IIARD International Journal of Geography & Environmental Management (IJGEM)
Vol. 10 No. 3 2024 E-ISSN 2504-8821 P-ISSN 2695-1878 www.iiardjournals.org (online version)

Environmental Pollution and Infant Mortality on Entrepreneurial Opportunities: A Champiopreneurship Approach

Dr Ovharhe, Orugba Harry (Ph.D) [1]* and Dr Woko, Boma Emmanuel (Ph.D) [2]
[1]*School of Social Development & Occupational Therapy, University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State, Nigeria
[2]Ignatius Ajuru University of Education, Port Harcourt, Rivers State
Corresponding Author: Dr. Ovharhe, Orugba Harry
Email: harryovharhe@yahoo.com **Orcid**: https://orcid.org/0000-0002-3631-498

D.O.I: 10.56201/ijgem.v10.no3.2024.pg144.171

ABSTRACT
This study examined environmental pollution and infant mortality on entrepreneurship opportunities in Nigeria from 1981 to 2023. The study projected potential champiopreneur as considerations on the post Covid-19 Era from 2020 to 2023 with flashback before 2019 using Systemization of Experience as to capture the stream of event using annual time series data from 1981-2019. The time series data were analyzed using the Toda-Yamamoto estimation technique. The study used infant mortality and entrepreneurship opportunities as variables to capture health implications on the after-math of Covid-19 prospects among entrepreneurs with Carbon dioxide, Nitrous Oxide, Government Expenditure on Health, and Particulate Matter as the main explanatory variables. The findings reveal that during the period of the study not much causality was in process it may be on plight basis. This implies that from statically data framework responses much contributed to Infant Mortality in Nigeria during the period of study (1981-2023). However, further finding reveals that increase in infant mortality result a causal effect increase in Infant maternity leads to a continuous pollution of the environment especially the Carbon dioxide emission in the period of study. Thus, the current infant mortality rate for Nigeria in 2023 is 54.740 deaths per 1000 live births, a 2.63% decline from 2022. The infant mortality rate for Nigeria in 2022 was 56.220 deaths per 1000 live births, a 2.57% decline from 2021. The study recommended that clean and renewable energy sources such as solar energy, wind energy and Hydro energy to replace the fossil fuel energy in the country. Infant mortality should be of great concerns to all stakeholders globally by eliminating the pollution in the environment. The study recommends the presence of Atmospheric Particulate matter ($PM_{2.5}$) is not healthy for any country and infant mortality. On this premise, the government should through the Ministry of health sensitize the public on the dangers of the pollutants because these might affect infant champiopreneurs for the future.

KEYWORDS*: Environmental Pollution, Entrepreneurship opportunities, Green Entrepreneurship, Infant Mortality, Government Expenditure on Health, Health Outcomes, Post Covid-19*

1. INTRODUCTION

Being a champion is good, but becoming a champion that is broke financially is chaotic and embarrassing. Winning the trophy, medal, award, laurel, without being LIQUID is a shame to humanity and the business world. Champion must learn how they can convert their championship fame to become liquid (wealth, riches, goodwill, social capital, monetary value). Any championship fame which cannot be transforming to liquidity in the long term might lead to dissatisfaction, poverty, negative cog-structure, deteriorate motivation, obsolete skills, depletion knowledge and dying potentials. Champion could be trail from their infancy-childhood-adulthood with the potentials of liquidity in pursuit of entrepreneurship opportunities. Champions that are searching, pursuit and grapping opportunities should have volatility and liquidity. This is the calls for CHAMPIONPRENEURSHIP. Championpreneurship consciousness enables entrepreneurs to sustain, survive and become successful of the dreams, vision and targeted goals in their entrepreneurial journey. Championpreneurship approach is focusing on entrepreneur champions into liquidity benefits and satisfaction.

From the stage of infancy and adulthood, championpreneurs are to be known as the 'King Ringing the Bells' of opportunities in the entrepreneurship world. For example infant do participate in the movies, entertainment, sport, education and fashion industries. This can be stimulated and tailored to their adulthood to make their livelihood meaningful and adorable. When these are well tailored, it may reduce when grown to adult-hood with hazardous conditions like high blood pressure, anxiety, trauma, depression, discouragement, bitterness, regret, hopelessness and frustration. Championpreneur can mount wings against any storms, turbulent, hazard, pandemic, environment pollution and degradation because of the energy they possesses. Championpreneurs must learn, relearn and unlearn how to mitigate challenges to boost entrepreneurship growth in the business world with the charisma, potential and trait they possesses.

With these charisma, potentials and trait of championpreneurship, any negative syndromes could be recommended as opportunities and competitive edge to navigate shifting the focus from identifying dying dreams, hopelessness, frustration, depression and misfortune to identifying resources, hopes, and dreams. Instead of asking, "What problems do you have that we can fix for you," a championpreneurs asks, what are your strengths, priorities, untapped resources, and hopes, and how can we build and grab the business opportunities in alliance with stakeholders toward the kind of social mission and community benefits by mitigating constraints, pitfalls, turbulence and environmental munificence beyond assessing the needs of youth, women and elderly (Roehlkepartain, 2008)..

A lot of global potential champion have been stripe of the opportunities to display their talent, innovation, inventions and skills and charisma because of the effect of environmental challenges limiting infant potentials. These infant in their prospective future might have grown to become problem solvers in the society that might have the solution to solve; Ebola Virus, Covid 19, HIV

among others such as mitigating and bridging global and communal crisis (WHO, 2023). Many potential infant champions have died without fulfilling their destiny, dreams and entrepreneurial journey. This might have occurs through negligence, carelessness and nonchalant attitude by various structural actors and stakeholders in the society (Ovharhe & Chukwuemeka, 2023).

Entrepreneurship opportunities in the eyes of champiopreneurship is about scanning for opportunities, chasing opportunities, grabbing opportunities and utilization of the opportunities to accomplish rewards and benefits. The essence of champiopreneurship is searching and pursuit of the opportunities in the business environment to actualization deterministic needs and set goals.

Champiopreneurs excels greater with the application of entrepreneurship intelligence, human intelligence, business intelligence, artificial intelligence, competitive intelligence, selling intelligence and market intelligence to survive in the business climax (Ovharhe, 2024). Champiopreneurship and entrepreneurship intelligence are symmetrical with great accomplishment of opportunities, dreams, visions and mission in the entrepreneurial journey.

The global economic solution lies in the hand of most infant in alignment with futuristic enterprise opportunities dreams achievement. Infant poses capability of the entrepreneurship opportunities to learn, re-learn and unlearn in the environment towards creating remedies and possible solution as competitive advantage (Ovharhe et al, 2021, 2022, 2023). This is very important because most business potentials are locked in offspring and infant which might have been champiopreneur closing the point of departure in knowledge gap, United Nations sees infant as interface bridge and image builders, decision makers, policy formulators and paces setters in the industrial revolution for the future. Hence, there carry the instrument of future consignment inventory management (Ahunanya, 2022a,b).

Entrepreneurship opportunities are everywhere and every time, it is just to recognize and identifies it. Entrepreneurship opportunities is where you are now, where you are going now and where you are coming from now. Entrepreneurship opportunities are not scared, but the ability, capability and capacity to identify it is the problem. Whatever you see, hear, fell, touch, perceived, taste in life has entrepreneurial opportunities, even the invincible and nature. The problem and challenges of entrepreneurship opportunities is for entrepreneurs and intrepreneurs with champiopreneur spirit to unlocked the 'entrepreneurship code' to create and invent competitive advantage of the opportunities to sustainability, survival and success in the business environment. This is what champiopreneurship is all about, by unlocking and decoding encrypted potential enterprise port-folio. Champions breathe with entrepreneurship opportunities no matter whoever, whenever, whatever, however and whichever the business situation may become by mitigating bleeding edge to leading edge. Champions ensure to invent, create and innovate password to decode and unlock entrepreneurship opportunities (Ovharhe & Abada, 2023a; 20203b).

Ovharhe and Odepli (2024) strongly believe that despise the bottlenecks and pitfalls on environmental degradation and pollution issues the application of entrepreneurship intelligence, artificial intelligence, market intelligence, sale intelligence and production intelligence, strategic intelligence, tactical intelligence and operational intelligence will enable the enterprise to sustain in the long-term (Ovharhe & Woko, 2024a,b).

Every entrepreneur could narrates her infancy-childhood memory with minute glimpse. Eric Beato (2024) the renowned entrepreneurship averred the leadership rhythm on resilience and allyship of champiopreneur, leadership applying business intelligence, creativity and innovation to achieve enterprise excellence. Breato (2024) and Ovharhe (2024) inclined that these factorial elements are expected to augment vital proceedings in empowering, proliferating and advancing infant-childhood, women, youth entrepreneurs beyond now and SDG towards champiopreneurship.
Even the greatest in various fields has a childhood trait like, Cristiano Ronaldo and Lionel Messi that champiopreneur in the football sport industries. Michael Jackson, Dolly Parton, Beyonce are in the music industries with their exclusive branding styles and pattern (Baysinger, 2024). Every champiopreneur should posses its special styles and pattern that is charismatic. This charismatic trait, whether known or unknown, gives a competitive edge when an opportunity arises. Elon Musk (X, Tesla), Mark Zuckerberg (Facebook), Bill Gates (Micro Soft), Amazon, Google etcetera are all champions in their various area of specialty, just as Coke-Cola is the champion in the soft drink industries. In the civil construction industries in Nigeria and most Africa countries, Julius Berger is the champiopreneur (Ovharhe & Woko, 2024a,b). The most important questions is; Who's next? (Ovharhe, 2024).

They are not just satisfied in the leadership position but want to use the slogan of CNN; 'Be the First to Know'. The Olympic is the determinant of championship for who win and hold the trophy with the accurate compliance to the disciplinary rule of the game. Champiopreneurship is about who is the game changer (Ovharhe & Woko, 2024a).

The major bottleneck and pitfall engulfed unlocking and decoding enterprise potential port-folio may lies on the infant. But, infant mortality in Nigeria is as a result of inadequate provision of trained medical and paramedical personnel and the inefficient utilization by the community of the services provided. Also, due to negligence of infrastructure, technical no how, wrong timing, poor decision, low spirit, of child care, failure in implementation pf health policy, they become a victim. We all have questions to answers in the light of infant mortality.

The current infant mortality rate for Nigeria in 2023 is 54.740 deaths per 1000 live births, a 2.63% decline from 2022. The infant mortality rate for Nigeria in 2022 was 56.220 deaths per

1000 live births, a 2.57% decline from 2021 (Fite, Tura, Yadeta, Oljira & Roba, 2023).

High rates of child mortality in Sub-Saharan Africa results from factors such as low intake of calories, high rates of HIV/AIDS, political instability, poor dietary intake or poor consumption of vital nutrients (UNICEF, 2009). Also, malnutrition accounts for 49% school absenteeism in 42% of Nigerian children (Fite *et al.*, 2023). Factors such as poverty, failure to breastfeed exclusively, maternal factors such as poor nutrition during pregnancy, lack of appropriate weight gain, illnesses like diarrhea, acute respiratory infection, poor consumption of vitamin supplements or fortified foods, large family size, poor sanitation, lack of education and information about good or adequate nutrition and food insecurity and safety have been identified as factors that affect under-five children's nutritional status (Kalu & Etim, 2018).

The environment pollution have destroys champion especially future potential infant on invention, innovation and creation of future change that will transform humanity (Abaje, 1bello & Ahmad, 2020; Adeyem, Sophie & Oluwatomisin, 2020; Aborisade et al., 2020). Even those living are scared of the future. The unborn child and born infant have no string to link to the world transformation because the unknown that future might becomes. Potential infant entrepreneurs also consider what the planet, the people and the profit we be struggling with on sustainability, survival and success (Ovharhe & Okolo, 2022).

Championpreneurship are characterized with charisma, spirit of enthusiasm with burning passion, visionary on focus, risk culture, creator, learning, leading the way, optimistic and opportunist of changing the future, resiliency, building the bridge and idea generator (Ovharhe, 2021, 2022a; 2022b, 2023). This also means infant that are potential champion should be characterized with these attributes. Infant possesses all these characteristics as inert model wired and locked within them.

Infant championpreneur will always rhythm melody with lyrics as stated below; viz:

-The beautiful ones are not yet born.

-We are born to win

-He makes all things beautiful in its time.

Also the descant is every potential infant entrepreneurs poses differs skills, knowledge and talent at suitable timing.

-There is timing to dance

-There is timing to sing

-There is timing to play

-There is timing to relax

-There is timing to childbirth

If there are certain factors that affect the right timing of giving birth to potential infant entrepreneurs. The skills, knowledge and talent will be misplacement of priority in the wrong timing via mortality.

The timing for every entrepreneur matters a great deal. The timing works with opportunities, because there is a right time to invest and there is a right time to harvest. Business opportunities are synonymous with timing proficiency base on potential and talent of individuals. Certain skills in life needs to be immortal or immortalized as bed rock and track to the future such as music, craft, sport because they are pivotal of future research and development for the scenario learning for invention.

Nevertheless, environmental pollution naturally could be detriment to the livelihood of infant. Infant mortality has sunk the purpose, dreams and vision of potential future entrepreneur that might contribute to growth and development of entrepreneurship opportunities.

Singh et al (1991) has identified pollution in a very simple manner, i.e., disequilibrium condition from equilibrium condition in any system. This definition may be applied to all types of pollution ranging from physical to economic, political, social, and religious (Temitope, 2020). Over the past couple of decades, various sources of pollution were identified that altered the composition of water, air, and soil of the environment. The substances that cause pollution are known as pollutants (Beyene & Balázs, 2021; Bezverkhyi & Poddubna, 2023; Mlambo et al., 2023) .

A pollutant can be any chemical (toxic, metal, radio-nuclides, compounds and gases) or geochemical substance (dust, sediment), biological organism or product, or physical substance (heat, radiation, sound wave) that is released intentionally or inadvertently by man into the environment with actual or potential adverse, harmful, unpleasant, or inconvenient effects. Such undesirable effects may be direct (affecting man) or indirect, being mediated via resource organisms or climate change (Ukpere *et al.,* 2018).

According to the World Bank, at an international level the cost associated with health damage from ambient air pollution is estimated to be $5.7 trillion, equivalent to 4.8% of global GDP. In individual countries, the economic burden of pollution associated with premature mortality and morbidity is also significant, equivalent to 5 to 14% of countries' GDPs. Individual country studies, for Argentina, Bangladesh, Bolivia, Brazil, China, Colombia, Egypt, India, Lao PDR, Mexico, Morocco, Nepal, Nigeria, Pakistan, Peru and Zambia, at national and sub-national levels, suggest that the costs of pollution-related disease are mainly due to outdoor and household air pollution; lead exposure; noise pollution; and inadequate water supply, sanitation and hygiene (Vijaya, 2021).

Environmental pollution takes place when the environment cannot process and neutralize harmful by-products of human activities (poisonous gas emissions) in due course without any

structural or functional damage to its system. Pollution occurs, on the one hand, because the natural environment does not know how to decompose the unnaturally generated elements (i.e., anthropogenic pollutants), and, on the other, there is a lack of knowledge on the part of humans on how to decompose these pollutants artificially. It may last many years during which the nature will attempt to decompose the pollutants; in one of the worst cases that of radioactive pollutants it may take as long as thousands of years for the decomposition of such pollutants to be completed.

To bridge the gap, the study examined environmental pollution and infant mortality on entrepreneurship opportunities in Nigeria from 1981 to 2023. The study projected potential champiopreneur as considerations on the post Covid-19 Era from 2020 to 2023 with flashback before 2019 using Systemization of Experience as to capture the stream of event using annual time series data from 1981-2019.

2. CONCEPTUAL/THEORETICAL FRAMEWORK

Infant Mortality

Infant mortality is the death of young children under the age of one year (Mathew, 2013). This death toll is measured by the infant mortality rate (IMR), which is the probability of death of children under one year of age per 1000 live births (Okereke *et al*., 2019). It can also be regarded as the death of an infant before his or her first birthday. Infant mortality rate has affected the rapid growth of potential innovative entrepreneurs that possesses a lot of affective skill, cognitive skill and psychomotor skill. Future champion over the globe that would have created constructive and inventive meaningful sustainable development framework has been missed such entrepreneurship opportunities. Conversely, in Nigeria according to United Nation Independent Children Emergency Fund (UNICEF, 2021) Infant mortality stands at 69 per 1,000 live births while for under-fives it rises to 128 per 1,000 live births. More than half of the under-five deaths 64 percent result from malaria, pneumonia or diarrhea. This proliferation and prevalence of infant mortality could be traced to negligence, misguided and leadership development problem in the country.

Environment pollution affects the organic and inorganic substance in the livelihood of infant that poses negative threat to child nutrient. Infant mortality can be cause be malnutrition. Nutrition is directly or indirectly linked to the seventeen Sustainable Development Goals (SDG) (National Population Commission, 2014), and it is critical in the overall development of individuals and the nation at large. On the other hand, malnutrition remains a major health problem and is responsible for one-third of all infant and child mortality especially in third world countries as opined UNICEF/WHO/World Bank (Fite *et al*.,, 2023). Malnutrition is the consumption of dietary nutrient either insufficiently or exclusively (Kalu & Etim, 2018). In most countries, it is often observed that child mortality arises from the synergistic impact of effect of under-nutrition and infection.

The Environmental Kuznets Theory

The Environmental Kuznet Theory also known as Environmental Kuznet Curve **(**EKC) follows the name of Nobel Laureate Simon Kuznets who had remarkably hypothesized an inverted 'U' income-inequality relationship (Kuznets, 1955). According to this hypothesis, as an economy develop market forces first increase and then decrease economic inequality. In the 1990s economists detected this relationship between economic growth and environmental degradation. Since then this relationship is known as Environmental Kuznets Curve (Nahman & Antrobus, 2005). It is important to note that the growth and development of every economic depends greatly on the entrepreneurship opportunities. Hence, the entrepreneurship opportunities are the perquisite to the economic growth and development (Effa et al., 2023a; 2023b).

According to the EKC theory, as a country develops, the pollution increases, but after reaching a specific level of economic progress pollution begins to decrease which is detriment to infant mortality in alignment to entrepreneurship opportunities. The EKC hypothesis suggests that environmental degradation is something unavoidable at the first stage of economic growth, so a developing country is forced to tolerate this degradation in order to develop. In a graphical representation the x-axis symbolize the economic growth in antecedent to entrepreneurship opportunities which is measured by GDP per capita and the y-axis represents the environmental degradation that are traceable to infant mortality which is measured by many different pollution indicators such as carbon dioxide, sulfur dioxide, nitrogen oxide, deforestation etc.
The Kuznets curve appeared to be consistent with experience at the time it was proposed. However, since the 1960s, inequality has risen in the US and other developed countries. According to estimates put forward by Thomas Piketty inequality has now returned to the levels of the late 19th century. Since 1991 the environmental Kuznets curve (EKC) has become a standard feature in the technical literature of environmental policy, though its application there has been strongly contested.

The Environmental Kuznets Curve (EKC) is a pragmatic relationship that is assumed to trace the pollution path followed by countries as their per capita gross domestic product (GDP) grows and describes the relationship between per capita income and of environmental degradation indicators (Zhang *et al*, 2019). In the infant stages of development, the levels of some pollutants climb with increases in per capita income, while at advanced levels of development, environmental degradation follows a downward trend as income per capita is moving upwards. These results give rise to a bell shaped curve relating economic growth to environmental degradation, redolent of the relationship hypothesized by Kuznets (1995) between economic and income inequality.

3. METHODOLOGY

The study adopts the quasi-experimental research design for the study. This design is chosen because it is an empirical study of the association between environmental pollution and health outcomes in Nigeria. The study employs descriptive statistics and Toda-Yamamoto estimation

technique as the main analytical tool. The study Environmental Pollution and Health Outcomes in Nigeria captures the following variables namely; Infant Mortality Rate (IMR), Nitrous Oxide (N2O), Carbon Dioxide (CO_2) Particulate Matter ($PM_{2.5}$) and Government Expenditure on Health (GXH). These variables are elaborated below.

-Dependent variables

Infant Mortality Rate (IMR) is the dependent variable which is explained below.

Infant mortality is the death of young children under the age one (1), the death toll is measured by infant mortality rate (IMR) which is the number of deaths of children under the one year of age per 100 live births.

-Independents Variables

In this study, Carbon dioxide emission (Co_2), Nitrous oxide (No_2), Particulate Matter ($PM_{2.5}$) and Government Expenditure on Health (GXH) filled in as the informative factors in the model.

Carbon Dioxide (CO_2)

Carbon dioxide molecules consist of one (1) carbon atom and covalently double bonded two (2) oxygen atoms, it is a colourless gas with a density about 53 higher burning of carbon containing power and other plant matter. The measure of Co_2 at the atmosphere his expended since individuals started consuming a lot of coal and oil in the nineteenth century. It is expected that an expression in carbon dioxide in Co_2 emanation will diminish Infant Mortality (IMR).

Therefore, δ IMR, / δ $Co_2 < 0$

Nitrous Oxide (N_2O) Nitrous Oxide, commonly known as laughing gas or nitrous, is a chemical compound having an oxide of nitrogen with the formula in No_2at room temperature. It is colourless non-inflammable gas, with a slight metallic scent and taste. At elevated temperatures nitrous oxide is a powerful oxidizer similar to molecular oxygen.

It is expected that an expansion in No_2 outflow will diminish Infact Mortality Rate (IMR). Therefore δIMR/ δ$No_2 < 0$.

Particulate Matter (($PM_{2.5}$)

The term fine particles or Particulate Matter (($PM_{2.5}$), refers to tiny particles or droplets in the air that are two and one half microns or less in width. Like inches, meters and miles, a micron is a unit o measurement for distance. The worth's of the larger particles in ($PM_{2.5}$) size range would be thirty times smaller than human hair. The smaller particles are so small that several thousand of them could fit on the period at the end of this sentence. The United State Environmental Protection Agency (EPA) established National Ambient Air Quality standards for ($P_{m2.5}$) in 1997 and revised them in 2006 and 2012. National Ambient Air Standards are established to be protective public health.

It is expected that an expansion in $PM_{2.5}$ outflow will diminish Infact Mortality Rate (IMR).

Therefore $\delta IMR/ \delta PM_{2.5} < 0$.

Government Expenditure on Health

General government (excluding social security) expenditure on health refers to expenditures incurred by central, state/regional and local government authorities, excluding social security schemes. Included are non-market, non-profit institutions that are controlled and mainly financed by government units (OECD Health Data 2001). General government (excluding social security) expenditure on health refers to expenditures incurred by central, state/regional and local government authorities, excluding social security schemes. Included are non-market, non-profit institutions that are controlled and mainly financed by government units.It is expected that expansion in Government Expenditure on Health(GXH) will diminish infant mortality. It is expected that an expansion in GXH outflow will diminish Infant Mortality

Therefore $\delta IMR/ \delta GXH > 0$.

Model Specification

The Model Specification of this study is in line with the work of Ovharhe & Saturday (2023) with a slight modification.
The point of emphasis was the nexus between real per capita health expenditure and per capita Co_2 emissions in Nigeria. But this study deviates from this scholars by designing three models, while the former is a single model. In this investigation the present study disaggregated health outcome into infant mortality.

Model
Infant mortality (IMR) is a function of carbon dioxide (CO_2), Nitrous Oxide (N_2O) Particulate Matter ($PM_{2.5}$) and Government Expenditure on Health (GXH).

Thus the functional forms of the models are as follows:

Infant Mortality Model
$IMR = f(CO_2\ N_2O, PM_{2.5}, GXH)$ …….(equ i)
Where;
CO_2= Carbon dioxide
N_2O = Nitrous oxide
$PM_{2.5}$= Particulate Matter
GXH=Government Expenditure on Health
IMR= Infant Mortality Rate
Econometrically, equation is specified as

Model

$IMR = \pi_0 + \pi_1 Co_2 + \pi_2 N_2O + \pi_3 PM_{2.5} + \pi_4 GXH + \mu$……(equ ii)

Where;

IMR, CO_2, N_2O, $PM_{2.5}$ and GXH are as earlier defined.

β_0=intercept

β_1- β_4, $\alpha 1$-$\alpha 4$ and $\pi 1$-$\pi 4$ are coefficient of the independent variable

$\mu 1$, $\mu 2$, $\mu 3$, $\mu 4$,….. are stochastic term /error term and CO_2, N_2O, $PM_{2.5}$, GXH, IMR remained as defined above. It is expected that these variables will reduce life expectancy, infant mortality and maternal mortality. Thus, a priori expectations of the predictor and criterion are β_1,-β_5, $\beta_5 < 0$

The study adopts descriptive statistics and unit root test to estimate the link between environmental pollution and health outcomes in Nigeria. The study applied Toda-Yamamoto estimation technique due to the result of the unit root test.

One of the basic techniques economists regularly use to explore the behaviour of variables is the descriptive statistics. Range, mean, medium, standard deviation, kurtosis, skewness, Jarque-bera, is employed in the study and Again the econometrics techniques spread unit root test and Toda-Yamamoto is used to drive out the result.

The investigation uses the augmented dickey fuller (ADF) test and KPSS to check whether the data are stationary or not. It is currently a typical practice to inspect the time series properties of the variables, to check if stationary test is at level or at contrast. Toda-Yamamoto estimation technique demonstrates the existence of short-run and long-run relationship among the variables. Basically, it determines or test causality among variables.

4. RESULTS, DISCUSSION OF FINDINGS

The E-view analysis was focused on 1981-2019, whereas, the review analysis capture from 2020-2023.

4.1 Presentation of Data.

The trend of Nigerian's Infant Mortality Rate (IMR), Carbon dioxide emission (CO_2), Nitrous oxide (N_2O) Particulate Matter ($PM_{2.5}$) and Government Expenditure on Health (GXH) are presented in table

Data on the variables; IMR, CO_2, N_2O, PM2.5 and GXH (1981-2019).

	IMR	CO2	N2O	PM2.5	GXH
1981	123.9	0.87430925	12780.45	-	0.0844575
1982	122.9	0.84727766	13501.08	-	0.0959464

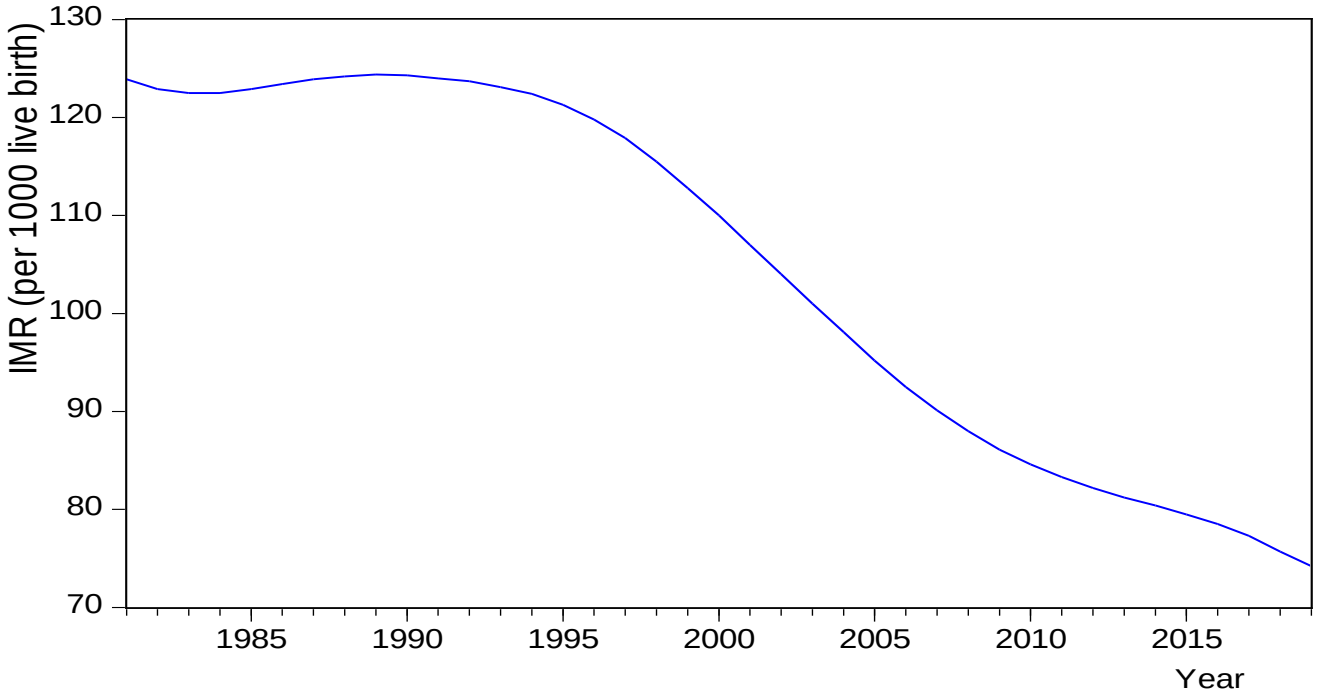
1983	122.5	0.75464209	13395.68	-	0.0827864
1984	122.5	0.85483601	13538.73	-	0.1015487
1985	122.9	0.83641324	13298.3	-	0.1320247
1986	123.4	0.85703744	13570.2	-	0.1341245
1987	123.9	0.67398509	13732.02	-	0.0413145
1988	124.2	0.78264527	13736.39	-	0.4228
1989	124.4	0.45740662	14471.62	-	0.5753
1990	124.3	0.41167477	15542.51	81.46689	0.5007
1991	124	0.43282688	14410.89	81.46689	0.6182
1992	123.7	0.46539645	15448.26	81.46689	0.1501607
1993	123.1	0.43950119	15623.45	81.46689	3.8716009
1994	122.4	0.33429857	15488.74	81.46689	2.0939837
1995	121.3	0.31201403	15799.47	77.88861	3.3207
1996	119.8	0.33479508	15706.91	77.88861	3.0237074
1997	117.9	0.36379871	15980.87	77.88861	3.8910988
1998	115.5	0.326916	16325.98	77.88861	4.7422667
1999	112.8	0.3341685	16131.27	77.88861	16.638773
2000	110	0.64704259	16230.62	74.50545	15.218082
2001	107	0.69395568	17581.17	74.50545	24.522272
2002	104	0.73553254	16007.71	74.50545	40.621417
2003	101	0.76055829	15776.91	74.50545	33.267982
2004	98.1	0.7315821	16738.24	74.50545	34.198484
2005	95.2	0.76419041	16555.54	59.98227	55.662997
2006	92.5	0.68921072	26531.11	59.98227	62.253622
2007	90.1	0.64827779	37938.31	59.98227	81.909366
2008	88	0.63876777	31494.46	59.98227	98.219319
2009	86.1	0.49298093	33,571	59.98227	90.2
2010	84.6	0.72017502	35475.2	51.52977	99.1
2011	83.3	0.80885464	35829.9	53.37225	231.8
2012	82.2	0.71165279	36184.7	50.09322	197.9
2013	81.2	0.72383244	35829.93	46.39325	179.98693
2014	80.4	0.73768261	35948.18	41.60273	195.97678
2015	79.5	0.64000315	35987.6	115.124	257.7
2016	78.5	0.64728484	35921.9	122.4784	200.82399
2017	77.3	0.6749902	35953.56	93.07	245.18802
2018	75.7	0.65409273	35954.35	72.8555891	296.44279
2019	74.2	0.65878926	35943.27	72.0078815	388.36714

Note: IMR =Infant Mortality Rate
CO_2 = Carbon dioxide Emission
N_2O = Nitrous oxide
$PM_{2.5}$ = Particulate matter
GXH = Government Expenditure on Health

Source: World Development Indicators (2019) and CBN statistical bulletin (2019).
NB: The post Covid19 analyses are capture from the period of 2020 to 2023.

Trend of Infant Mortality Rate (MMR) in Nigeria. (1981-2019)

The figure shows then figure of Infant Mortality Rate (IMR) per 1000 birth in Nigeria. In 1981 the figure is 123.9. The figures fluctuate slightly from 122.9 in 1982 to 124.4 in 1989 indicating the apex figure recorded in the period of study. However, the figures maintained a steady decrease from 124.3 in 1990 to 74.2 in 2019.



Time series plot of Infant Mortality Rate (IMR) 1981-2019

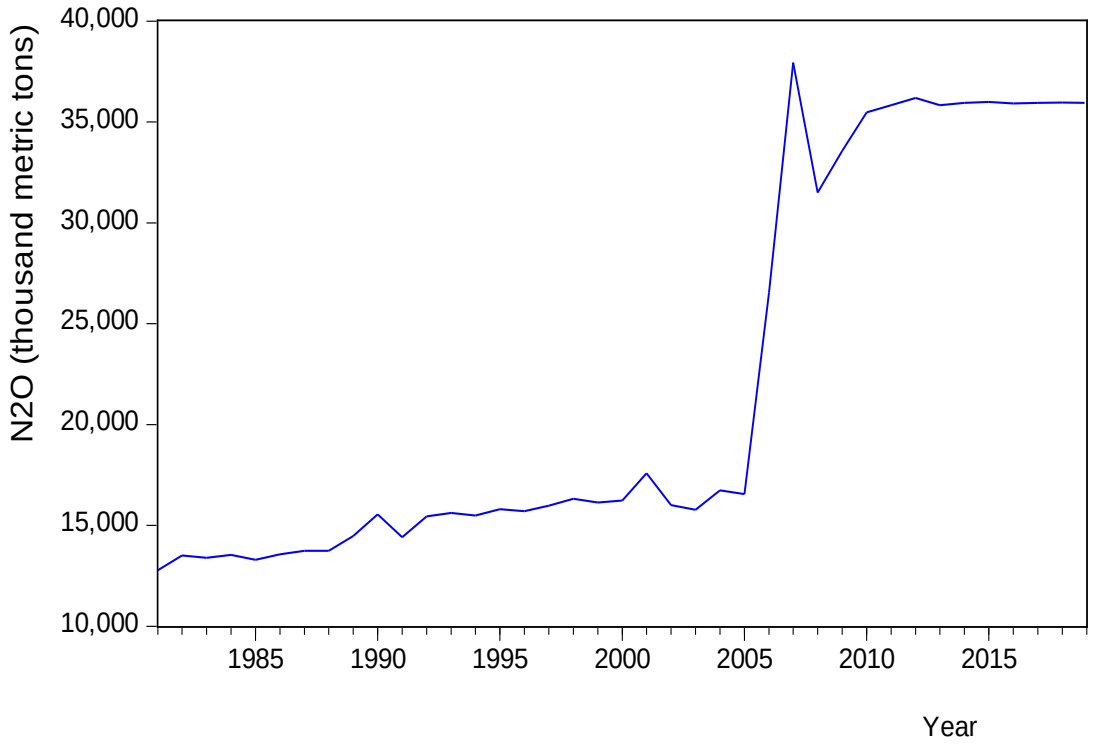
Trend of Carbon dioxide emission (CO_2) in Nigeria. (1981-2019).

The figure indicates that the figures of carbon dioxide emission (CO_2) in Nigeria are in puzzle form with strong up and down spike during the period chosen for this study. The figure of 0.87430925 in metric tones, per capital in 1981 indicate the highest in the period of study, while 0.312.01403 in 1996 reveals the smallest in figure of carbon dioxide emission.

Time series plot of Carbon dioxide (CO_2) 1981-2019

Trend of Nitrous oxide emission (N_2O) in Nigeria (1981-2019).

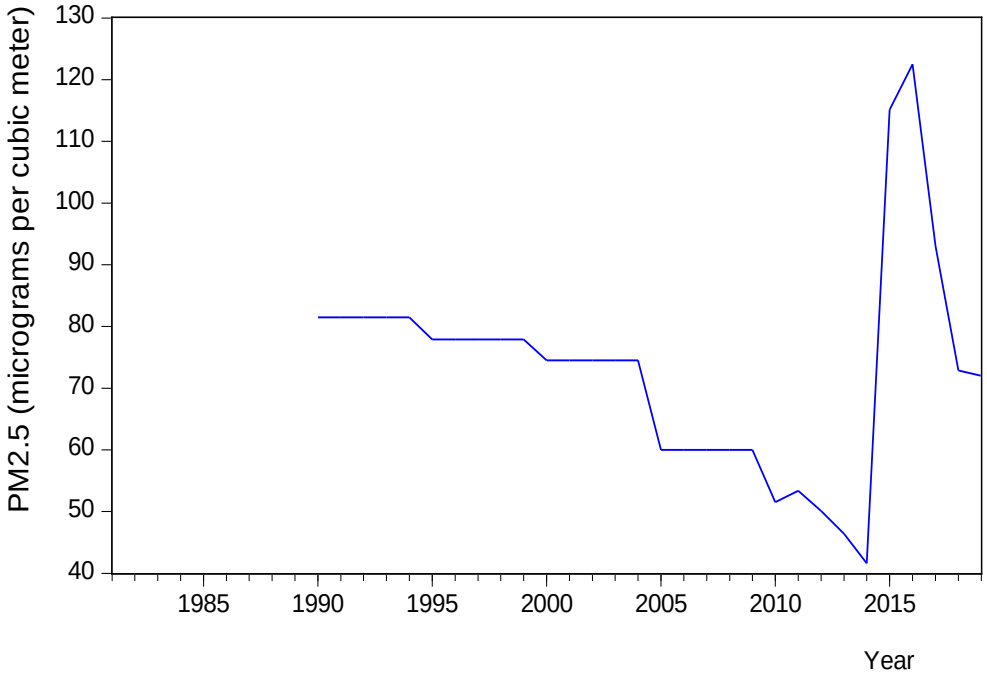
The figure indicates slight fluctuation in figures of Nitrous oxide emission (N_2O). 12780.45 in metric tonnes in 1981 to 16555.54 in 2005. From 2006 there is a spike of 26531.1, to 37938.31 metric tonnes in 2007. The figures then puzzle down to 31494.40 in 2008 and ended up to 35943.27 metric tonnes in 2019.



Time series plot of Nitrous Oxide (N_2O) 1981-2019

Trend of Nigeria's particulate Matter ($PM_{2.5}$) microgram (1981-2019).

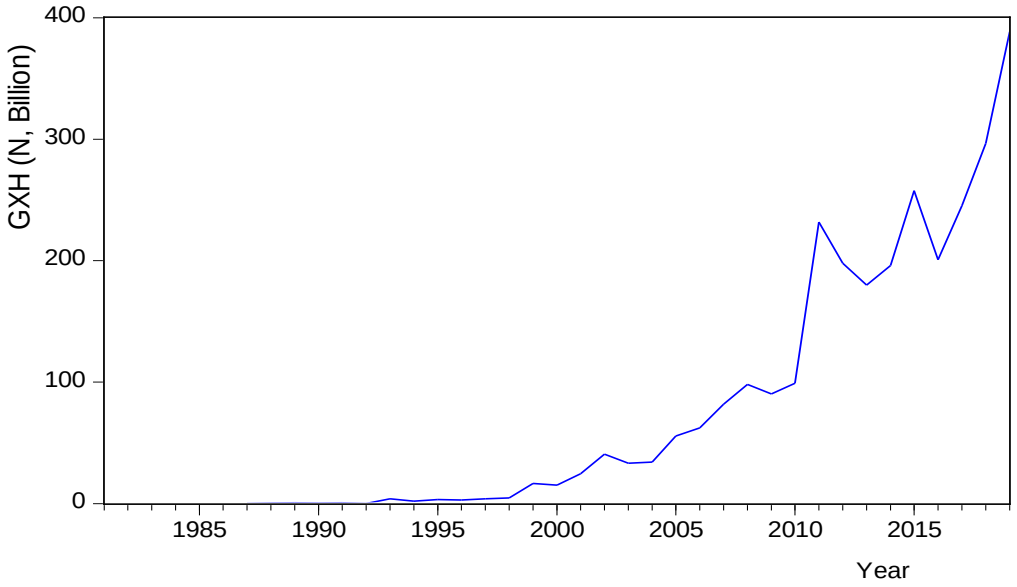
The figure shows the value of Particulate Matter ($PM_{2.5}$) fluctuating in a puzzle form. It shows a steady and continuous decrease of 81.46689 in 1990 to a minimum level of 41.60273 on 2014. The values of 115.124 in 2015 depict the highest level of particulate matter in the period of study. However, in 2019 the value is 72.0078815 in micrograms per cubic meter.



Time series plot of Particulate Matter ($PM_{2.5}$) 1981-2019

Trend of Nigeria's Government Expenditure on Health (1981-2019).

The figure shows the value of Nigeria's government expenditure on health in Billions of Naira. Government expenditure health in Nigeria have been in a fluctuating state but the figures indicate more of increase then decrease. In 1981 0.0844575 was allotted for expenditure on health, the value of 0.041315 in 1987 was the least figure. However, considering the period under study the highest amount of government expenditure on health is 388.36714 in 2019.



Time series plot of Government Expenditure on Health (GXH) 1981-2019

4.2 Data analysis

The analyses of the data were done in phases. The first phase is the descriptive statistics to ascertain the stationarity of the variables. Secondly, the analyses of further results were done based on each of the models. That is the Infant Mortality Rate (IMR) model.

Descriptive Statistics

Table below presents the result of the descriptive statistics of the variables employed on the estimation in the study.

Descriptive Statistics Test Results

	IMR	CO2	N2O	PM25	GXH
Mean	104.7256	0.627523	22203.50	72.92477	73.58668
Median	110.0000	0.673985	16131.27	74.50545	16.63877
Maximum	124.4000	0.874309	37938.31	122.4784	388.3671
Minimum	74.20000	0.312014	12780.45	41.60273	0.041315
Std. Dev.	18.71087	0.174144	9819.546	17.64341	103.1706
Skewness	-0.315348	-0.535557	0.621843	0.762062	1.386098
Kurtosis	1.430709	2.008642	1.496877	4.278001	3.887616
Jarque-Bera	4.648233	3.461372	6.184970	4.945300	13.76852

Probability	0.097870	0.177163	0.045389	0.084361	0.001024
Sum	4084.300	24.47340	865936.5	2187.743	2869.881
Sum Sq. Dev.	13303.67	1.152388	3.66E+09	9027.403	404478.4
Observations	39	39	39	30	39

Source: Authors Computation

The result of the descriptive statistics in table above shows that the mean values of the variables- IMR, CO_2 N_2O, $PM_{2.5}$ and GXH are 104.7256, O.627523,22203.50, 72.92477 and 73.58668 respectively. From the table above the standard deviation N_2O shows that N_2O (9819.546) was the most volatile variable in the series, while CO_2 (0.174144) was the least volatile variable. The skewness statistics showed that IMR and CO_2 were negatively skewed; suggesting that their distribution has a long tail, while $PM_{2.5}$ and GXH are positive meaning that their distribution has a right tail.

Also the Kurtosis statistics showed that IMR, CO_2 and N_2O variables were Platykurtic suggesting that their distribution were flat relative to relative to normal distribution, except for $PM_{2.5}$ and GXH that are leptokurtic, suggesting that its distribution was peaked relative to a normal distribution.
Based on these observations, it indicates that the series are non-stationary. However, this indication is not surprising, since the data are time series in nature. In sum, there is unit root (non-stationarity) in the series.
Based on these observations, it is therefore necessary to test for stationarity of variables and the long run relationship. The unit root test is conducted so as to make the variables stationary. The study adopts the Augmented Dickey Fuller (ADF) and KPSS unit root test procedure.

ADF unit root test for Infant Mortality Rate (IMR) model

Variables	ADF at level	ADF at 1st difference	ADF at 2nd differences	Status	Remark
IMR	0.033512	-3.805060		1(1)	Stationary
CO_2	-2.173144	-6.810304		1(1)	Stationary
N_2O	-0.53324	5.661445		(11)	Stationary
$PM_{2.5}$	-3.239679	-		1(0)	Stationary
GXH	-2.994850	2.034424	-3.924636	1(2)	Stationary
CRITICAL VALUES					
1%	-3.632900	-3.632900	-3.632900		

5%	-2.948404	-2.948404	2.948404
10%	2.612874	-2.612874	2.612872

Source: Author's computation

KPSS unit root test for Infant Mortality Rate (IMR) model

Variables	KPSS at level	KPSS at 1st difference	KPSS at 2nd differences	Status	Remark
IMR	0.710439	0.300452		1(1)	Stationary
CO_2	0.129624			1(1)	Stationary
N_2O	0.644024	0.104490		(11)	Stationary
$PM_{2.5}$	0.161337			1(0)	Stationary
GXH	0.650704	0.687235	0.312066	1(2)	Stationary
CRITICAL VALUES					
1%	0.739000	0.739000	0.739000		
5%	0.463000	0.463000	0.463000		
10%	0.347000	0.347000	0.347000		

Source: Author's computation

The outcome of the ADF unit root test in table reveals that Infant Mortality Rate (IMR), Carbon dioxide emission (CO_2) and Nitrous oxide (N_2O) were stationary at first deference I(1), while Particulate Matter ($PM_{2.5}$) is stationary at level and Government Expenditure on Health (GXH) were stationary at second difference 1(2). Hence the study conclude that the variables used in the Infant Mortality Rate (IMM) model were integrated of different order, that is 1(1), 1(0) and 1 (2).
The result for the KPSS unit root test presented in table shows that Infant Mortality Rate (IMR) and Nitrous oxide (N_2O) were stationary at first difference 1(1), Carbon dioxide (CO_2) and Particulate Matter ($PM_{2.5}$) were stationary at level 1(0) while Government Expenditure on Health (GXH) is stationary at second difference 1(2).
Hence, the study conclude that the variables involve in Infant Mortality Rate model three (3) were integrated of different order integration that is I(1), I(0) and I(2).
However, since the ADF and KPSS result indicate that the series are of different order of integration, we proceed to conduct Toda-Yamamoto modeling techniques.

Toda-Yamamoto Estimation result for Infant Maternity Rate (MMR) model is offered in table below. Toda Yamamoto causality test result model

Dependent variable: IMR

Excluded	Chi-sq	df	Prob.
CO2	0.237115	2	0.8882
N2O	1.461551	2	0.4815
PM25	1.440120	2	0.4867
GXH	4.767314	2	0.0922
All	11.03459	8	0.1997

Dependent variable: CO2

Excluded	Chi-sq	df	Prob.
IMR	3.632176	2	0.1627
N2O	1.338473	2	0.5121
PM25	1.115174	2	0.5726
GXH	2.019738	2	0.3643
All	9.257122	8	0.3211

Dependent variable: N2O

Excluded	Chi-sq	df	Prob.
IMR	6.998402	2	0.0302
CO2	3.390266	2	0.1836
PM25	1.191244	2	0.5512
GXH	0.510577	2	0.7747
All	16.41872	8	0.0368

Dependent variable: PM25

Excluded	Chi-sq	df	Prob.
IMR	0.171696	2	0.9177
CO2	0.465158	2	0.7925
N2O	0.279345	2	0.8696
GXH	0.970780	2	0.6155
All	2.041670	8	0.9797

Dependent variable: GXH

Excluded	Chi-sq	df	Prob.
IMR	0.589647	2	0.7447
CO2	7.289242	2	0.0261
N2O	0.067846	2	0.9666
PM25	34.16072	2	0.0000
All	44.24017	8	0.0000

Source: Authors computation

From table, the result of the Toda-Yamamoto causality test show that CO_2, N_2O, $PM_{2.5}$ and GXH show no causality with IMR; IMR, N_2O, $PM_{2.5}$ and GXH show no causality with CO_2; CO_2 $PM_{2.5}$ and GXH. Show no causality with N_2O; IMR, CO_2, N_2O and show no casualty with $PM_{2.5}$; IMR and N2O, show no casualty with GXH. However, the result further reveals that there is a unidirectional causality which runs strictly from IMR to N_2O, CO_2 to GXH and $PM_{2.5}$ to GXH.

Discussion of result for Infant Mortality Rate (IMR) model three (3)Relationship between Carbon dioxide (CO_2), Nitrous oxide (N_2O), Particulate Matter $PM_{2.5}$ and Government Expenditure on Health (GXH) on Infant Mortality Rate (IMR) in Nigeria.

(i) Carbon dioxide (CO_2) and Infant Mortality Rate in Nigeria

From the result of the Toda-Yamamoto causality test the study reveals that there is no causal relationship between Carbon dioxide (CO_2) and Infant Mortality Rate **(IMR)** with direction from Carbon dioxide (CO_2) to Infant Mortality Rate **(IMR)** in Nigeria within the period of study. This is shown by the chi-square value of 0.2317115 and probability value of 0.8882. This implies that Carbon dioxide (CO_2) does not contribute or result to Infant Mortality Rate **(IMR)** in Nigeria within the period of study.

(ii) Nitrous oxide (N_2O) and Infant Mortality Rate in Nigeria

From the result of the Toda-Yamamoto causality test the study reveals that there is no causal relationship between Nitrous oxide (N_2O) and Infant Mortality Rate **(IMR)** with direction from Nitrous oxide (N_2O) to Infant Mortality Rate **(IMR)** in Nigeria within the period of study. This is shown by the chi-square value of 1.461551 and probability value of 0.4815. This implies that Nitrous oxide (N_2O) does not contribute or result to Infant Mortality Rate **(IMR)** in Nigeria within the period of study.

(iii) Particulate matter ($PM_{2.5}$) and Infant Mortality Rate (IMR) in Nigeria

From the result of the Toda-Yamamoto causality test the study reveals that there is no causal relationship between Particulate matter **($PM_{2.5}$)** and Infant Mortality Rate **(IMR)** with direction from Particulate matter **($PM_{2.5}$)** to Infant Mortality Rate **(IMR)** in Nigeria within the period of study. This is shown by the chi-square value of 1.440120 and probability value of 0.4867. This implies that Particulate matter **($PM_{2.5}$)** does not contribute or result to Infant Mortality Rate **(IMR)** in Nigeria within the period of study.

(iv) Government Expenditure on Health (GXH) and Infant Mortality Rate (IMR) in

Nigeria

From the result of the Toda-Yamamoto causality test the study reveals that there is no causal relationship between Government Expenditure on Health (GXH) and Infant Mortality Rate **(IMR)** with direction from Government Expenditure on Health (GXH) to Infant Mortality Rate **(IMR)** in Nigeria within the period of study. This is shown by the chi-square value of 4.767314 and probability value of 0.0922. This implies that Government Expenditure on Health (GXH) does not contribute or result to Infant Mortality Rate **(IMR)** in Nigeria within the period of study (Agboola, 2020; Agboola, 2020).

(v) **Infant Mortality Rate (IMR) and Carbon dioxide (CO_2) Emission in Nigeria**

The result of the Toda-Yamamoto causality test reveals that there is no causal relationship between Infant Mortality Rate (IMR) and Carbon dioxide (CO_2) emission in Nigeria during the period of study. This is shown by the chi-square value of 3.632176 and probability value of 0.1627. Consequently, since the probability value of 0.1627 is greater than 0.05% percent. The implication is that infant mortality does not contribute to carbon dioxide (CO_2) emission in Nigeria during the period of study (Igbokwe, Nwufo & Ononogbo, 2018; Nnorom & Odeyingbo, 2019).

(vi) **Nitrous Oxide (N_2O) and Carbon dioxide (CO_2) Emission in Nigeria**

The result of the Toda-Yamamoto causality test reveals that there is no casual relationship between Nitrous oxide (N_2O) and Carbon dioxide (CO_2) in Nigeria during the period of study. This is shown by the chi-square value of 1.338473 and probability value of 0.5121. However, since the probability value of 0.5121 is greater than 0.05% percent. This implies that Nitrous Oxide does not contribute to carbon dioxide (CO_2) emission in Nigeria during the period of study.

(vii)**Particulate Matter ($PM_{2.5}$) and Carbon dioxide (CO_2) Emission in Nigeria**

The result of the Toda-Yamamoto causality test reveals that there is no causal relationship between particulate matter and Carbon dioxide emission in Nigeria during the period of study. This is made obvious by the chi-square value of 1.115174 and probability value of 0.5726. Consequently, since the probability value of 0.5726 is greater than 0.05% percent, it implies that particulate matter ($Pm_{2.5}$) does not contribute to carbon dioxide (CO_2) emission in Nigeria during the period of study.

(viii) **Government Expenditure on Health (GXH) and Carbon dioxide (CO_2) emission in Nigeria.**

The result of the Toda-Yamamoto causality test reveals that there is no causal relationship between Government Expenditure on Health (GXH) and carbon dioxide emission in Nigeria during the period of study. This is shown by the chi-square value of 2.019738 and probability value of 0.3643. However, since the probability value of 0.3643 is greatest than 0.05% percent. The implication is that Government Expenditure on Health (GXH) does not contribute to carbon dioxide (CO_2) emission in Nigeria during the period of study.

(ix) **Infant Mortality Rate and Nitrous Oxide (N_2O) Emission in Nigeria:**

The result of the Toda-Yamamoto causality test reveals that causality exit between infant mortality Rate (IMR) and Nitrous Oxide (N_2O) emission in Nigeria during the period of study. This is shown by the chi-square value of 6.998402 and probability value of 0.0302.

Consequently, since the probability value of 0.0302 is less than 0.05% percent, it implies that infant mortality contribute to Nitrous Oxide (N_2O) emission in Nigeria during the period of study.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The study examined the health outcomes of environmental pollution in Nigeria spanning from 1981-2019. In order to achieve the objectives annual time series data of Infant Mortality Rate (IMR) which were modeled as the dependent variable and Carbon dioxide emission (CO_2), Nitrous Oxide (N_2O), Particulate Matter of less than 2.5 diameter $PM_{2.5}$ and Government Expenditure on Health (GXH) which acted as the independent variables were sources from secondary sources such as the publications of the Central Bank of Nigeria (CBN) statistical bulletin and annual report and statement of account and World development Indicators (WDI). The analysis was carried out using Toda-Yamamoto modeling technique to establish the result.

The findings of the study on the basis of which appropriate policy recommendation were proffered can be summarized as follows:

i. Carbon dioxide (CO_2) emission does not have a causal effect on Infant Mortality Rate IMR) in Nigeria in the period of study. Implying that Carbon dioxide (CO_2) emission does not result to Infant Mortality Rate (IMR) in Nigeria in the period of study (Oluwadare, 2020).
ii. Nitrous Oxide (N_2O) emission does not have a causal effect on infant mortality in Nigeria in the period of study. Implying that Nitrous oxide (N_2O) emission does not result to infant mortality in Nigeria during the period of study.
iii. Particulate matter (($PM_{2.5}$) emission does not have a causal effect on Infant Mortality Rate (IMR) during the period of study in Nigeria implying that Particulate Matter ($PM_{2.5}$) emission does not result to infant mortality rate (IMR) in Nigeria during the period of study (Seiyaboh & Izah, 2019; Oyebode, 2019; Osuagwu1, Agunwamba, & Okoli, 2020).
iv. Government Expenditure on Health (GXH) does not have a causal effect on infant mortality in Nigeria in the period of study. Implying that government expenditure on health (GXH) does not result to a reduction in infant mortality rate (IMR) in Nigeria in the period of study (Osabohien, Osabuohien & Urhie, 2018; Ogundipe, Olurinola & Ogundipe, 2018; Oguntunde, Okagbue, Oguntunde & Odetunmibi, 2019).

Having examined the target variables, the findings according to Toda-Yamamoto estimation technique reveals that environmental pollution did not result to a reduction in infant mortality in Nigeria during the period of study in Nigeria. However, the infant mortality Nigeria could basically be as a result of inadequate medical care as postulated by Okereke (2019) and confirmed by Oyediran (1981) who emphasize that the problem of infant mortality in Nigeria is as a result of inadequate provision of trained medical and paramedical personnel and the inefficient utilization by the community of the services provided.

Consequently, despite the target variables additional findings using the Toda-Yamamoto estimation technique reveals as follows;

5.2 Conclusion

Environmental pollution did not result to infant mortality in Nigeria during the period of study in the short term; rather increase in life expectancy contributes to environmental pollution in Nigeria. Environmental pollution might be detriment to the health from the 2020 to 2023 review which might affect mortality likelihood.

5.3 Recommendations

The following recommendations are made based on the findings of the study.

.

i. Infant mortality should be of great concerns to all stakeholders globally by eliminating the pollution in the environment.
ii. The presence of Atmospheric Particulate matter ($PM_{2.5}$) is not healthy for any country. On this premise, the government should through the Ministry of health sensitize the public on the dangers of the pollutants because might affect championpreneurs for the future
iii. The government should implement the gas flaring prohibition act promulgated in 2005 and strongest penalty be melted on any company that flout the law towards protecting future infant championpreneurs in the business world.

5.4. Contribution to Knowledge

This study contributes to knowledge in the following ways:

The study investigates the effects of environmental pollution on health outcomes in Nigeria in antecedent to infant mortality on detriment to entrepreneurship opportunities. The study specifically takes into consideration pollution impacts on infant mortality in Nigeria spanning over a period of 1981 to 2023 with systemization of practice and knowledge.

On the basis of the above trend, the study contributes that entrepreneurship opportunities' on prospective and potential champion in the enterprise world are affected by environmental pollution in respective to prevalence of infant mortality.

The study develops comparison study among the pollution effect on infant mortality on entrepreneurship opportunities basis from 1981-2019 and 2020-2023 respectively.

REFERENCES

Abaje, I,B., 1bello, Y., & Ahmad, S.A. (2020). A review of air quality and concentrations of air pollutants in Nigeria. *J. Appl. Sci. Environ. Manage*, 24 (2), 373-379

Aborisade M. A, Gbadebo A.M., Adedeji O.H, Okeyode I.C., & Ajayi O.A. (2020). Excess lifetime Cancer risk and Radiation Pollution hazard indices in rocks and soil of some selected mining sites in Nasarawa State, Nigeria. *Environmental Mnagement Journal*, 34(2), 547-563

Adeyem, A., Sophie, O., & Oluwatomisin, M. O. (2020). Environmental degradation and food security in Nigeria.*International Journal of Energy Economics and Policy*, 10(1), 316-324.

Agboola, D. (2020). Quantifying the erosion of natural darkness in the global protected area

system. *Conservation Biology*, 29(4), 1132-1141.

Agboola, H.O. (2019). *Environmental pollution in Nigeria; Types and health consequences. Graduate/Tutorial Assistant*, Department of Human Kinetics and Health Education, University of Ibadan, Ibadan, Oyo State, Nigeria.

Ahunanya, V, Ovharhe, O. H., Emenike, C. G., & Otto, G. (2022a). Consignment inventory system and entrepreneurial success among micro warehousing firms. *International Journal of Social Science & Management Research*. 8(5), 18-28.DOI:10.56201/ijssmr.v8.no5.2022.pg18.28

Ahunanya, V., Ovharhe., O. H., Emenike, C. G., & Otto, G. (2022b). Consignment inventory system and obsolescence management in the drilling fluid firms in Nigeria. *International Journal of Social Science & Management Research*, 8(5),1-27.DOI: 10.56201/ijssmr.v8.no5.2022.pg1.17

Baysinger, T. (2024). Sony said to pay around $600M for Michael Jackson catalog deal. *https://www.axios.com/2024/02/12/sony-michael-jackson-catalog*

Beato, E. (2024). 2024: A year of collaboration and innovation at the blank school. *https://entrepreneurship.babson.edu/2024-blank-school/*

Beyene, S. D., & Balázs K. (2021). Empirical evidence for the impact of environmental quality on life expectancy in African countries. *Journal of Health and Pollution*, 11(29),:210312. DOI: 10.5696/2156-9614-11.29.210312

Bezverkhyi, K., & Poddubna, N. (2023). International requirements for enterprise reporting on climate impact. DOI: 10.31617/3.2023(126)07

Chibuike, C. U., & Ovharhe, O. H. (2022). Emergence of risk culture and lean culture in Nigeria during pandemic and crisis era: Using confirmatory analysis. *International Journal of Multidisciplinary Research and Growth Evaluation*, 3(1), 263-271. DOI: https://doi.org/10.54660/anfo.2021.3.1.14

Chibuike, C. U., Ovharhe, O. H., & Abada, A. M. (2022). Synchronization of lean accounting alert and entrepreneurial sustainability among micro firms in Nigeria during pandemic and catastrophe: Using confirmatory factor analysis. *The International Journal of Business & Management*,10(1), 1- 13. https://doi.org/10.54660/anfo.2021.2.6.15

Effa, G. A., Ovharhe, O. H., Ezirim, A. C., & Igwe, S. (2023a). Procurement sustainability policy and logistics performance in Nigeria. *International Journal of Marketing and Communication Studies* (IJMCS), 7(1), 56-72. DOI: 10.56201/ijmcs.v7.no1.2023.pg56.72

Effa, G. A., Ovharhe, O. H., Ezirim, A. C., & Igwe, S. (2023b). Strategic procurement initiatives and logistics performance in Nigeria. *International Journal of Marketing and Communication Studies* (IJMCS), 7(1), 38-55. DOI: 10.56201/ijmcs.v7.no1.2023.pg38.55.

Fite, M. B., Tura, A. K., Yadeta, T. A., Oljira, L., Roba, K.T. (2023). Factors associated with undernutrition among pregnant women in Haramaya district, Eastern Ethiopia: A community-based study. *PLoS ONE* 18(3), e0282641. https://doi.org/10.1371/journal.pone.0282641

Igbokwe, J. O., Nwufo, O.C., &Ononogbo C. (2018). The health and environmental implications of thermal power generation in Nigeria.*IIARD International Journal of Mechanical*

Engineering Research, 2(1), 21-42

Kalu, E.R., & Etim, K. D. (2018). Factors associated with malnutrition among underfive children in developing countries: A Review. *Global Journal of Pure and Applied Sciences*, 24(1), 69-74

Kuznets, S. (1955). Economic growth and income inequality. *American Economic Review, 45*(3), 1–28.

Mlambo, C., Ngonisa, P., Ntshangase, B., Ndlovu, N., & Mvuyana, B. (2023). Air pollution and health in Africa: The burden falls on children. *Economies* 11: 196. https://doi.org/10.3390/ economies11070196

Nahman, A., & Antrobus, G. (2005). The environmental Kuznets curve: A literature review. *South African Journal of Economics*, *73* (2), 60-72.

Nnorom, C. I., &Odeyingbo, O. A. (2019). *Electronic waste management practices in Nigeria. In book:* Handbook of Electronic Publisher: Elsevier BV. DOI:10.1016/B978-0-12-817030-4.00014-0

Ogundipe, A.A., Akinyemei, O., &Ogundipe, O.M. (2018), Energy access: Pathway to attaining sustainable development in Africa. *International Journal of Energy Economics and Policy*, 8(6), 371-381.

Ogundipe, O.M., Olurinola, O.I., & Ogundipe, A.A. (2018). Health aid and child mortality in Africa: Evidence from disaggregated analysis. *Etude de la Population Africaine*, 32(1), 4043-4056.

Oguntunde, P.E., Okagbue, H.I., Oguntunde, O.A., &Odetunmibi, O.O. (2019).A study of noise pollution measurements and possible effects on public health in Ota Metropolis, Nigeria.*Macedonian Journal of Medical Sciences*, 7(8),1391-1395 DOI: 10.3889/oamjms.2019.234 PMID: 31110591 PMCID: PMC6514342

Okereke, E., Ishaku E., Unumeri G., Mohammed, B., & Ationson B., (2019). Reducing maternal and newborn mortality in Nigeria; a qualitative study of stakeholders' perception about the performance of community health workers and the introduction of community midwifery at primary healthcare level. *Human Resources for Health Journal*. *17*(1), 4-6.

Oluwadare, O. (2020).Strategic approach for controlling soil and groundwater contamination in urban and rural areas of Nigeria. *Applied Journal of Envirommental Pollution,* 23(2), 23-43

Osabohien, R., Osabuohien, E., &Urhie, E. (2018), Food security, institutional framework and technology: Examining the nexus in Nigeria using ardl approach. *Current Nutrition and Food Science*, 14(2), 154-163.

Osuagwu1, J. C., Agunwamba, J.C., & Okoli, S.A. (2020). An investigation on the extent of soil pollution resulting from vehicular emission. *Journal of Environmental Pollution,* 24(2), 43-53

Ovharhe, O. H. (2022a). Sustainable development goals: Multicollinearity between therapeutic entrepreneurship and rehabilitation therapy among African nations. *International Journal of Small Business and Entrepreneurship Research*, 10(3), 1-59. DOI: https://doi.org/10.37745/ijsber.2013/vol10n3157

Ovharhe, O. H. (2023). *Light entrepreneurship and customer funded business: Simplified.* Moldova: Lambert Academic Publishing.

Ovharhe, O.H. (2024). *Business intelligence and innovation moderating roles on entrepreneurship and management using championpreneurship approach*. In K. Kankaew, P. Nakpathom, A. Chnitphattana, K. Pitchayadejanant, & S. Kunnapapdeelert (Eds.), *Applying business intelligence and innovation to entrepreneurship advances in business strategy and competitive advantage* (p. 171-223). IGI Global.com .https://doi.org/10.4018/979-8-3693-1846-1.ch009.

Ovharhe, O. H., & Odepeli, S. (2024). Environmental pollution and maternal mortality among female entrepreneurs. *International Journal of Geography and Environmental Management* (IJGEM), 10(2), 170-195.10.56201/ijgem.v10.no3.2024.pg170.195

Ovharhe, O. H., & Woko, B. E. (2024a). Environmental pollution and life expectancy among Intrepreneurs. *International Journal of Medical Evaluation and Physical Report* (IJMEPR), 10(2), 9-32. DOI: 10.56201/ijmepr.v8.no3.2024.pg9.32

Ovharhe, O. H., Woko, E. B., & Ezeocha, V. U. (2021). Remote working: Entrepreneurial risk and entrepreneurial survival in the micro firms in Niger-Delta, Nigeria (COVID-19 Pandemic Prospects). *International Journal of Small Business and Entrepreneurship Research*, 9(4), 11-28. DOI: https://doi.org/10.37745/ijsber.2013/vol9n11-28

Ovharhe, O. H., & Abada, A. M. (2023a). IFRS: Entrepreneurial exit and Entrepreneurial entre. *American Journal of Social Development and Entrepreneurship*,. 2(2) 1-8, DOI: https://doi.org/10.54536/ajsde.v2i2.1578

Ovharhe, O. H., & Chukwuemeka, S. P. (2023). Sustainable Development Goals: Therapeutic Entrepreneurship and Mental Health Conditions. *British Journal of Multidisciplinary and Advanced Studies*, *4*(1), 81–119. https://doi.org/10.37745/bjmas.2022.0107

Ovharhe, O. H., & Igbokwe, E. L. (2021). Analytical intervention of remote working correlates on risk culture and entrepreneurial adaptability in South-South Geopolitical Zone, Nigeria: Covid-19 Perspective. *Journal of Education and Practice, IISTE*, 12(3), 34-44, DOI: 10.7176/JEP/12-34-05

Ovharhe, O. H., & Okolo, B. S. (2022). Sustainable development goals: Lean entrepreneurship and Green entrepreneurship. *International Journal of Research and Scientific Innovation, 9(10), 59-71. ISSN: 2321-2705*

Ovharhe, O. H., Ahunanya, V., Woko, E. B. (2022). Consignment inventory system and entrepreneurial survival in Lagos State. *International Journal of Social Science & Management Research*, 8(5), 29-42. DOI: 10.56201/ijssmr.v8.no5.2022.pg29.42

Ovharhe, O. H., Chibuike, C. U., Abada, A. M. (2023). Lean accounting and lean entrepreneurship. *American Journal of Social Development and Entrepreneurship*,. 2(2) 1-8, DOI: https://doi.org/10.54536/ajsde.v2i2.1578

Ovharhe, O. H., Okolo, B. S., Woko, E. B., Igbokwe, L. (2022). Light entrepreneurship and customer funded business model. *International Journal of Social Sciences and Management Research*, 8(5), 87-106. DOI: 10.56201/ijssmr.v8.no5.2022.pg87.106

Ovharhe, O. H., Woko, E. B., & Ogolo, T. M. (2021). Competitive risk strategy and entrepreneurial satisfaction among fast moving consuming goods in Nigeria during covid-19 pandemic using confirmatory factor analysis. *International Journal of Multidisciplinary*

Research and Growth Evaluation, 2(6), 267-272.https://doi.org/10.54660/anfo.2021.3.1.14

Ovharhe, O. H.., & Abada, A. M. (2023b). IFRS adoptions on entrepreneurship entry and entrepreneurship exit: The Nigeria experience from 2006-2017. 2**(** 2**),** *American Journal of Social Development and Entrepreneurship*. DOI: https://doi.org/10.54536/ajsde.v2i2

Ovharhe, O.H. (2022b). Sustainable development goals: Therapeutic entrepreneurship and entrepreneurship Injelititis among West Africa Countries. *World Journal of Entrepreneurial Development Studies* (WJEDS) 7(1), 87-113. DOI: 10.56201/wjeds.v7.no1.2022.pg87.113

Oyebode, O. J. (2019). Strategic approach for controlling soil and groundwatercontamination in urban and rural areas of Nigeria. *Arid Zone Journal Of Engineering, Technology & Environment,* 15(4), 973-984

Pam, A. A., & Garba, Y. (2019**).** Examination of the legal regulation on noise pollution in Nigeria. *Applied Acoustics*, 47(3), 239-250

Roehlkepartain, E.C. (2008). Beyond needs assessments: Identifying a community's resources and hopes. *https://www.search-institute.org/downloadable/2008-Roehlkepartain-Beyond-Needs-SL-NSLC.pdf*

Seiyaboh, E.I., &Izah, S.C. (2019). Impacts of soil pollution on air quality under Nigerian setting. *Journal of Soil Water Science*, 3(1), 45-53

Temitope O. S. (2020).Air pollution in Nigeria: A review of the causes, effects, control and management. *Changing Environment and Development*, 4(4),.368-375

Ukpere, D.R.T., Clifford, A.B., Ojule, E.S.C. & Ottah, C. R. (2018). Impacts of air pollution in the Niger Delta Region of Nigeria. *IIARD International Journal of Geography and Environmental Management*, 4(4), 20-28

UNICEF (2021). Situation of women and children in Nigeria: Challenges faced by women and children in Nigeria. https://www.unicef.org/nigeria/situation-women-and-children-nigeria

Vijaya R. K. (2021). Visual pollution: Advertising, signage and environmental quality.*National Park Service and Colorado State Institute for Research on the Atmosphere*. 24(1), 24-32

WHO (2023). Maternal mortality. *https://www.who.int/news-room/fact-sheets/detail/maternal-mortality*.

Zhang, L., Yang,Y., Li, Y., Qian, Z., Xiao,W., Wang, X., Rolling, C. A., Liu, E., Xiao, J., Zeng, W., Liu, T., Li, X., Yao, Z., Wang, H., Ma, W., & Hualiang, L. (2019). *Short-term and long-term effects of PM2.5 on acute nasopharyngitis in 10 communities of Guangdong.* University Press.