, for sustainable economic growth under prevailing global dynamics, productive activities that are technology-gearred must be embraced and this would require among others, strong political will for economic restructuring and restoration of decaying infrastructure, including relevant institutional frameworks. In the short run, her full membership of ARIPO would require urgent revisit to take advantage of pooling of economic, human and technical resources for substantive patent search and examination, a crucial step to enhancing the value of grants.

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