Nigeria Health Sector

Market Study Report

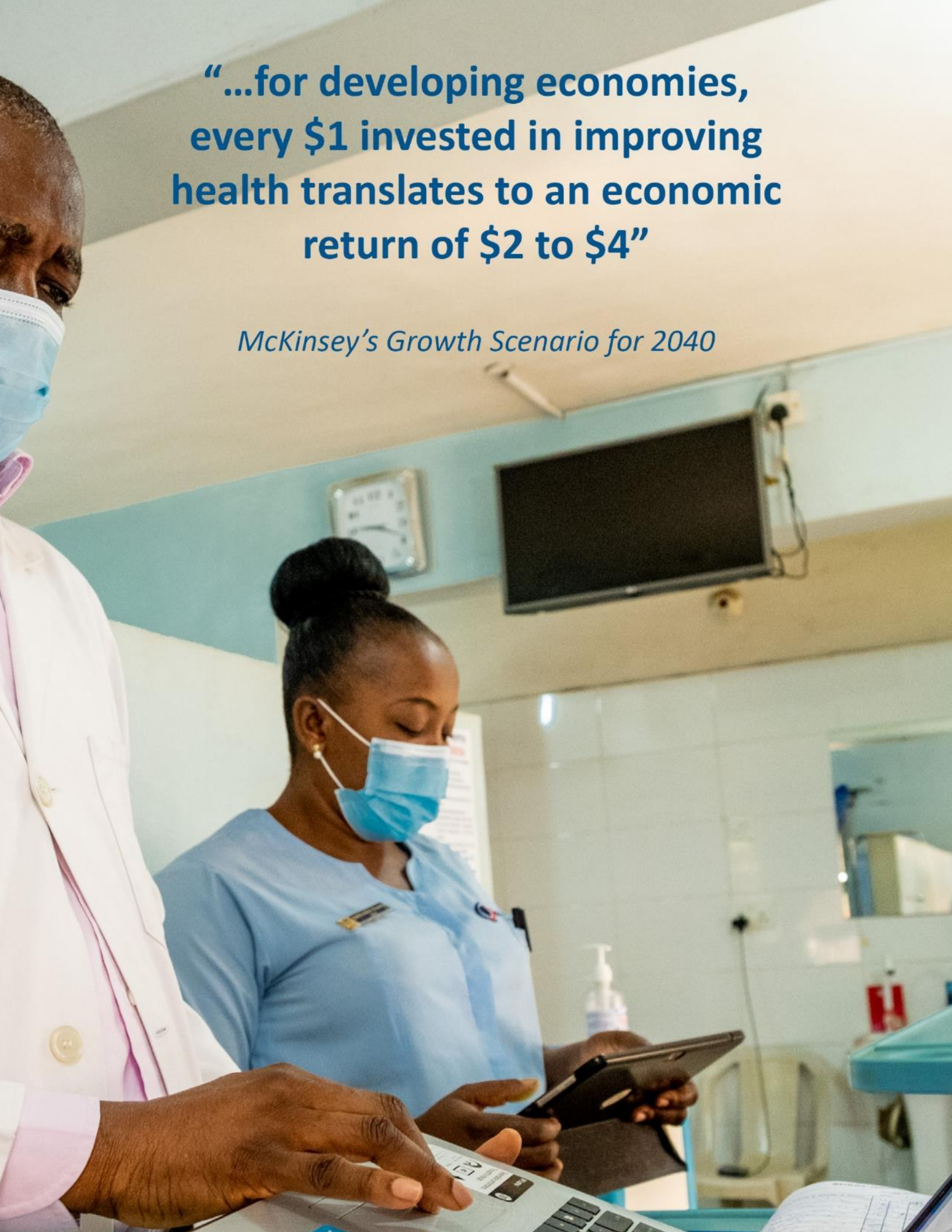
This study was commissioned by the Embassy of the Kingdom of the Netherlands in Nigeria and put together by PharmAccess Foundation's Nigeria Office (PAF). The views expressed do not necessarily reflect the Dutch Government's official policies.

Kingdom of the Netherlands

PharmAccess FOUNDATION

MEDICAL CREDIT FUND

SafeCare HEALTHCARE STANDARDS



"…for developing economies, every $1 invested in improving health translates to an economic return of $2 to $4"

McKinsey's Growth Scenario for 2040

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Abbreviations, List of Figures and Tables

Abbreviations

AGPMPN	Association of General & Private Medicine Practitioners of Nigeria
B2B	Business-to-Business
B2C	Business-to-Consumer
BHCPF	Basic Healthcare Provision Fund
BMHP	Basic Minimum Health Package
BPP	Bureau of Public Procurement
CAGR	Compounded Annual Growth Rate
CBN	Central Bank of Nigeria
CDs	Communicable Diseases
DB	Doing Business
DCVMs	Developing Countries Vaccine Manufacturers
DFIs	Development Financial Institutions
DTP	Diphtheria, tetanus, & pertussis
EMR	Electronic Medical Record
EPC	Engineering, Procurement, & Construction
ERGP	Economic Recovery and Growth Plan
FBC	Full Business Case
FDI	Foreign Direct Investments
FGN	Federal Government of Nigeria
FMCs	Federal Medical Centers
FMoH	Federal Ministry of Health
GDP	Gross Domestic Product
HCP	Healthcare Provider
HFN	Healthcare Federation of Nigeria
HFR	Health Facility Register
HHIS	Health Holland International Strategy
HMIS	Health Management Information System
HMOs	Health Management Organizations
ICRC	Infrastructure Concession & Regulatory Commission
ICT	Information Communication Technology
IFC	International Finance Corporation
IMF	International Monetary Fund
IRR	Internal Rate of Return
KWh/d	Kilo Watt Hour per Day
LLINs	Long-lasting Insecticide treated Nets
LSH	Life, Science, and Health
MBPD	Million Barrels per Day
MCF	Medical Credit Fund
MDBs	Money Deposit Banks
MNCs	Multinational Companies
mRNA	Messenger Ribo Nucleic Acid
N/NGN	Naira / Nigerian Naira
NBS	National Bureau of Statistics
NCC	Nigerian Communication Commission

NCDC	National Centre for Disease Control
NCDs	Non-Communicable Diseases
NG	Nigeria
NHA	National Health Account
NHIS	National Health Insurance Scheme
NITDA	National Information Technology Development Agency
NMDC	Nigerian Medical & Dental Council
NNRA	Nigeria Nuclear Regulatory Authority
NPHCDA	National Primary Healthcare Development Agency
NPV	Net Present Value
NSIA	Nigerian Sovereign Investment Authority
NTDs	Neglected Tropical Diseases
OBC	Outline Business Case
OEMs	Original Equipment Manufacturers
OOP	Out-of-Pocket
OPEX	Operating Expenses
PAF	PharmAccess Foundation
PAR	Portfolio at Risk
PHCs	Primary Healthcare Centers
PPMVs	Patent and Proprietary Medicine Vendors
PPPs	Public Private Partnerships
PPs	Private Partnerships
PSHAN	Private Sector Health Alliance of Nigeria
ROI	Return on Investment
SHIA	State Health Insurance Agency
SHIS	State Health Insurance Scheme
SMoH	State Ministry of Health
SPV	Special Purpose Vehicle
TA	Technical Assistance
UHC	Universal Health Coverage
UNICEF	United Nations Children's Fund
WHO	World Health Organization

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Executive Summary

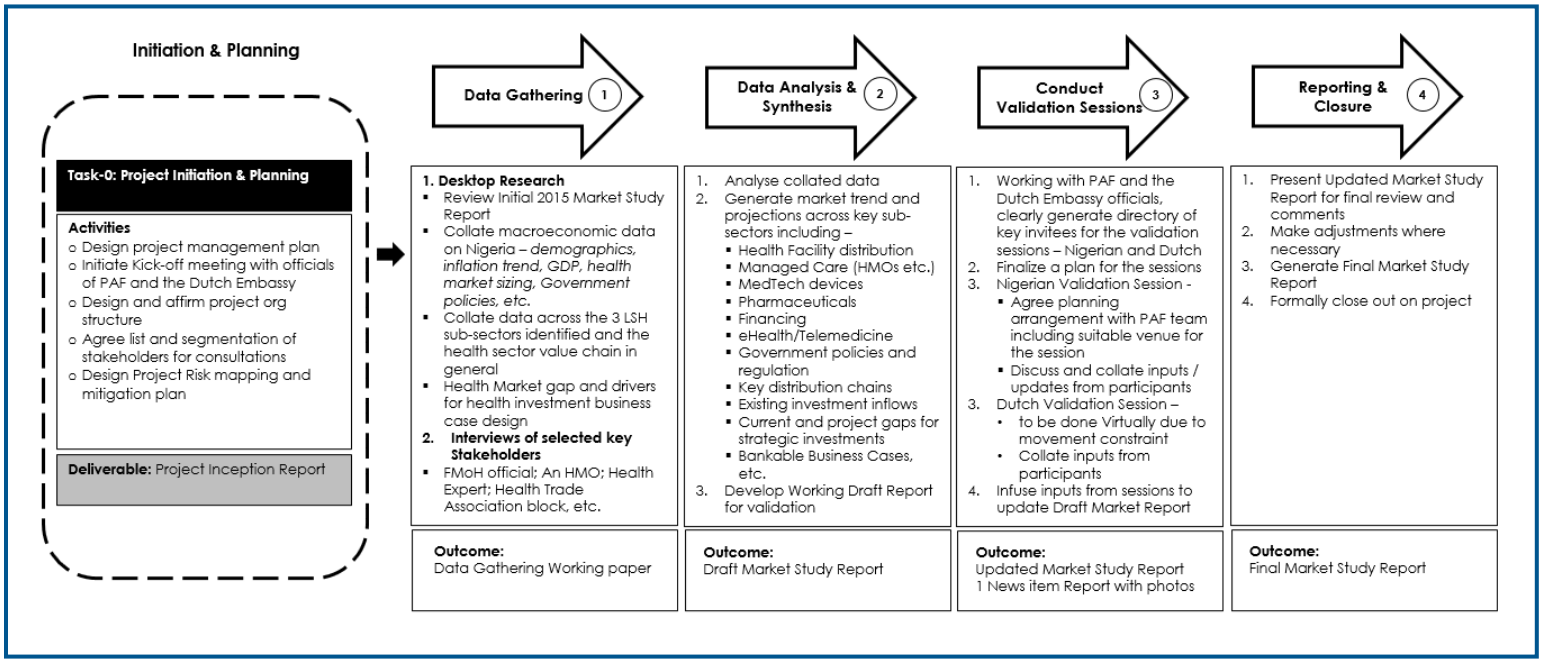
1. About the Market Study

This market study was commissioned by the Dutch Consulate in Lagos, on the basis of an MOU signed by the leadership of Nigeria and the Netherlands in 2018 and the outcome of an annual Trade and Investment Working Group (TIWG) meeting held in June 2021. The study provides an update to an earlier study outcome conducted in 2015 and serves as input for the design of viable private partnerships (PP), and public private partnership (PPP) opportunities.

The strategic objective of the study is to foster robust working partnerships, collaboration, and investments between Dutch Life-Science-Health (LSH) businesses and the health market players in Nigeria both in Government and the private sector.

2. Methodology

The methodology adopted for the conduct of the study is clearly indicated in the figure below. Critical to success was the approach to data gathering involving extensive desktop research, interview sessions with key market players, review of the pre-existing market database, amongst others. Key findings were validated by stakeholders (see Appendix 4). Virtual and in-person presentation sessions were also conducted for Dutch LSH market players for inputs.



3. Nigeria in Brief

Nigeria is the largest economy in Africa with a GDP of over US$430 billion and is home to a population of about 213 million people whose median age is estimated to be 18 years. The population is projected to more than double by 2050 thus putting pressure on the health system. At the moment, the economy is facing difficulties with low growth and high inflation, which are further discussed in Chapter 2 of this report. Despite the macroeconomic challenges identified however, the country remains one of Africa's most important investment destinations.

In its latest 2021 publication, the Absa Africa Market Index (AFMI), ranked Nigeria as the third most attractive destination for investment on the continent. The Index is based on 6 strategic pillars – Market depth; Access to FX; Market transparency, tax, and regulatory environment; Capacity of local investors; Macroeconomic opportunity; and Enforceability of standard master agreements. See remarks at the end of Section 2.3 of this report for details.

4. The Nigerian Healthcare Market Overview

Fig.13, Section 3.4 of this report provides an overview of the landscape of the healthcare system in Nigeria from the supply side to demand side and key regulatory bodies, among other details.

Key Findings

- Health facilities are categorized into three sub-groups: Government owned, for-profit private, and faith based. Government owned facilities are the most dominant in number and account for over 70% of health facilities in the country. In terms of access to care however, the private health facilities account for about 60% of services provided in the country
- There are 39,983 hospitals and clinics in Nigeria as of 2019, according to the FMoH's health facility registry (HFR) database
    - Primary Healthcare Centers (PHCs) account for 85.2%
    - Secondary health facilities account for 14.4%
    - Tertiary care facilities account for 0.4%
- As of 2014, there were an estimated 134,000 beds yielding a ratio of 0.8 beds per thousand population at a Compounded Annual Growth Rate (CAGR) of 3.8% since 2009
- **Market Size:** Demand for healthcare was valued at $15 billion in 2018 and is projected to hit over $18 billion at the end of 2023
- **Covid-19 Impact:** At the height of the pandemic in 2020, aggregate national GDP declined by 6.1% in Q2 while the health sector GDP grew by 2%, overtaking the larger economy by 8% (see Section 3.1 for details)
- Household (HH) health expenditure stood at $6.9 billion and $8.6 billion in 2019 and 2021 respectively (see Appendix 6)
- Aggregate budget allocations to health in the 36 States post pandemic declined by 2.5% from $1.92 billion in 2020 to $1.87 billion in 2022 (see Appendix 7)

5. Nigeria Healthcare Value Chain Component

Sections 3.4.1 to 3.4.8 of the report provide a detailed situational analysis of each component of the Nigerian healthcare value chain. Opportunities for potential investments and collaborations were also identified for each of them.

Key Summary findings:

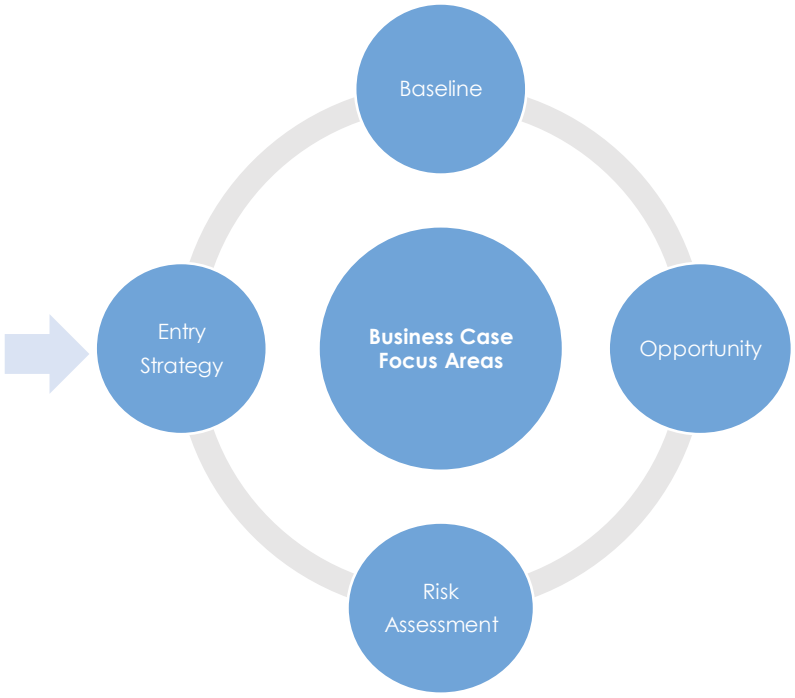
Value Chain Components	Clinics & Hospitals | Diagnostics | Health Insurance	Medical Devices | Telemedicine & Digital health | Medical Tourism	Pharmaceutical | Healthcare Financing
Section	3.4.1- 3.4.3	3.4.4 - 3.4.6	3.4.7 - 3.4.8
Key Findings (Summary)	• Only 20% of PHCs are estimated to be functional • Secondary facilities account for an avg. 61% of total expenditure receipts, 2010 -17 • 15% of radiology providers are stand alone • 60% of X-ray equipment are obsolete, age 10+ years • 50 million diagnostic X-ray examinations are carried out annually • Health Insurance penetration <10%. Projected to hit 70% coverage by 2030 • NG UHC service Index rated 44 vs. global average of 67	• 99% of med devices are imported • Med devices segment valued at $186 mil. and $202 mil. in 2022 & 2023 respectively • eHealth revenue projected to hit $315.2 mil. & $704 mil. in 2022 & 2027 respectively at a CAGR of 17.42% • eHealth user penetration to hit 13.4% and 19.2% in 2022 and 2027 respectively *(Statista)* • Medical tourism expenditure hit $1.9 billion in 2019 with oncology, orthopedics, nephrology, & cardiology as leading drivers	• NG pharma accounts for 60% of the market in the ECOWAS block • OTC medicines accounts for a significant share of the NG pharma market • Prescription ethical pharma and OTC pharma products are valued at $500 mil. and $900 mil. respectively • There are 132 licensed pharma manufacturers in-country • There are 5,795 licensed pharma distributors & 350 importers • For every $1 pharma export, Nigeria imports $99 worth • OOP account for 75% of healthcare financing in Nigeria
Opportunities Identified	• Revitalization of moribund PHCs. 10,000 facilities targeted in ERGP • 386,000 additional beds required & $82 bn required in healthcare real estates • Radio-diagnostic Equipment maintenance & Biomed engineering training • Urgent need to digitalize Health insurance processes to curtail low investment performance indicators identified • Need to scale up investments in health insurance penetration to improve UHC Service Index rating for NG	• Growing importance of health informatics & evidence-based reporting • Requirement for turnkey project structuring on the rise • NCDs are becoming more prevalent in NG's disease-burden mix • A number of innovative digital health start-ups are springing up and open to investments • Growing investments for local capture of medical tourism opportunities e.g., Afreximbank's medical center of excellence, Duchess Hospital, etc.	• There's an urgent need for the domestication of Vaccine production particularly DTP3 Vx • Local pharma supply unable to meet growing local demand • In partnership with local distributors and industry regulator, NAFDAC, opportunity for import is very attractive • Growing need to reduce HH healthcare expenditure through the strengthening of the health insurance system digitally

6. Identified Case Studies

Having identified opportunities across the health sector value chain, 9 case studies have been described in line with the thematic value chain component of the Health Holland International Strategy 2020-2023 (HHIS) reviewed in the course of this exercise (see Appendix 10). The identified business cases are a sub-set of the varied opportunities that the health sector has to offer to interested parties.

Identified Case Studies

1. Revitalization of Dysfunctional PHCs
2. ICT Integration of NHIA Processes
3. Deployment of Solar Systems across target PHCs
4. Telemedicine
5. Medical Equipment Leasing & Maintenance
6. Domesticated Vaccine Production
7. Pharma Import Opportunity
8. Turnkey Health Infrastructure Opportunities
9. Local production of Long-lasting Insecticide treated nets (LLINs)



Details of the business cases are contained in Section 5 of this report. Each business case is targeted at a mix of stakeholders depending on the context of the opportunity (PPP or PP). These stakeholders include – agencies of government, development partners, private sector players, investors, regulatory bodies, and Dutch LSH partners.

For each business case, there are 4 key focus areas analyzed – Baseline situation, opportunities, entry strategy, and risk assessment.

It is important to mention that these business cases are no substitute to the investor's due diligence and/or feasibility study effort. They only serve to provide insights into potential market performance for identified opportunities and are subject to simulations and/or sensitivity checks and adjustments depending on risk tolerance.

7. Conclusion

The Nigerian health market is relatively under-developed and in urgent need of partnerships and investments. The identified gaps in the market offer a huge opportunity for investments with prospects for decent returns as demonstrated in the business cases. This is however dependent on having a clear understanding of the market landscape, inherent opportunities and associated risks, appreciation of relevant government policies, and engagement of key stakeholders – which this market study report has tried to provide deep insights into.

The hope is that the market information provided in this report, alongside identified opportunities will trigger the influx of investments that will improve the fortune of the Nigerian health market, and, by extension, the health indices of the Nigerian people.

1. Introduction

1.1 Background

The Netherlands and Nigeria have a long cooperation history and are important trading and investment partners. As of 2019, total trade volume between both countries was valued at US$9.45 billion. Over a 24-year period, spanning from 1995 to 2019, total trade value grew at an average 11.9% on a year-on-year basis. See Fig. 1.

The gross trade volume in 2019 was dominated by Oil and Gas, accounting for US$7.88 billion (i.e., 83%) while packaged medicaments (a pharma component) accounted for US$627 million (i.e., 10.6% of Dutch exports to Nigeria and 7% of total trade value between both countries).

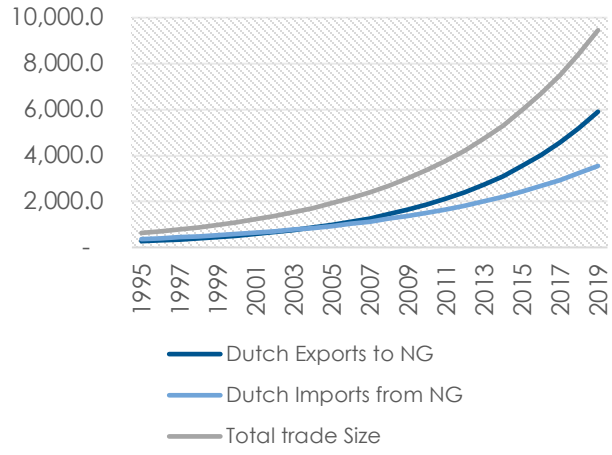
In 2018, Nigeria and the Netherlands signed an MOU to enhance economic and private sector bilateral relations; and Life, Science, and Health (LSH) was one of the 4 strategic areas of focus. Expected outcomes for the short to medium term in Nigeria's health sector include:

1. Improving access to basic, safe, quality and affordable healthcare via health insurance uptake
2. Fostering Public Private Partnerships (PPPs), private partnerships (PPs) to promote the revitalization of the primary, secondary, tertiary care facilities
3. Promoting the adoption of health technology to improve efficiency, effectiveness, transparency and accountability

This initiative comes at a time when the health sector is in dire need of strategic collaborations and investments to improve Nigeria's health indices.

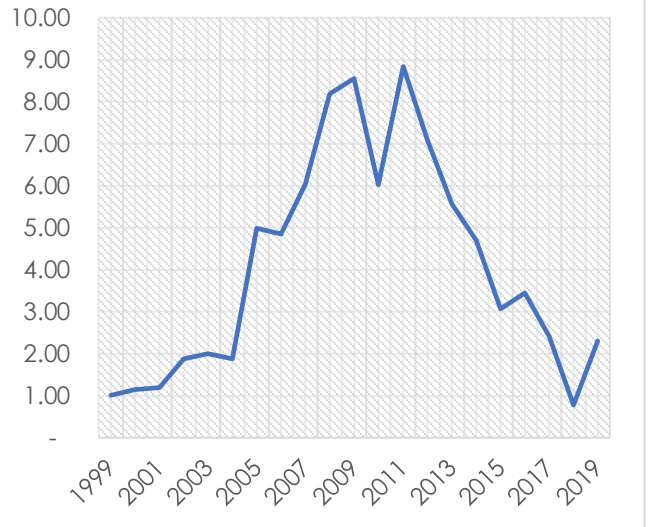
This move will help enhance the influx of additional FDIs into the country. Nigeria's net FDI inflows has largely been on a downward spiral, declining from US$8.84 billion in 2011 (2.2% of GDP) to US$2.3 billion in 2019 (0.5% of GDP) - see Fig. 2 and 3. It is however expected that this trend will improve positively in the coming years ahead.

Fig. 1: Nigeria-Netherlands Trade Volume Size (US$ million), 1995-2019



SOURCE: The Observatory of Economic Complexity (OEC)

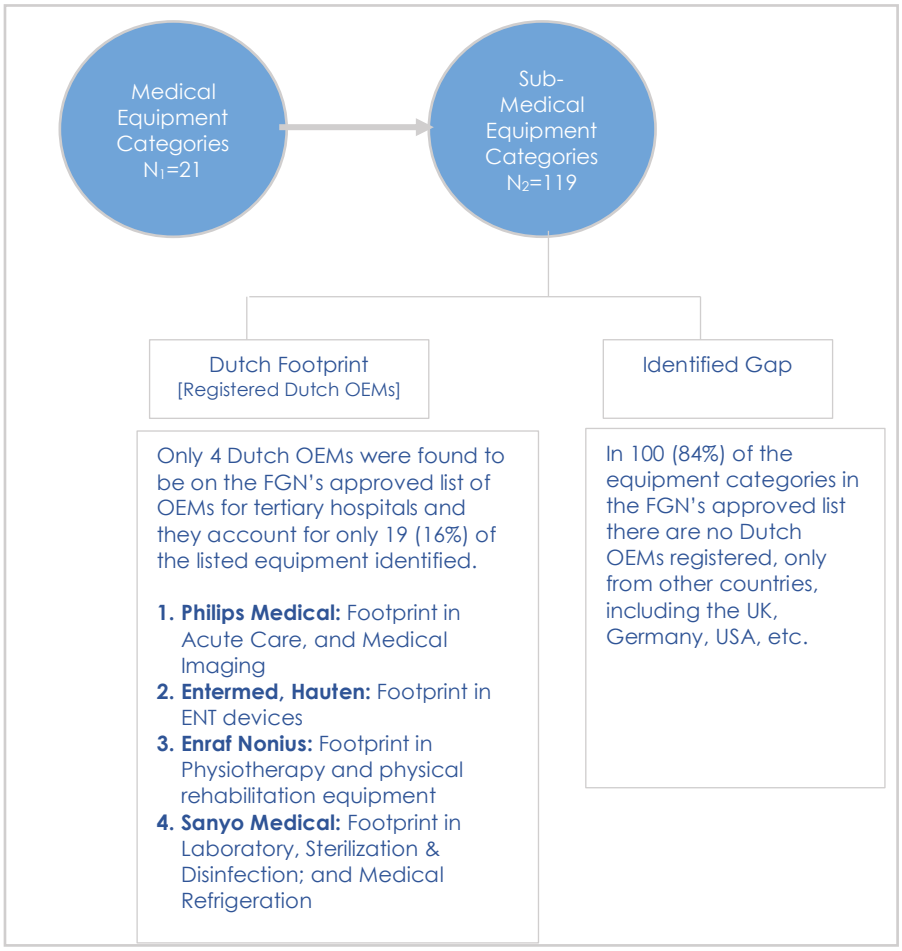
Fig. 2: Nigeria FDI Net Inflows (US$ billion)



SOURCE: The World Bank, WB

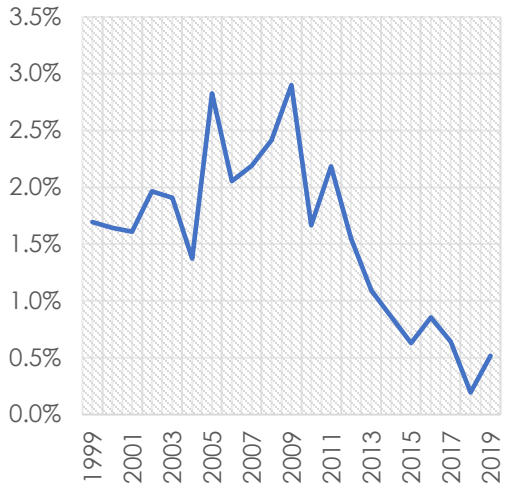
The Dutch-Nigeria Life Science and Health collaboration is also expected to support the realization of Nigeria's Economic Recovery and Growth Plan (ERGP) objectives for the health sector as detailed in Section 5.1of the plan.

Fig. 4: Dutch OEMs' Footprint in Tertiary Care Equipment Supplies in Nigeria



SOURCE: The Presidency (BPP/FMoH/SON/NNRA), 2017-2018

Fig. 3: Nigeria FDI Net Inflows (% of GDP)



SOURCE: The World Bank, WB

To effectively harness the opportunities available within the Nigerian healthcare space leveraging the foregoing, the Dutch Government, through its Consulate in Nigeria, thought it wise to initiate this market study to further provide empirical market information that will allow for a more robust engagement between Dutch healthcare businesses and relevant Nigerian Government Agencies and local private sector players going forward. Details of the strategic objectives of the study are provided in Section 1.2 of this report.

1.2 Strategic Objectives of the Market Study

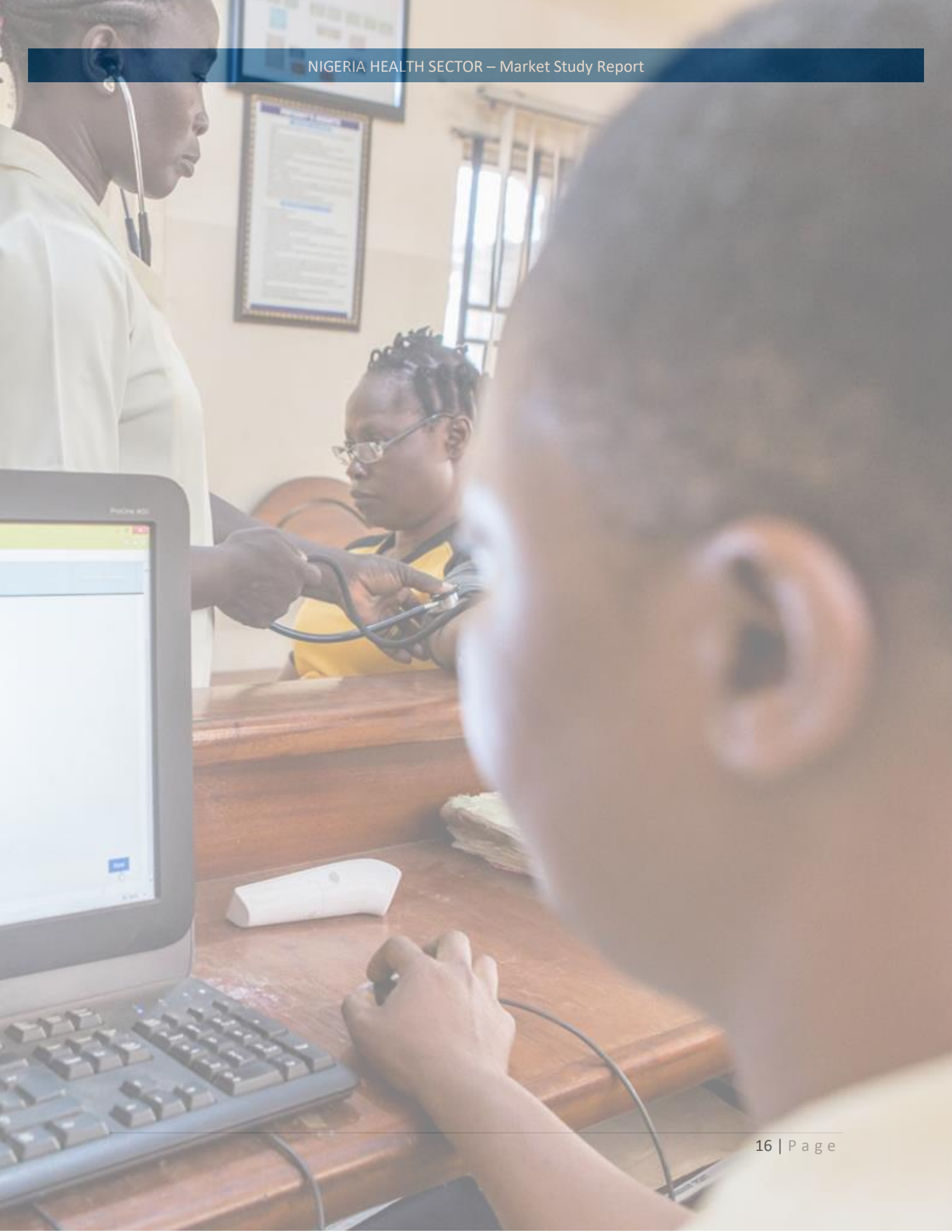
Prior to this study, an earlier exercise was conducted and outcomes published in 2015. The 2015 study report provided an overview of the health sector trends, opportunities and market entry considerations (see Section 7 for link to the report). **The current study is expected to provide an update on the previous study outcomes and serve as input for the design of viable private partnerships (PP), and public private partnership (PPP) opportunities.**

In the Medical Equipment space for instance, records of the FGN show that only 4 Dutch OEMs were listed among the approved OEMs registered to provide medical equipment supplies to support tertiary care capital project development in Nigeria.

In the said listing (see Appendix 1), there are 119 med equipment sub-categories, with the Dutch OEMs having footprints in only 19 (16%) leaving 100 equipment areas unexplored (see Fig. 4). This is an indication of a potentially viable area of extended collaboration expected to be developed in the near term. Detailed Business Cases for opportunity capture and exploitation are in Section 5 of this report.

Generally, this study is expected, among other things, to:

1. Provide deeper insights into the opportunities in Nigeria's health sector post COVID-19
2. Generate inputs into the design of a roadmap for collaboration between Nigerian healthcare firms, government, and Dutch companies
3. Define financing, business, and operating models for improved access to quality care leveraging IT Systems, medical devices, intelligence, and applications
4. Provide insights into how Dutch firms can position as Nigeria's innovative partners for LSH related transactions
5. Facilitate partnership opportunities between Dutch Topsector LSH and the Private Sector Health Alliance of Nigeria (PSHAN)



2. Nigeria Macroeconomic Overview

2.1 Macroeconomic Environment

Nigeria, the largest economy in Africa, is a lower middle-income country (LMIC) with a real GDP size of US$432.3 billion at the end of 2020 – a 21% decline from 2014 GDP figures of US$546.7 billion occasioned by two contractions and two recessions within the period. Per capita GDP reportedly dipped from US$2,327 in 2010 to US$2,230 in 2019, representing a decline of 4%.

The Nigerian economy is largely dependent on crude oil sale for foreign exchange earnings. Except for in 2019, Nigeria's crude oil output has been under 2 million barrels per day (MBPD) from 2018 to 2021. The IMF projects that this trend may continue in 2022 with an average 1.7 MBPD output. Declining oil prices in the international market have also impacted negatively on the nation's earnings – declining from a high of US$71.6 per barrel in 2018 to US$66.9 per barrel at the end of 2021. COVID-19 had the greatest impact with prices dropping to as low as US$42 at the end of 2020.

The consumer price index (i.e., inflation rate) averaged 15.9% in 2021but stood at 21.2% in October 2022 (IMF).

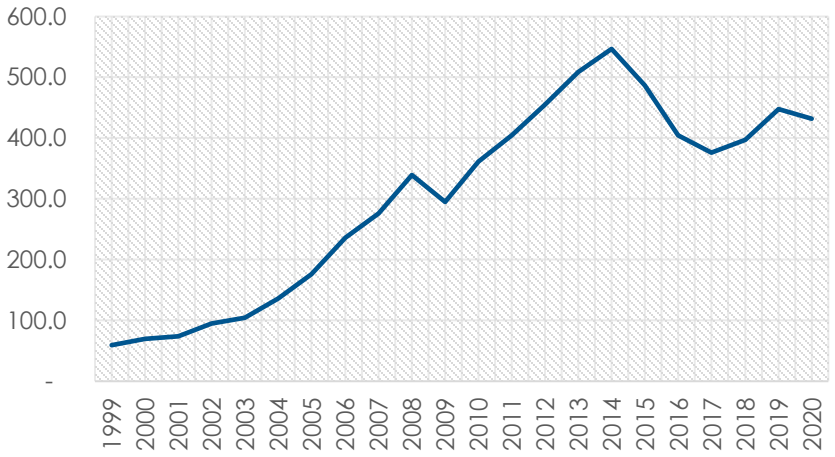
The private sector is a major pillar driving economic performance in Nigeria. A review of IMF data shows that the private sector component of gross national savings averaged 25% of GDP from 2018 to 2021 while government savings averaged at 1.65% of GDP (i.e., no net savings recorded). **In terms of investment, the private sector accounted for 89% of gross national investments compared to the government's 11%.**

Table 1: Nigeria Macroeconomic Indices

		2018	2019	2020	2021	2022
National income and prices						
Real GDP (at 2010 market prices)	%Growth	1.9	2.2	-1.8	2.6	2.7
Production of crude oil	MBPD	1.93	2	1.83	1.65	1.7
Nominal GDP at market prices	NGN'trn	129.1	145.6	154.3	183	212.1
Nominal non-oil GDP	NGN'trn	115.7	133.2	144.1	166.9	195.2
Nominal GDP per capita	US$	2,153	2,230			
Consumer price index (annual average)	%	12.1	11.4	13.2	15.9	14.3
Consumer price index (end of period)	%	11.4	12	15.8	14.9	13.8
Investment and savings		(Percent of GDP)				
Gross national savings	%of GDP	20.5	21.4	24.7	26.8	26.2
Public	%of GDP	-1.1	-1.2	-2.2	-2.1	-2.3
Private	%of GDP	21.6	22.6	26.9	28.9	28.5
Investment	%of GDP	19	24.6	28.6	29.5	28.5
Public	%of GDP	3	3	2.5	3.2	3.1
Private	%of GDP	16	21.7	26.2	26.3	25.4
Current Account Balance	%of GDP	1.5	-3.3	-4	-2.8	-2.3
Consolidated government operations		(Percent of GDP)				
Total revenues and grants	%of GDP	8.5	7.8	6.3	7.4	7
Total expenditure and net lending	%of GDP	12.8	12.5	12	13.7	13.4
Of which : fuel subsidies	%of GDP	0.5	0.4	0.1	1	0.5
Overall balance	%of GDP	-4.3	-4.7	-5.7	-6.3	-6.4
FGN interest payments	%of FGN Rev.	60.8	54.9	88.8	85.5	92.6
Interest payments	%of Cons. Rev.	19.9	21.4	33.5	29	32.8
Money & Credit						
Credit to the private sector (y-o-y,%)	yoy%	-11.9	23.5	15.8	21.6	8.6
External Sector						
Price of Nigerian oil (US dollar per barrel)	US$	71.6	64	42.3	66.9	65.9
External debt outstanding 3	US$'Billion	99.9	102.3	105.5	111.6	117.8
Gross international reserves	US$'Billion	42.8	38.1	36.5	36.4	35.5
Gross Int'l Reserve as % of Ext. Debt Outstanding	%	233%	269%	289%	307%	332%

SOURCE: The IMF, 2022

Fig. 5: Nigeria Real GDP Distribution (US$ billion)



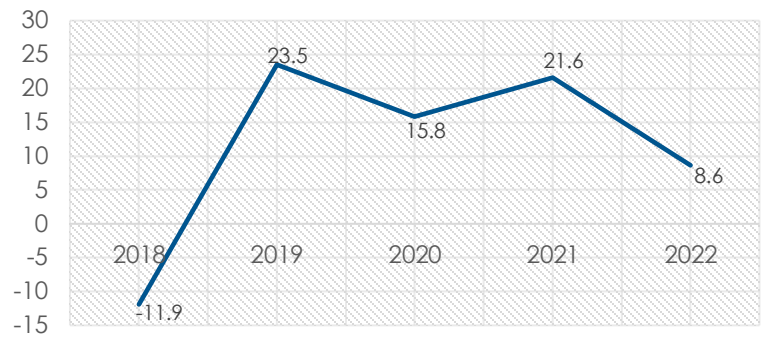
SOURCE: The World

NB: in a recent data release by the NBS, actual GDP growth at the end of 2021 was put at 3.4% - this is with regards to IMF's forecast in Table 1

An important parameter for economic growth and, by extension, attraction of investment, is the allocation of credit to the private sector. For Nigeria, growth in credit extension to the private sector averaged 12.25% from 2018-2021. It is however projected to decline to 8.6% in 2022. See Fig. 6.

Another factor hindering private investments is the uncertainty around a devaluation of the Naira which is fueled by continued FX shortages, rising inflation, limited debt servicing capacity and restrictions on FX transactions put in place by the Central Bank of Nigeria in an effort to control the exchange rate. The upcoming elections in 2023 add to the uncertainty.

Fig. 6: YoY % Growth in Credit Extended to the Private Sector



DATA SOURCE: The IMF

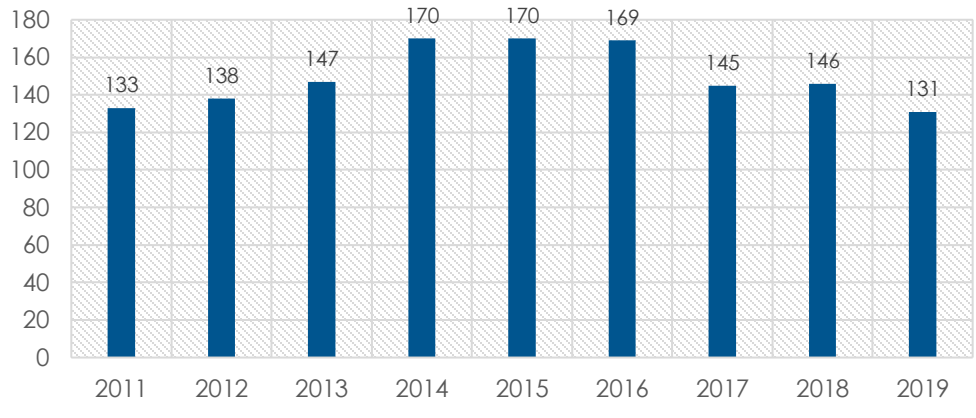
2.2 Ease of Doing Business in Nigeria

Doing Business (DB) was an initiative of the World Bank designed to provide objective measures of the various dimensions of the regulatory environment as it applies to local firms. **Doing Business provides quantitative indicators on regulation for starting a business, dealing with construction permits, getting electricity, registering property, accessing credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency both at the national and sub-national levels.**

Out of 190 countries surveyed, Nigeria ranked 170 in 2014 and 2015, the country's lowest performance since 2011. From 2016 to 2019 however, Nigeria's ranking improved significantly from 169 to 131 respectively.

The 2019 ranking appears to be the country's highest in almost a decade moving up 15 places, see Fig. 7. Nigeria had a DB score of 56.9% on aggregate to attain this position.

Fig. 7: Nigeria Ease of Doing Business Ranking, 2011-2019



SOURCE: Statista

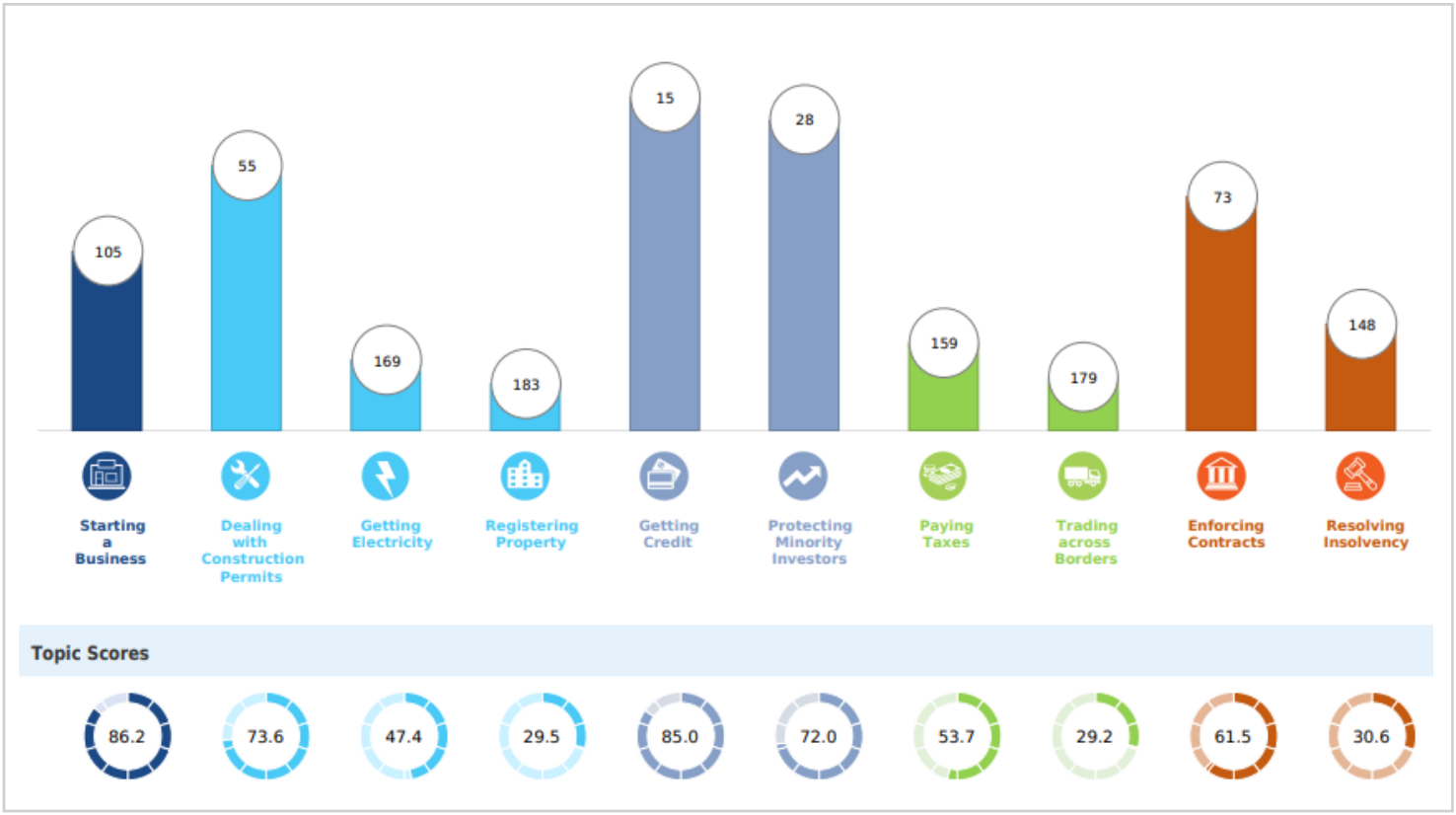
In terms of breakdown by DB topics, Nigeria recorded her highest ranking of 15 in "Access to Credit" with a score of 85%. The country also did well in terms of "Protecting Minority Investors" with a ranking and score of 28 and 72% respectively – this shows that to a reasonable extent, investors' interest is actually receiving the attention it deserves.

In terms of "dealing with construction permit" and "enforcing contracts", Nigeria did fairly well with a ranking of 55 and 73 respectively.

Despite being ranked 105 in terms of starting a business, Nigeria secured a DB score of 86.2% which is quite significant and noteworthy.

The least ranked DB elements in Nigeria include Property registration (183), Cross border trading (179), and Access to electricity (169). More needs to be done by the Government in these areas to further engender investor confidence.

Fig. 8: Ranking on Doing Business Topics - Nigeria



SOURCE: The World Bank: "Doing Business 2020, Nigeria"

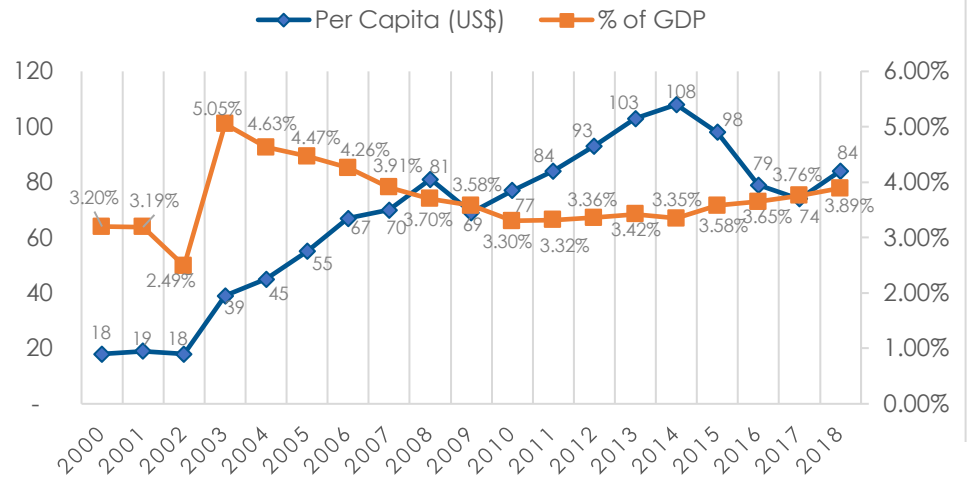
2.3 Nigeria Healthcare Spending

Nigeria's total healthcare spending per capita improved significantly when compared with baseline figures of the year 2000 when it stood at US$18. This indicator grew to US$108 in 2014. It has however experienced significant decline since then. **As of 2018, healthcare spends per capita closed at US$84**. This may be attributed to the fact that growth in government's fiscal allocation to the sector is probably not matching the growth in population and associated healthcare needs of the people.

As a proportion of GDP, Nigeria's healthcare spending averaged 4% over the last 20 years. It only exceeded 5% in 2003 (see Fig. 9).

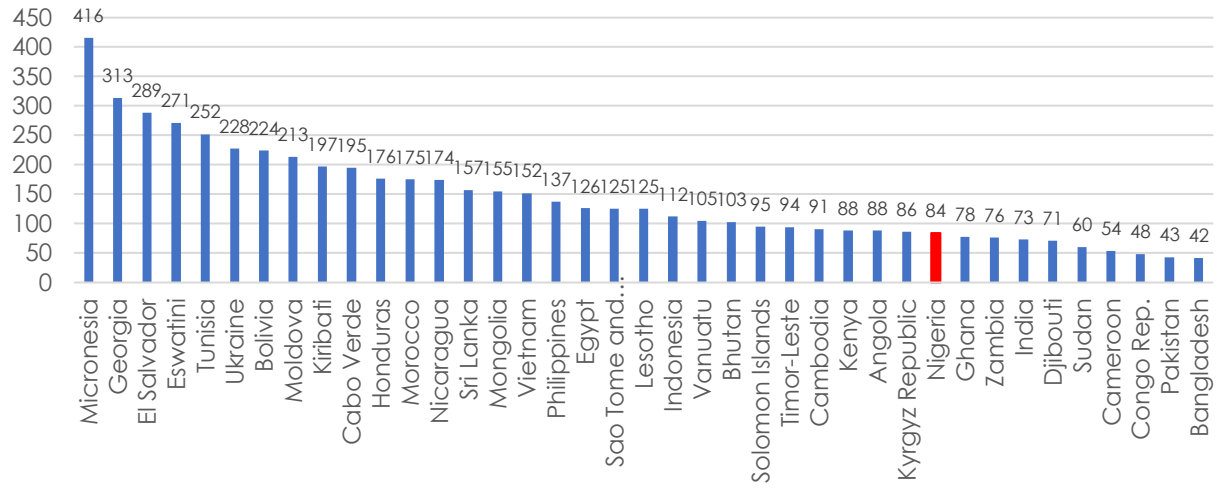
A key reason for this trend is the fiscal constraint experienced by Government over the years. In Table 1, 92.6% of FGN's revenue is projected to be spent on debt servicing alone (i.e., interest payment) in 2022 while the national account balance is projected to be 2.3% of GDP in the same period. As a result, some form of collaboration - PP and PPP - will be needed to strengthen the sector going forward.

Fig.9: Nigeria healthare spend per capita & % of gdp



DATA SOURCE: The World Bank

Fig.10: Healthcare Spend per Capita in Developing Countries (US$), 2018



REMARK:

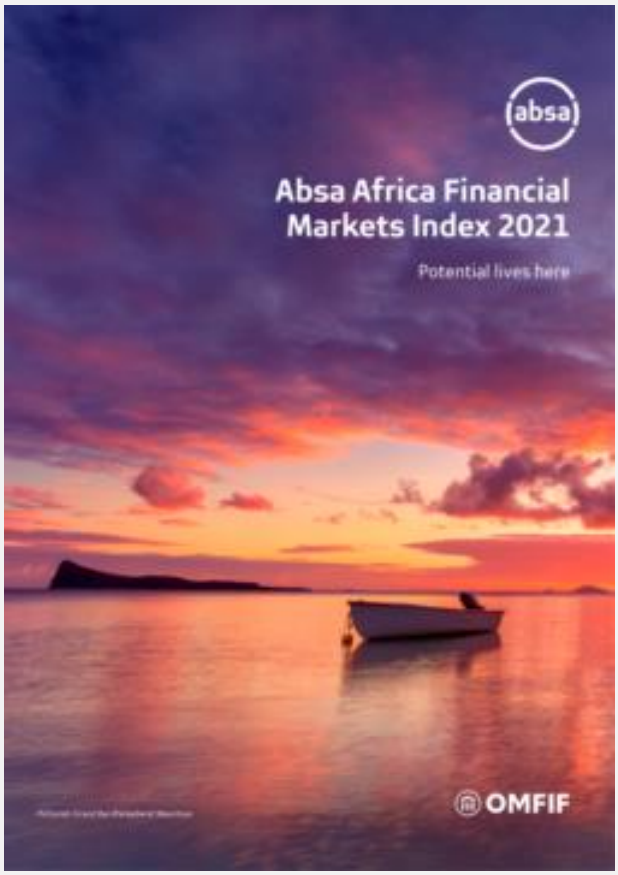
In spite of the macroeconomic trend highlighted so far in this section, the Nigerian market has been known to exhibit strong resilience and capacity to emerge from the short-term challenges being experienced. This fact is further buttressed by the outcome of the Absa Africa Market Index (AFMI) economic evaluation conducted on 23 African countries, published in 2021.

The AFMI ranked Nigeria as the third most attractive investment destination in Africa across six strategic pillars indicated in the table below. The country ranked number 1 in the area of Market transparency, tax and regulatory environment with a score of 86%. It secured a maximum score of 100% and ranked second for enforceability of standard master agreements while also being ranked second in terms of market depth.

These are empirical facts that engender investor confidence and a proof as to the viability of investment inflows into the country.

	Pillar-1	Pillar-2	Pillar-3	Pillar-4	Pillar-5	Pillar-6	Aggregate Position
	Market Depth	Access to FX	Market transparency, tax & regulatory environment	Capacity of local investors	Macroeconomic opportunity	Enforceability of standard master agreements	On aggregate, Nigeria ranks as the **3rd most attractive investment market in Africa** for 2021
Score	62%	20%	86%	44%	69%	100%	
Ranking (/23)	2	23	1	5	5	2	

SOURCE: Absa AFMI, 2021




CUSTOMER SERVICES
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3. Nigeria Health Market Outlook

3.1 Market Overview

The Nigerian healthcare sector is grossly underdeveloped and does not meet local needs. Much of the country's healthcare infrastructure is confined to major cities with people living in urban areas getting four times as much access to healthcare as those living in the rural areas. The private health sector is dominant but highly fragmented, consisting of many small medical facilities that are privately owned by medical professionals. Most of these hospitals have less than 10 beds and minimal facilities.

The Health Facility Registry (HFR) of the Federal Ministry of Health (FMoH) estimated that there are 39,983 hospitals and clinics in Nigeria as of 2019 – over 70% of these facilities are government owned. **The primary healthcare centers (PHCs) account for 85.2% of this number while secondary and tertiary healthcare facilities account for 14.4% and 0.4% respectively.**

The HFR database also indicated that there are an estimated 154 tertiary health facilities in the country. The public tertiary health facilities consist largely of Federal University teaching hospitals, Federal Medical Centers (FMCs), National Orthopedic Hospitals, among others and they are 99 in number. There are also about 55 private tertiary health facilities that are operational.

Nigeria had an estimated 134,000 hospital beds in 2014, equivalent to 0.8 per thousand population, well below the average for the African region. The number of hospital beds is estimated to have grown at a compound annual growth rate (CAGR) of 3.8% since 2009, slightly higher than population growth, but at an insufficient rate to have a significant impact on the population bed ratio[1].

Market Size

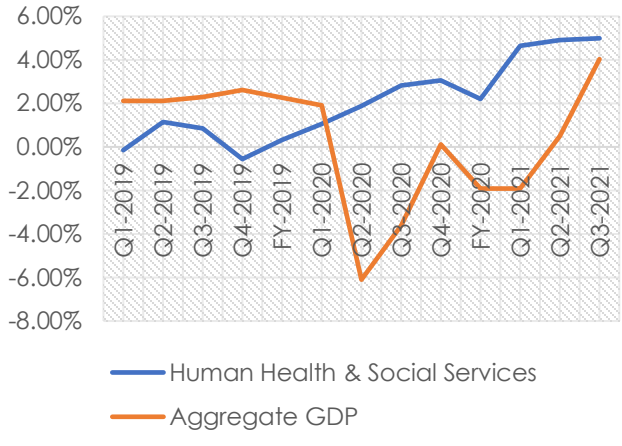
Demand for healthcare services in Nigeria is projected to increase, over a 5-year period, from US$15 billion in 2018 to over US$18 billion in 2023.

The health sector's contribution to aggregate Real GDP stands at an average of 4% (see Fig.9) with out-of-pocket (OOP) expenses accounting for over 74% of total spend in the sector.

As a result of the COVID-19 pandemic, the health sector out-performed the aggregate economy in terms of real GDP growth on a comparative basis. This development became noticeable from Q2 2020 (see Fig. 11). The sector grew from -0.56% at the end of Q4 2019 to 1.89% at the end of Q2 2020, while the aggregate economy declined from a growth rate of 2.6% in Q4 2019 to -6.1% at the end of Q2 2020.

The growth in the health sector is largely attributed to the increased investments committed to it by both public and private sector players as part of measures to curtail the pandemic as well as address other growing needs in the market.

Fig.11: Nigeria Health Sector Comparative Growth Analysis



DATA SOURCE: The NBS

3.2 Demography & Epidemiology

1. This is according to data secured from the US Department of trade, 2015

Nigeria's population was estimated at 200 million by end of 2018, growing at an estimated rate of 3.2% per annum, up from 2.5% in 2000. The population is young with 63% of the total population under age 25 (children under 15 account for 44% and youths aged 15-24 account for 19%). Of the remainder, 34.2% are adults aged 25-64 and 2.8% are elderly aged 65 and above. From these demographic data, it is obvious that Nigeria's population will remain very young in the short to medium term.

A combination of population growth at increasing rates, and slow progress in coverage of essential health services, especially preventive healthcare, provides the ground for a worsening disease burden. In the absence of significant rural development, population growth translated into urbanization, which increased from 34.8% in 2000 to 48.5% in 2016. While this exerts enormous pressure on urban social services, including health services, urban poverty has also led to substantial growth of shanty towns and urban slums where social services are rationed and of low quality.

The epidemiological profile is dominated by infectious and parasitic diseases. Leading drivers of disease burden are maternal, neonatal and nutritional factors, HIV, tuberculosis, malaria, acute respiratory infections and other infectious diseases. These account for approximately 71% of years of life lost in 2010, up from 66% in 1990. The population structure and the disease profile require increased services for reproductive, maternal, newborn, child and adolescent health (RMNCAH).

Table 2: Nigeria Health & Human Capital Indices Summary

S/N		HEALTH, ECONOMIC & HUMAN CAPITAL INDICES AND VARIABLES	VALUES
1	1.1	Estimated Number of Doctors Trained in Nigeria (2014)	65,000
	1.2	Number of Doctors practicing in Nigeria (2014)	25,000
2	2.1	Estimated Number of Doctors Trained in Nigeria (2016)	72,000
	2.2	Number of Doctors that Travelled abroad (2016)	20,000
Health And Economic Indicators Based on Disease Burden (2015)			
3	3.1	Under 5 Mortality Rate	117
4	4.1	Maternal Mortality Rate	560.0
5	5.1	Prevalence of HIV	3.10%
6	6.1	Estimated Proportion of Cardiovascular Disease Mortality	12.00%
7	7.1	Estimated Diabetes Prevalence	4.04%
8	8.1	Public Hospitals Per Million People	87.8
9	9.1	Private Hospitals Per Million People	53.8
10	10.1	Primary Health Centres Percentage of Health Facilities	85.60%
11	11.1	Secondary Hospitals Percentage of Health Facilities	14.00%
12	12.1	Tertiary Hospitals Percentage of Health Facilities	0.20%
Increasing Burden and gap of Non Communicable Diseases			
13	13.1	Population (2020 est.)	206 mil.
14	14.1	Consultant Oncologist	25
15	15.1	Neurologist	50
16	16.1	Neuro Surgeons	40
17	17.1	Consultant Paediatricians	600
18	18.1	Population of Children In Nigeria	70.0 mil.
19	19.1	Estimated Spending on Medical Tourism annually in Nigeria	US$1bn
20	20.1	Health Insurance Coverage In 2013	5.00%
Average Hospital Beds Per 10, 000			
21	21.1	Sub Saharan Africa	12.0
22	22.1	Europe and Central Asia	56.0
23	23.1	East Asia And Pacific	36.0
24	24.1	Nigeria	5.0
25	25.1	Global Average	26.0
Other Indices			
26	26.1	Life Expectancy at Birth (Male and Female)	34 years
27	27.1	Global Average of Life Expectancy at Birth (Male and Female)	70 years
28	28.1	Under Five Mortality Rate (Per 100, 000 Live Birth)	560
29	29.1	Global Average of under 5 Mortality Rate (Per 100, 000 Live Birth)	201
30	30.1	Nigeria's Rank on Proportion of GDP spent on health	109/191

SOURCE: Research Work of Epundu et al, 2017 as published in the Asian Journal of Medicine

The RMNCAH services are the key drivers for most of the health policies and investments by government across all levels. Primary care in particular is gaining the much-needed attention it deserves thus making it an attractive ground for investment participation both at the PPP and private segments.

3.3 COVID-19 Situational Analysis

The advent of the pandemic triggered an economic contraction which later translated into a recession. As of 15th November, 2022, Nigeria recorded 266,000 confirmed cases (0.12% of total population size) with a 97.7% recovery rate. Death rate due to the pandemic stood at 1.2% of confirmed cases.

In terms of administered doses of COVID-19 vaccines, over 31.4 million have been given (as of 8th April, 2022) while the government is ramping up efforts for mass a vaccination strategy through the National Primary Healthcare Development Agency (NPHCDA).

Fig. 12: COVID-19 Update as of 15th Nov., 2022

SOURCE: JHU CSSE Covid-19 data

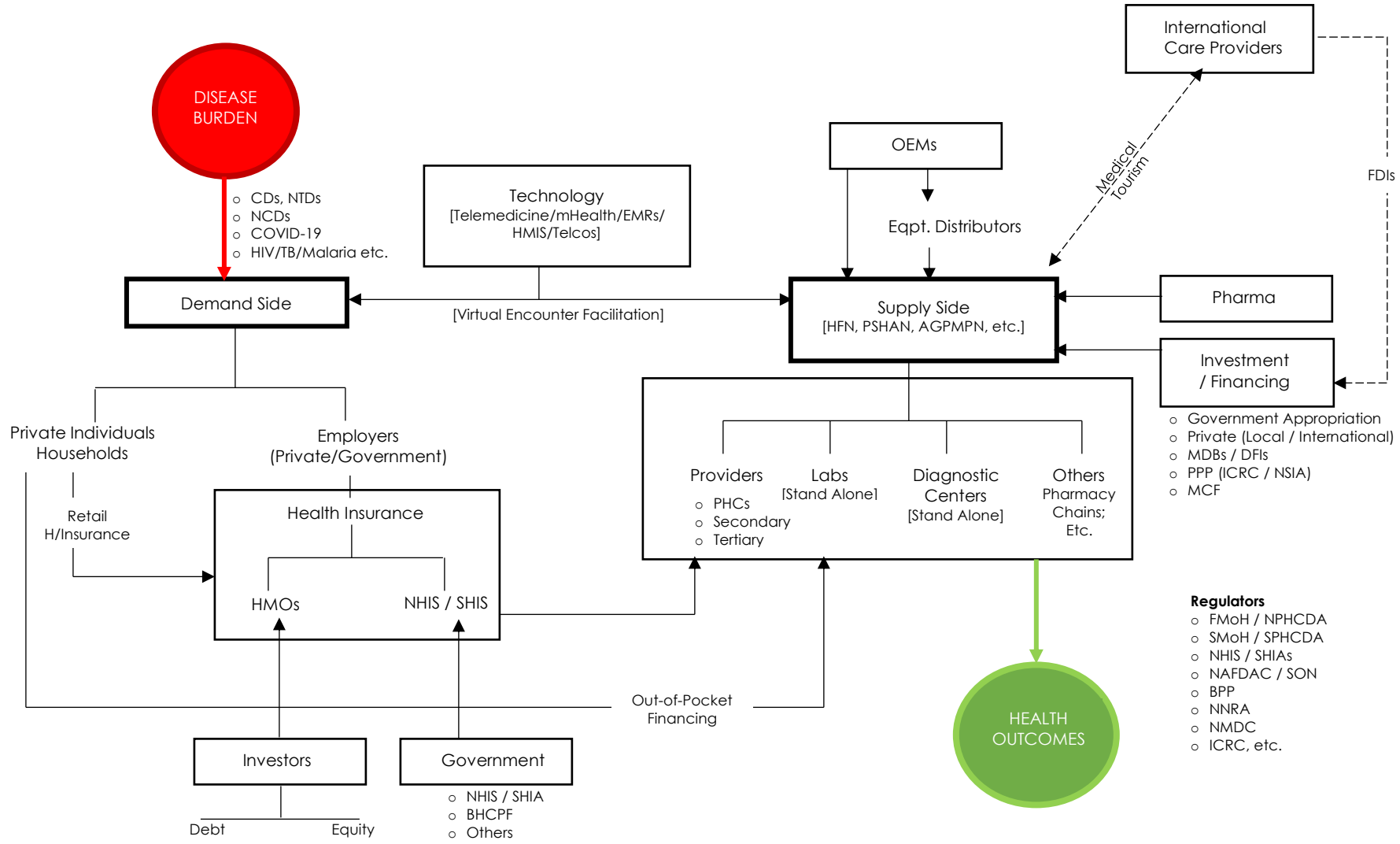
3.4 Nigeria Healthcare Value Chain

The healthcare value chain is a system of interactive components working together toward the delivery of improved quality outcomes for key stakeholders. Such stakeholders spread across the demand side (largely patients and other consumers of health services), supply side (i.e., healthcare providers), investors, regulators, OEMs, Financial Institutions, Drug manufacturers, amongst others. Fig. 13 provides insight into the health system architecture of Nigeria.

The aim of this section is to provide a baseline situational review of the major value chain components for the purpose of identifying gaps that can be explored for potential investments and collaborations.

These will also serve as inputs into the business case design for the Dutch health business community that have indicated interest in working with Nigerian health businesses and relevant government institutions.

Fig.13: Nigeria Healthcare Value Chain



3.4.1 Clinics & Hospitals

A. Primary Healthcare Centers (PHCs)

- There are 34,076 PHCs in Nigeria, accounting for 85.3% of total hospital and clinics in the country
- Of this number, it is estimated that only 20% are functional[2]
- Most of them lack the capacity to provide essential healthcare services, in addition to challenges of poor staffing, inadequate equipment, poor condition of infrastructure, and a lack of essential drug supply

- **The WHO reported that only a quarter of PHCs have more than 25% of the minimum required equipment package**
- The capacity to provide basic emergency obstetrics services is limited to about 20% of the PHC facilities
- Due to the foregoing, ₦1.95 trillion (US$5.4 billion[3]), representing 84% of primary health care expenditures, was spent in non-PHC facilities (i.e., secondary and tertiary care in 2017[4])

B. Secondary & Tertiary Health Facilities

- There are 5,753 secondary and 154 tertiary care facilities in Nigeria
- From 2010 to 2017, secondary facilities accounted for an annual average 61% of total provider expenditure receipts while tertiary facilities accounted for 21%

- **In 2017, secondary providers earned US$2.91 billion in expenditure receipts while tertiary providers earned US$1.11 billion**

Table 3: Nigeria Health Provider Expenditure Receipts

Healthcare Providers	NGN'Billion							
	2010	2011	2012	2013	2014	2015	2016	2017
Tertiary hospital	143	145	207	207	255	229	241	372
Secondary hospital	404	479	574	625	675	695	783	970
Primary Health Centres	130	131	165	178	176	190	223	370
Total Expenditure Received (NGN'Billion)	**677**	**755**	**946**	**1,010**	**1,105**	**1,114**	**1,247**	**1,712**
Avg. FX Rate (NGN:US$)	122.26	155.94	158.8	159.3	165.2	197.88	257.66	333.71
Total Expenditure Received (US$'Billion)	5.54	4.84	5.96	6.34	6.69	5.63	4.84	5.13

Tertiary hospital	21%	19%	22%	20%	23%	21%	19%	22%	21%
Secondary hospital	60%	64%	61%	62%	61%	62%	63%	57%	61%
Primary Health Centres	19%	17%	17%	18%	16%	17%	18%	22%	18%

DATA SOURCE: National Health Account (NHA)

2. This is a driver for the ERGP's PHC revitalization plan
3. Avg. FX Rate in 2017 was N333.7:US$1
4. This data is based on FMoH National Health Account Report (NHA) for 2017

Investment Opportunities

- Nigeria requires 386,000 additional beds and $82 billion of investments in healthcare real estate assets to reach the global average of 2.7 beds per thousand people in 2019
- To sustain this ratio however, Nigeria will actually require 646,000 additional beds by end of 2035[5]
- Revitalization of non-functional PHCs across the country – leveraging 2017 revenue performance, has the capacity of boosting expenditure receipts to US$5.54 billion up from US$1.11 billion (see Table 3)

3.4.2 Diagnostics (Radiology & Laboratory)

A. Radio diagnostics[6]

- The radiology market is regulated by the Nigerian Nuclear Regulatory Agency (NNRA)
- The market is grossly underserved
- Less than 15% of radiology providers are stand-alone facilities
- Access to ultrasound scan (USS) and X-ray services have the highest uptake in radio-diagnostics because they are more affordable and relatively available
- Available radiographers in Nigeria are less than 2,000
- Over 60% of X-ray equipment in Nigeria are obsolete and age 10 to 60 years[7]
- There are over 60 brands of X-rays in Nigeria with only 6 brands accounting for 70% of market volume[7]
- About 50 million diagnostic x-ray examinations are carried out and about 3,000 radiation therapy patients treated annually[7]

- **Computer tomography**
  - There were 183 CT scanners in Nigeria (as of March 2018)
  - 57.4% (105 units) of these scanners are privately owned while public institutions own 42.6% (78 units)
  - Three (3) states in Northern Nigeria – Kogi, Kebbi, and Zamfara – had no CT scanner installed
  - Most available CT Scanners are 2,4, 16, and 64 slices
  - Currently, two (2) 640-slice CT scanners are available in the country – one at a public facility in Akwa Ibom State and the other in a private radio-diagnostic center in Lagos
  - Foremost suppliers of radio-diagnostic equipment in Nigeria are GE, JNCI, and Philips Medical, among others

- **Magnetic Resonance Imaging (MRI)**
  - There are 58 installed MRI Units in Nigeria
  - About half of the units are low-field strength systems and there are some centers with 1.5T machines, particularly in the cities
  - There is no 3T unit in the country yet
  - Lagos is home to 25% of installed MRI scanners in Nigeria
  - Two-thirds of the scanners are privately owned

- **Radiotherapy**
  - Nigeria has 9 radiotherapy centers – 1 private while the remaining 8 are owned by the FGN
  - Equipment distribution among these 9 centers includes
    1. Five (5) Linear Accelerators
    2. Three (3) Co-60 treatment machines
    3. Two (2) high dose rate (Co-60 and Ir-192)
    4. Three (3) low-dose rate brachytherapy machines (Cs-137)
    5. Four (4) CT-SIMS and two (2) conventional simulators
    6. Six (6) treatment planning systems, two of which are not functional
  - Centers with radiotherapy units in the country include:
    1. Ahmadu Bello University Teaching Hospital (ABUTH)
    2. FMC Gombe
    3. Usmanu Danfodiyo University Teaching Hospital, Sokoto
    4. National Hospital, Abuja
    5. University of Benin Teaching Hospital
    6. University of Nigeria Teaching Hospital
    7. University College Hospital, Ibadan
    8. Lagos University Teaching Hospital (LUTH)
    9. EKO Hospital, Lagos (private)
  - Recently, additional private players are coming into this space and chief among them are the likes of Marcelle Ruth Cancer Centre, and MeCure, both in Lagos

Investment Opportunities

- **Energy Gap:** Powering the radio-diagnostic machines requires a stable power supply which is currently not the case in Nigeria. Addressing such a need via investments in eco-friendly alternative energy solutions will go a long way toward addressing this challenge with a possibility of yielding a decent return on investment (ROI)
- **Picture Archiving & Communication System (PAC):** Most radio-diagnostic images are poorly stored leading to loss of vital patient information. Investments in electronic data storage solutions would bridge this gap, generate value for money for service providers and also ensure a potentially good ROI for would-be investors
- **Equipment Maintenance & Biomedical Engineering Training**: There is a huge investment opportunity here. Currently, there is an estimated 1.4 Biomedical Engineers per million people in Nigeria. Collaborating with universities and/or setting up a training institution where fees can be paid by trainees or via an arrangement with government is an avenue that could be considered for investment while also addressing the challenges as identified.

Table 4: Nigeria Diagnostic Imaging Personnel Distribution

Personnel	Year estimate was made	Estimated No. of Personnel	Personnel per Million population
Radiologists	2015	300	1.5
Radiographers	2016	1,318	6.7
Medical Physicists	2019	100	0.57
Biomedical Engineers	2017	280	1.4
X-Ray ("Dark Room") Technicians	2018	1,111	5.63

SOURCE: Bukunmi M.I., Tolulope A.O., "The Journal of Global Radiology", 2020

Table 5: Census of Radiology Equipment in Nigeria

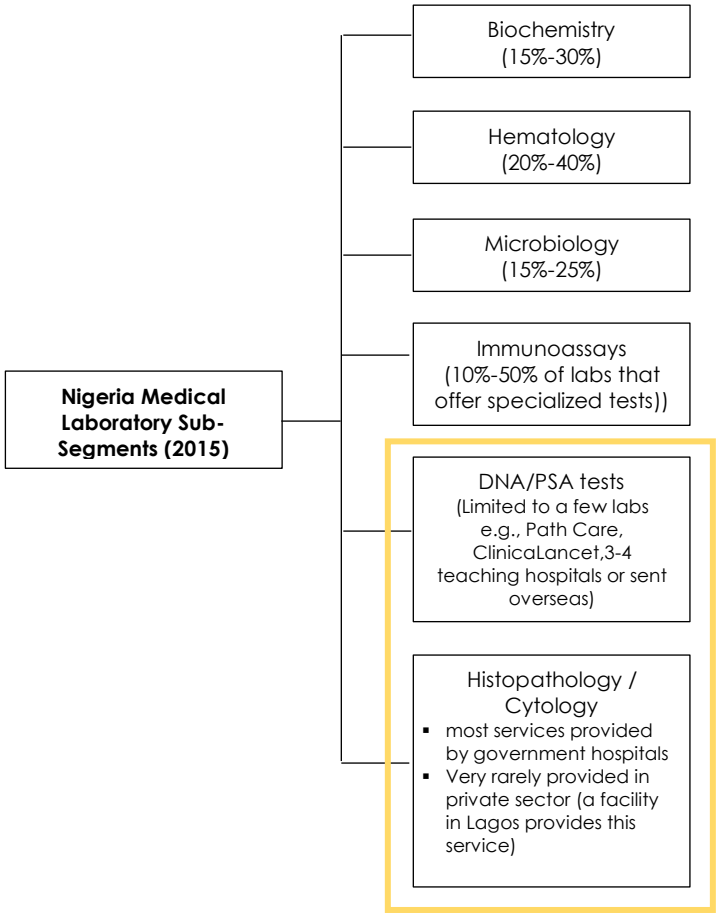
Equipment	Current Estimate	Year Estimate was computed
X-Ray	5,000	2006
CT	183	2018
MRI	58	2018
Ultrasound	4,500	2018
Angiography	NA	NA
Mammography	180	2018
Fluoroscopy	28	2018
Lithotripter	NA	NA
DEXA	NA	NA
LINAC	5	2017
Cobalt-60 Machine	3	2016
SPECT	3	2016

NB: There appears to be no updated master record of radiology equipment and manpower distribution in Nigeria.

B. Laboratories[8]

- Market is fragmented with over 10,000 labs (including those in hospitals)
- No player has up to 15% of the total market – there is room for the emergence of a market leader with a network of laboratories or franchise network
- Path Care, Clinix, Echo Scan are high end players dominant in specialized tests (e.g., PSA, DNA etc.) but not in general tests
- There are an estimated 3,000 registered lab scientists in Nigeria with over 430 new graduates per year

Fig.14: Nigeria Medical Laboratory Sub-segments



8. The data referenced were from the research work conducted by the Anadach Consulting Group, 2016

Opportunity Factors in the Clinical Laboratory Service Market

- Subsector is estimated to have grown at ~20% between 2008-2014, but is expected to slow down with new entrants
- Moderate growth is occurring with more specialized diagnostic tests. For example:
  - Demand for the Prostatic Specific Antigen test is estimated to be growing at more than 40% a year
  - Increased incidence of cancer, cardiac and kidney related diseases (e.g., over 100,000 new cancer cases per year)
  - Reproductive hormones given the growing infertility market
  - Increasing demand for quality healthcare with rising private health expenditure
- Should the clinical trial market pick up in Nigeria, drug level monitoring will expand considerably

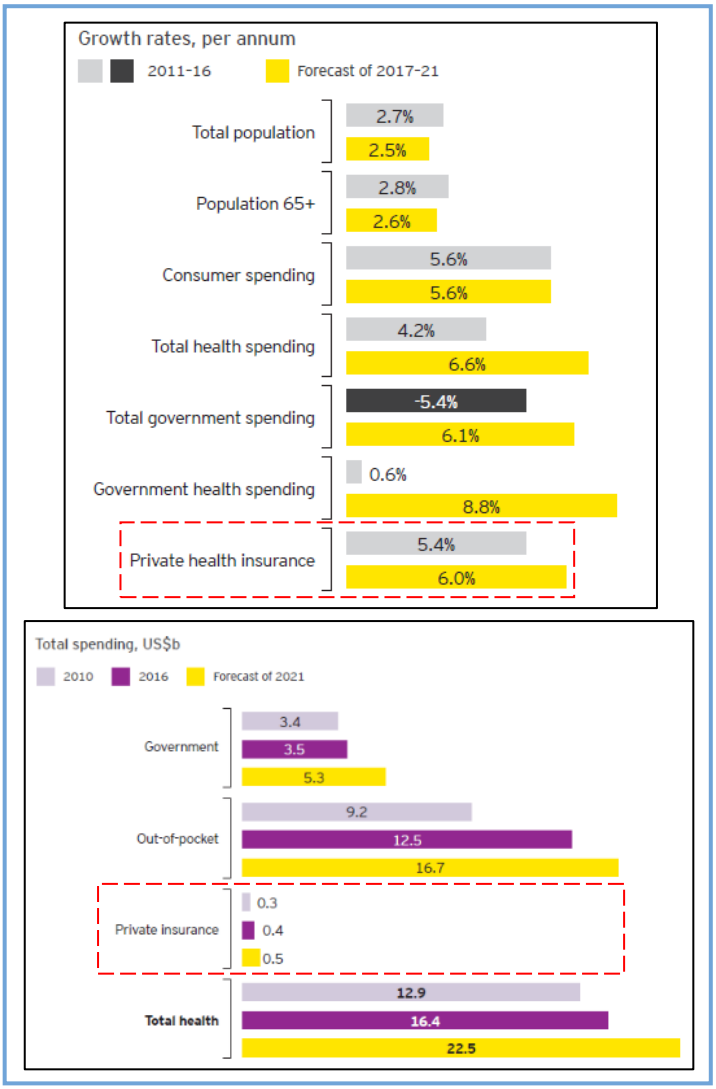
3.4.3 Health Insurance

The national health insurance scheme was launched in 2005 as a mechanism to engender universal health coverage (UHC) by helping to bridge the healthcare financing gap in Nigeria.

The following is a summary of development in this value chain component:

1. Number of provisionally re-accredited HMOs as of May 2018 stood at 52 (4 had been delisted earlier by the NHIA)
2. Health insurance penetration rate is about 5.1%[9]
3. Number of branches owned by HMOs nationwide stands at over 600
4. Industry reports revealed that the employee size of HMOs in Nigeria stands at about 2,000 on aggregate
5. The NHIS requires all accredited HMO companies to have a minimum paid up capital as follows:
   - A National HMO - NGN400 million
   - A Zonal HMO – NGN200 million
   - A State HMO – NGN100 million
6. Investment Performance:
   - Low industry profitability with return on equity (ROE) estimated at 2.7% (Agusto Report, 2018)
   - Some HMOs were reported to have experienced losses for 3 years consecutively
   - These are as a result of inefficient processes which serve as an opportunity for the deployment of modern technology for value enhancement
7. Factors driving low Profitability:
   - High medical loss ratio (MLR) which stood at 86.6% in 2017
   - This is substantially above 44.5%, 34% loss ratio reported in the Life and Non-life insurance businesses respectively
8. The majority of State Governments have passed Health Insurance Laws setting up State Health Insurance Agencies (SHIAs) for expanded coverage at the State levels

Fig.15: Healthcare Spending for Insurance



SOURCE: Ernst & Young / Oxford Economics

9. Private health insurance growth, based on an E&Y Report, averaged 5.4% between 2011-2016 and grew by 6% from 2017-2021
10. **Total private insurance spending for 2010, 2016, and 2021 estimated to be US$300 million, US$400 million, and US$500 million respectively** (see Fig. 15)

9. This is based on a report published by Agusto & Co., 2018. However, **the NHIS projects that about 8.8% of Nigerians would be covered under social health insurance schemes in 2021 and about 70% by the end of 2030 (see Appendix 2)**

3.4.4 Nigeria Medical Devices Market

Market Trend

Nigeria is largely dependent on imports for medical devices. About 99% of the country's medical devices and equipment are imported from foreign countries. Local production is very low and consists largely of syringes. In 2017, a foreign investor made available $30 million to set up a production unit for syringes in Akwa Ibom state, South-south Nigeria (i.e., the Jubilee Syringe Manufacturing Company). The company has a production capacity of 700 million units per annum, which can be further scaled up to one billion units. The company hopes to meet some of the annual syringe demand in the country, which stands at 4 billion units and is currently being met by imports from China.

In 2018, the total medical devices sales figure was about US$134.7 million, up by 10.8% from the NGN 37 billion total sales in 2017. Growth in this segment is expected to continue into the foreseeable future at an average of 9%. The market is expected to reach a value of US$201.8 million by 2023. The Nigerian economy grew at 2.01% in Q1 2019 based on a report from the NBS. This was short of the 2.5% projected. This underperformance reflected in the stunted growth of medical devices in the country, as data showed that Q1 2019 imports value was US$24.0 million, a 0.3% year-on-year decline when compared to Q1 2018.

Key Competitors

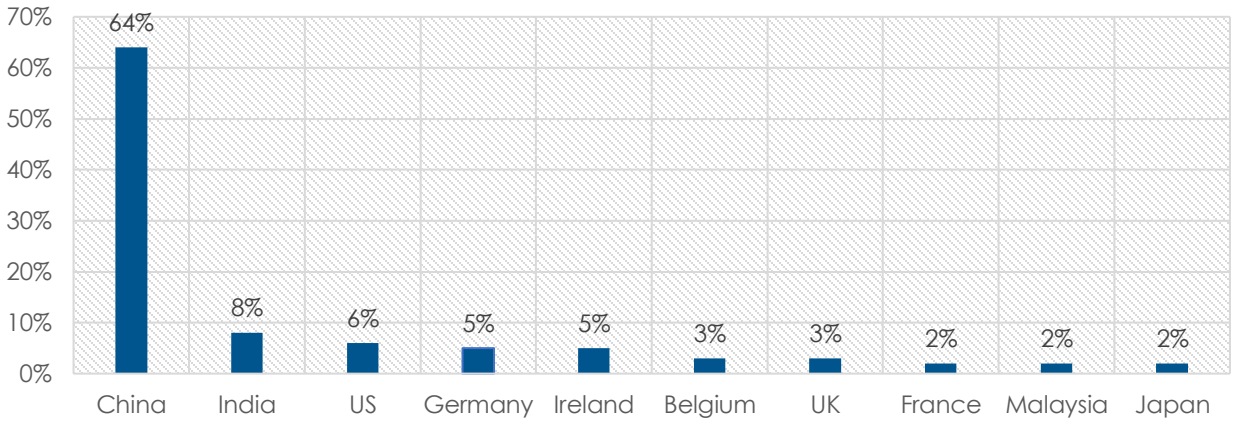
China was the leading supplier of medical devices to the Nigerian market in 2017, accounting for over 64% of the volume sold to the Nigerian market by the top ten suppliers. In the same year, India accounted for 8% while the U.S. accounted for 6% of the total imports to Nigeria. Over the past 10 years, Chinese imports have been increasing at a high year-on-year rate. Chinese imports peaked in 2014 when over 75, 000 medical devices were sold in Nigeria. See Fig. 16.

Product Categories

The medical devices segment in Nigeria is sub-divided into consumables, diagnostic imaging, dental products, orthopedics & prosthetics, patient aids, and other medical devices. Table 6 shows how much was spent on each product category from 2016 to 2018. The table provides further information on the projected growth expected in these categories up to 2023.

The market was projected to expand at an average rate of 15% in 2019, however the diagnostic imaging category is expected to offer less opportunities than the other categories due to its slightly lower growth rate of 12.7%.

Fig. 16: Top-10 Medical Devices Suppliers, 2017



SOURCE: BMI Research

Table 6: Nigerian Medical Device Category Growth Forecast (US$ million)

Product Category	2016	2017	2018	2019(F)	2020(F)	2021(F)	2022(F)	2023(F)
	$'m	$'m	$'m	$'m	$'m	$'m	$'m	$'m
Consumables	40.7	45.3	51.5	59.2	63.2	64.9	70.9	77.7
Diagnostic Imaging	27.0	19.6	22.5	25.4	27.2	28.1	30.3	33.2
Dental Products	2.9	5.3	4.1	4.7	5.1	5.3	5.9	6.6
Orthopaedics & Prosthetics	10.1	4.1	4.9	5.7	6.3	6.5	6.8	7.2
Patient Aids	16.8	12.4	14.4	16.9	18.1	18.6	20.1	21.6
Other Medical Devices	35.8	34.9	37.3	43.2	46.7	48.8	51.7	55.5
Total	**133.3**	**121.6**	**134.7**	**155.1**	**166.6**	**172.2**	**185.7**	**201.8**
Annual Growth		-9%	11%	15%	7%	3%	8%	9%

SOURCE: BMI Research

Leading Sub-Sectors

Most private clinics cannot afford new equipment and therefore seek refurbished ones as a means of augmenting available facilities.

Medical devices in high demand include diagnostic equipment such as the MRI, CT scan, Digital X-Ray, Ultrasound, Mammography and Ultrasound Scans.

Medical disposables, especially those for testing for malaria parasites, drug abuse, and infectious diseases such as HIV/AIDS and tuberculosis will also do well in Nigeria.

On a broad scale, the top 3 high demand medical devices include:

1. Diagnostic Equipment - particularly radiological and imaging devices
2. Primary Care Devices - ventilators, point of care (POC) tools, furniture, medical consumables etc.
3. Laboratory Equipment

Table 7: Challenges & Opportunities in Nigeria's Medical Devices Market

CHALLENGES		OPPORTUNITIES	
1.	**High cost of importation** triggered by import duties charged by Government and inefficient port operations (10% to 15%)	1.	Greater appreciation of technology in diagnostics and therapeutics
2.	**Issues with after-sales support** occasioned by poor scale of biomedical engineers, and challenges in getting spare parts	2.	Growing importance of health informatics & evidence-based reporting
3.	**Poor demand financing** - this is occasioned by the fact that the scale of operations in Nigerian hospitals is limited. For instance, in Nigeria, the maximum number of MRI procedures that can be conducted per day is between 8-10. The procedures are usually too costly for the consumers	3.	OEMs are seeing the need to innovate and target lower priced tier markets

4.	Irregularity of power supply to run the machines/equipment	4.	OEMs are seeking local partners in Nigeria due to medical tourism, population size, and growing middle class
5.	Weak regulatory environment	5.	Addressing manpower capacity challenges via training arrangements, providing innovative solutions to bridge the power supply gap associated with the usage of medical equipment such as the MRI, etc.
		6.	Turnkey project structuring: At the moment there is no sufficient capacity locally to effectively manage the structuring of high-ticket turnkey projects in the market
		7.	The disease burden mix in Nigeria indicates that non-communicable diseases[10] are becoming more prevalent thus triggering the need for specialized centers and devices to manage them

10. The Global Cancer Observatory (GLOBOCAN) Report on Nigeria revealed that in 2020, there were a total of 124,815 cancer cases and 78,899 related deaths. As the lifespan of Nigerians increases and the country industrializes, it is projected that nearly 40% of Africa's cancer burden will occur in Nigeria

3.4.5 Telemedicine & Digital Health Start-Ups in Nigeria

Overview

The primary vision of the National Health ICT Strategic Framework 2015–2020 was that "by 2020, health ICT will help enable and deliver universal health coverage [UHC] in Nigeria", which is way before the 2030 date for achieving UHC. The strategic framework also has a monitoring and evaluation plan with indicators for tracking progress.

Although there are plans to increase interoperability among health facilities and technologies, the framework does not acknowledge the role and importance of digital health start-ups in creating the enabling environment required to achieve the primary vision – *according to a UK Aid publication*.

Appendix 9 provides a summary of insight into Nigeria's Digital Health Index performance as of 2021. On a scale of 1 (lowest) to 5 (highest), the country's rating on "Standard and Interoperability", "Infrastructure", "Strategy and Investment", and "Workforce" stood at 1, 2, 3, and 2 respectively. In all, seven (7) standard parameters were examined.

Market Performance:

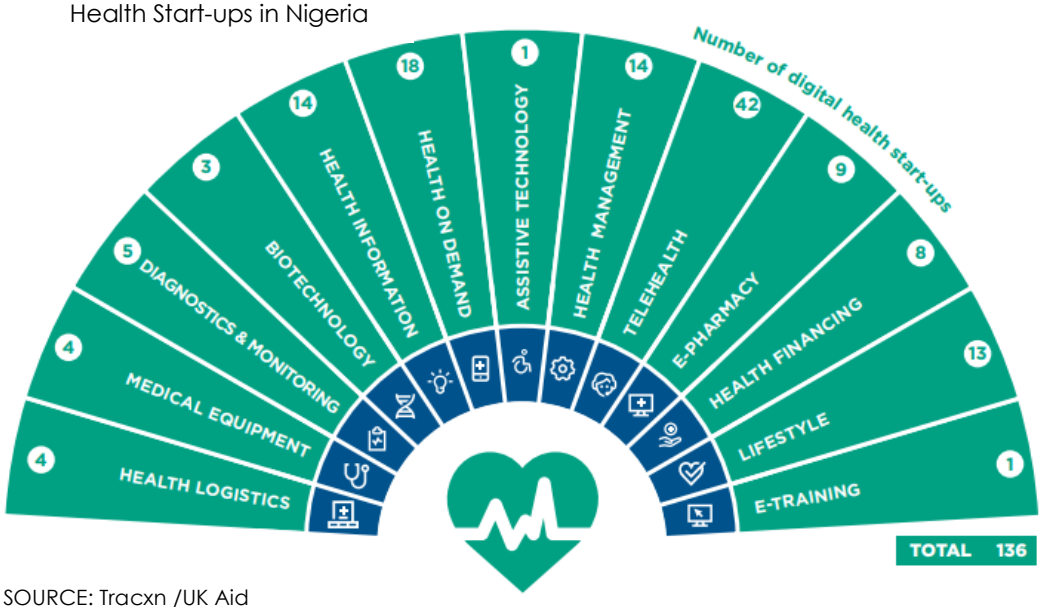
1. **Market Size: Available reports reveal that HealthTech in Africa is projected to hit a market value of US$11 billion by 2025[11]. In Nigeria, there are about 136 health-tech start-ups with telehealth segment accounting for 30.1% (42).** See Fig. 17

2. Capital Raise by Digital Start-ups: Of the US$4 billion raised by start-ups in Africa in 2021, Nigerian digital start-ups accounted for US$1.37 billion (34.25%) placing the country as number one on the continent. **At the end of Q3 2021, Nigerian HealthTech start-ups raised US$27.3 million in capital next only to financial services firms (US$113 million), and Venture Capitalist firms (US$40.1 million),** see Fig.18.

3. Key Market Drivers for the Digital Economy:

   a. Internet penetration – 140.3 million (65%) as of October 2021 as against 0.2 million in year 2000
   b. Active mobile phone subscriber base: 191.95 million (Oct. 2021)
   c. Teledensity: 100.56% (as of Oct. 2021)
   d. Broadband subscription: 76.15 million (as of Oct. 2021)
   e. Contribution of the digital sector to GDP: 14.42% as of Q2 2021

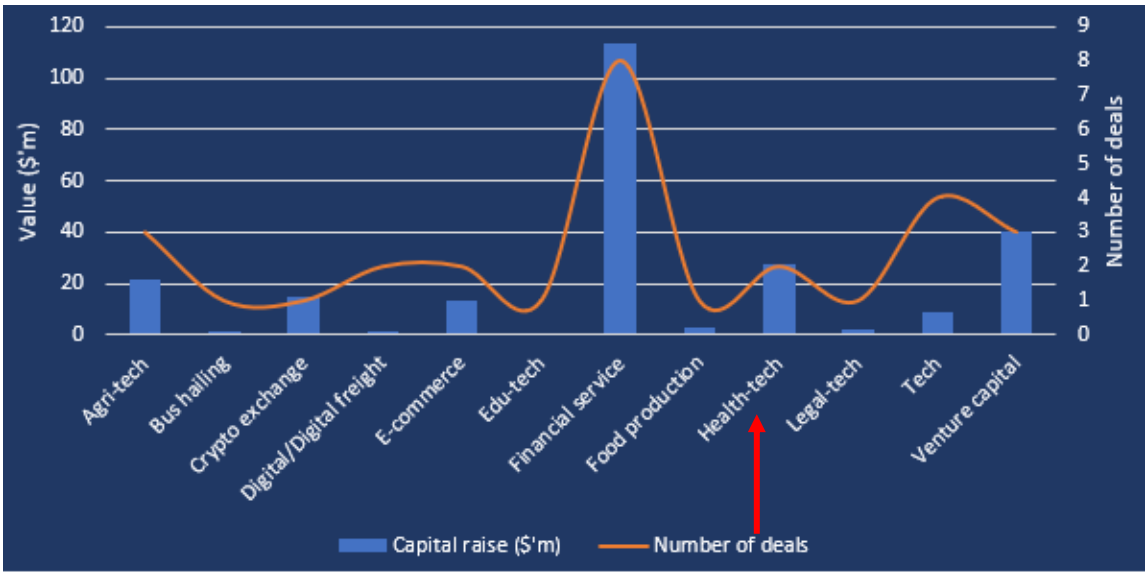
Fig.17: Number of Digital Health Start-ups in Nigeria



SOURCE: Tracxn /UK Aid

11. This is based on a report published by techcrunch.com, Feb. 2022

Fig.18: Funds Raised by Nigerian Start-ups Q3 2021, by Sector



SOURCE: Nairametrics

4. eHealth Market Segment in Nigeria (based on *Statista* data)

   a) Revenue in the eHealth segment is projected to reach US$315.20 million in 2022
   b) Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 17.42%, resulting in a projected market volume of US$703.70 million by 2027
   c) User penetration will be 13.37% in 2022 and is expected to hit 19.20% by 2027
   d) The average revenue per user (ARPU) is expected to amount to US$10.88

See Appendix 8 for more details

Case Study

Table 8 provides a case study comparative analysis of three of the most successful digital health start-ups in Nigeria. **DrugStoc**, **Reliance Health,** and **CarePay** have only been around for about 6 years and they have been able to raise a combined US$97 million dollars in capital, attracting global equity investors.

The impacts recorded in terms of performance are very significant. Investing in such start-ups provides opportunity for an attractive return on investment for Dutch Equity Funders and VC firms.

Table 8: Case Study Summary for Digital Health Start-Ups in Nigeria

	DRUGSTOC	**RELIANCE HEALTH**	**CAREPAY**
	2015	2016	2015 in Kenya and operational in Nigeria since 2018
	https://drugstoc.com/	https://reliancehealthinc.co/	https://www.carepay.com; https://healthcare.carepay.com
	Chibuzo Opara & Adham Yehia	Femi Kuti, Opeyemi Olumekun, and Matthew Mayaki	Michiel Slootweg and Kees Van Lede
	Sourcing and distribution challenges in Africa's pharmaceutical supply chain	Accessibility and Affordability issues of healthcare in Nigeria	Weak pre-payment infrastructure and accessibility to healthcare challenges among the populace
	Digital Pharma Start-up providing an e-health platform for drug procurement	Use of integrated technology enabled process to provide health insurance and telemedicine via partnerships with hospitals and healthcare facilities	To provide efficient and easy access to affordable care via end-to-end digital health management, claims processing, distribution of health plans, and extension of Working Capital to providers
	To deliver quality pharmaceutical products to 100 million people within Nigeria	To substantially exceed its current customer base size of 200,000	100 million people with access to affordable healthcare through CarePay
	The platform links drug companies with institutions such as hospitals and pharmacies while charging a commission for every sale made	Via subscriptions, healthcare is provided through its telemedicine platform, drug delivery system, and two clinics based in Lagos, Nigeria. Others are via third-party provider partners: hospitals, diagnostic centers and pharmaceutical centers.	Seamless virtual connection of payers, providers, and recipients of care via a mobile cloud-based digital platform
	▪ Volume: o Currently serving 14 million people with a plan to cover 100 million spread across 16 states outside of Lagos o Currently links 400 manufacturers to 3,200 doctors, hospitals, and pharmacies ▪ Financial: o The platform's monthly revenue has grown by over 1,500% in the last 3 years	▪ Volume: o Over 200,000 individuals (B2B and B2C) use Reliance Health o Client Retention rate: 99% ▪ Financial: o The HMO insurance plan ranges from NGN3,500 (US$7) to NGN148,500 (US$297) selected monthly, quarterly, or yearly o The startup averaged 3.5X year-on-year revenue growth from 2016	▪ Managed till date on the CarePay platform: o Over 20 public and private health schemes with o 5,000,000 registered members o 5,500 registered healthcare providers ▪ 1,500,000 visits recorded on the CarePay platform with over $40.5 million paid out in claims to healthcare providers ▪ $84 million in loans disbursed to healthcare providers since inception. ▪ Growing number of insurance policies and discount cards distributed via the CarePay marketplace
	US$4.4 million in Series A Funding	▪ US$2 million, in 2017 ▪ US$6 million in Series A, January 2020 ▪ US$40 million in the Series B round (2021/22) – the largest of its kind in African HealthTech	▪ $45 million series A growth capital raised in 2019

Table 8: Case Study Summary for Digital Health Start-Ups in Nigeria

	DRUGSTOC	**RELIANCE HEALTH**	**CAREPAY**
	▪ Africa Healthcare Master Fund (AAIC) – lead investor ▪ Others include – o Chicago-based Venture firm, Vested World o the German Development Bank (DEG), and o high-net-worth individuals	▪ Latest round of funding was led by General Atlantic (a US based equity investor) ▪ Others include - Partech, Picus Capital, Tencent Exploration, Africa Healthcare Master Fund, P1 Ventures, Laerdal Million Lives Fund and M3 Inc.	▪ Dutch Health Insurance Fund (HIF) ▪ ELMA foundation ▪ Investment Fund for Health in Africa (IFHA)

3.4.6 Medical Tourism

Overview

Medical tourism is fast becoming a culture among many Nigerians due to the deplorable state of the health care system in Nigeria. Every month, almost 5,000 people leave the country for various forms of treatment abroad when such treatment should have been carried out in Nigeria. About US$1.3 billion is lost to medical tourism yearly which could have been invested in the development of the country's health care system.

According to a Price Waterhouse Coopers report (2016), 60% of Nigeria's medical tourism spend goes to four key specialties: oncology, orthopedics, nephrology, and cardiology (see Fig.19). This is nearly 20% of the total government spending on the public health sector for the year, including salaries of all public sector doctors, nurses, and other healthcare workers as well as other health programs like malaria, tuberculosis, polio and HIV/AIDS prevention.

India, for example, is a major market for medically challenged Nigerians who can afford or are compelled by fate of ill-health to seek medical attention outside the country. According to the Indian High Commission in Nigeria, 18,000 (47%) of Nigerians that visited India in the year 2012 alone did so for medical treatments at an estimated cost of US$260 million.

Medical Tourism Statistics[12] & COVID Impact

- Average spend per year: US$1.35 billion (US$1.9 billion as of 2019)
- No. of medical travels per month: 9,000
- Key destinations:
  - India (5,000 visitors per month)
  - Other countries (6,000 per month)
- Annual Growth Rate: 20%
- Customer Distribution:
  - Cash paying (75%)
  - Government paid (15%)
  - Insurance company (6%)
  - Employer paid (4%)

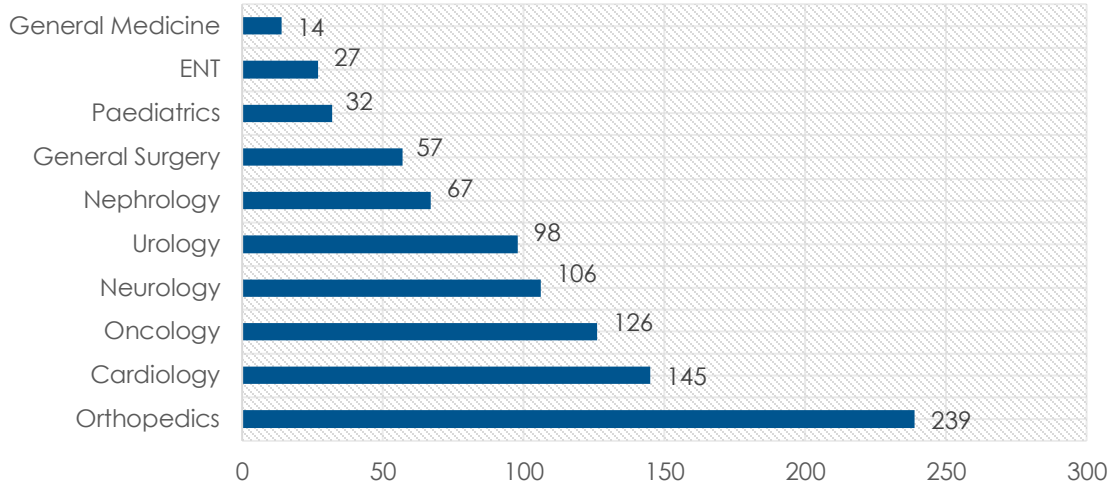
The advent of the COVID-19 pandemic has however changed the trajectory of this market's dynamics. Nigerians, and by extension, investors, have now been compelled to look inwards for a way of domesticating the medical tourism opportunity.

A classic example of this is the Duchess Hospital Lagos (a subsidiary of the Reddington Hospital Group), a 100-bed multi-specialty facility, commissioned recently in November 2021.

Another of such investments is the US$300 million African Medical Centre of Excellence due to be built in Abuja, Nigeria's capital, and funded by the African-Export-Import bank (Afreximbank). A sizeable number of FDIs are coming into the country on account of the prospects offered by the local capture of medical tourism spend by Nigerians.

12. Data Ref.: https://www.slideshare.net/bomanga/medical-tourism-in-nigeria

Fig. 19: Nigeria Medical Tourism Spend by Specialty (US$ million)



SOURCE: Nigeria Private Healthcare Summit by the Anadach Group

3.4.7 Nigeria Pharmaceutical Market

Current Market Trend

The determining factor in the pharmaceutical business is the disease pattern and West Africa is no exception to this dictum. Malaria, HIV/AIDS, and tuberculosis, coupled with widespread malnutrition and poverty, represent a double burden of disease on the population. In addition, heart-related diseases are also increasing. Over the counter (OTC) medicines such as analgesics, antimalarials and multivitamins make up a large share of the Nigerian pharma market.

Antiretroviral (ARV), artemisinin combination therapy (ACT), anti-TB and antimicrobial anti-diarrheal agents are life saving for patients in Nigeria. Local production of these essential life-saving medicines could make them more accessible for people with life threatening diseases provided that the price of such medicines is affordable.

Market Sizing & Value Chain Analysis

Estimates of the size of the pharmaceutical market in Nigeria vary significantly. In 2009, the Pharmaceutical Manufacturing Group of the Manufacturers' Association of Nigeria (PMG-MAN) estimated the size of the total pharmaceuticals and healthcare products market to be in excess of US$ 2 billion annually. The estimated market for prescription ethical pharmaceuticals is US$500 million and that for OTC pharmaceuticals about US$900 million.

Furthermore, PMG-MAN estimates the Nigerian market for biological products (including vaccines, insulin, interferon, etc.) to be worth about US$100 million while related healthcare and lifestyle products account for about US$500 million.

A report by Business Intelligence Services (BIS) estimates the pharmaceutical market in Nigeria at US$600 million (referencing Business Monitor International, BMI 2010). Of this figure, BMI attributes the largest share of US$418 million to generic medicines, US$121 million to OTC products and US$61 million to patented products.

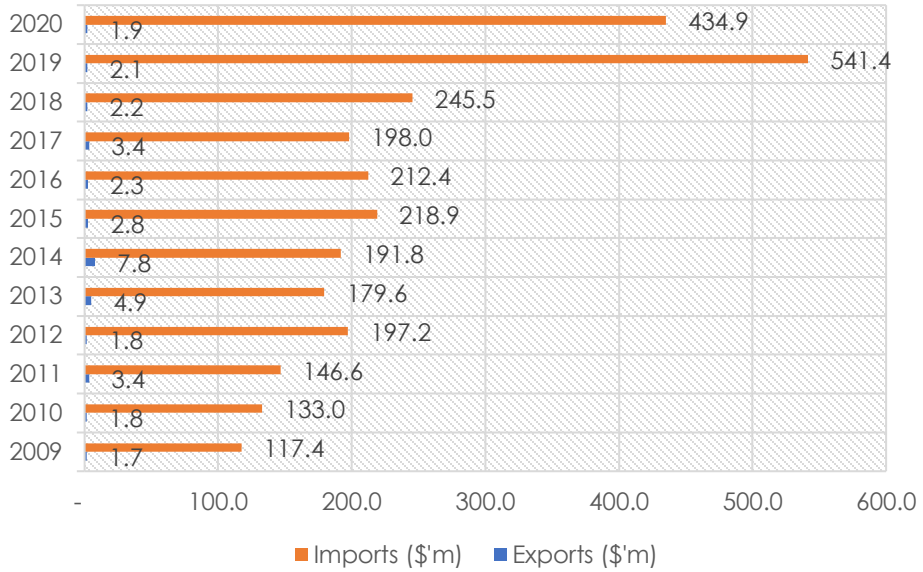
A recent data release from the National Bureau of Statistics (NBS) indicates that Nigeria's pharmaceutical manufacturing sector was worth US$777 million in 2018, a figure largely unchanged over the last few years with growth of less than 1% recorded in both 2017 and 2018. Figures from the Pharmaceutical Society of Nigeria, PSN, however, put the sector's value nearly a third higher at approximately US$1.3 billion. Even at this level, the sector's economic contribution is relatively small, accounting for less than 0.25% of GDP. Forecasts suggest sales to grow marginally in value over the next three years, carrying diminishing weight as a percentage of GDP.

Nigeria accounts for 60% of the health products consumed in the Economic Community of West African States (ECOWAS) by volume (PMG-MAN, 2010) and, with an estimated population of about 600 million, the ECOWAS sub-region represents a huge potential market for investors.

Fig. 20: Nigeria Pharmaceutical Industry Value Chain Analysis

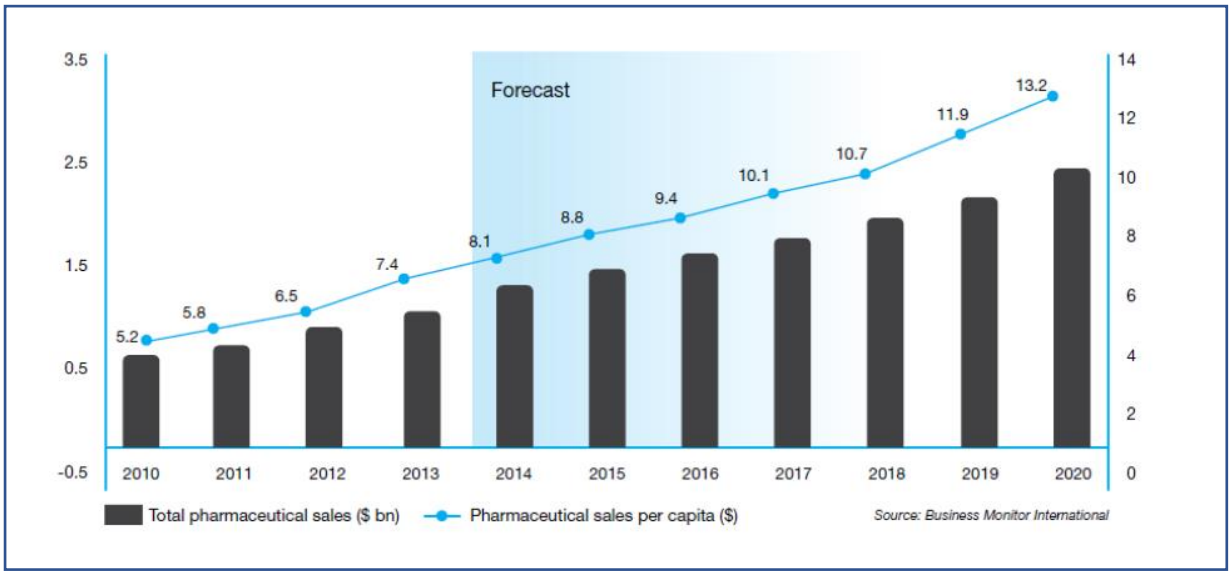
SOURCE: Asoko Insight

Fig.21: Nigeria Exports & Imports of Medicinal and Pharma Products, 2009-2020



SOURCE: UNCTAD / CEIC Data

Fig. 22: Pharmaceutical Sales, Historical Data, and Forecast (Nigeria)



Total estimated pharmaceutical sales in 2020 is about US$10 billion with a sales-per-capita of US$13.2 according to BMI.

Market Mapping

Market information available on *Asokoinsight.com* revealed as follows:

- Of the leading 20 pharmaceutical companies in Nigeria, 65% are privately owned while the remaining are publicly listed companies
- A quarter of the companies earn over $25 million annually, with two, GSK and Neimeth, recording revenues above $500 million a year. The remaining 15 firms are roughly evenly split between those with revenues above and below $5 million a year.
- The pharmaceutical industry is largely concentrated in Lagos where 75% of the leading companies are headquartered. The remaining companies are split between Ogun, Enugu, Oyo and Imo State

Vaccine Production – a Grossly untapped Opportunity

Africa represents about 14% of global population but account for less than 0.1% of the world's vaccine production – implying that over 99% of supplies come from external sources. A research report funded by the UK Aid, published in March 2021, indicated that 70% of vaccine volume procured for Gavi-supported countries (mostly in sub-Saharan Africa) originated from India and is projected to increase in the coming years.

Nigeria has received close to US$1 billion in disbursements from Gavi to support vaccination efforts in the country (see Table 9). Currently, the country has no capacity to produce legacy DTP3 vaccines (Vx) and COVID-19[13] vaccines to meet the need of her over 200 million citizens. In addition, the population is projected to more than double by 2050 thus significantly bolstering demand.

This Vx supply gap provides an opportunity for investment and exploitation by Dutch health businesses toward domesticating capacity for Vx production in-country.

Table 9: Nigeria DTP3 Vaccine Commitment by Gavi

(17 Sept. 2019) Approvals 2001-2023 (US$)	(17 Sept. 2019) Commitments 2001-2023 (US$)	(17 Sept. 2019) Disbursements 2001-2023 (US$)	(17 Sept. 2019) % Disbursed (US$)
1,092,227,745	1,285,313,082	954,315,294	93%

SOURCE: Gavi

13. On February 18th, 2022, Nigeria, Egypt, Algeria, Tunisia, South Africa, and Senegal secured the WHO's approval to access the mRNA technology for local COVID-19 production

3.4.8 Healthcare Expenditure & Financing

Aggregate Health Expenditure

Total estimated health expenditure (THE) increased from US$15.8 billion in 2010 to US$19.1 billion in 2014. It later declined, in dollar terms, to US$13.4 billion in 2017 in spite of the corresponding increase in Naira terms – this trend is occasioned by the devaluation of the local currency from NGN165:US$1 in 2014 to NGN333:US$1 in 2017.

Current health expenditure (CHE), and Capital expenditure (CAPEX) accounted for an average 95%, and 5% of THE respectively.

Table 10: Nigeria Aggregate Health Expenditure, 2010-2017

Aggregate Health Expenditure 2010-2017	NGN' Billion							
	2010	2011	2012	2013	2014	2015	2016	2017
Current Healthcare Expenditure (CHE)	1,808.1	2,096.2	2,419.6	2,754.5	3,038.4	3,294.8	3,739.5	4,297.1
Capital Health Expenditure	125.4	213.6	127.7	200.1	121.6	139.4	194.7	158.4
Total Health Expenditure (THE), N'Bn	**1,933.5**	**2,309.8**	**2,547.3**	**2,954.6**	**3,160.0**	**3,434.2**	**3,934.2**	**4,455.5**
FX Rate (NGN:$)	122.2606	155.938	158.7932	159.267	165.15	197.8763	257.6604	333.715
Total (US$'billion)	**15.8**	**14.8**	**16.0**	**18.6**	**19.1**	**17.4**	**15.3**	**13.4**

DATA SOURCE: National Health Account (NHA), FMoH

Healthcare Payment Sources

The burden of healthcare finance is borne dominantly by households (HH). Estimated household health expenditure, in Naira terms, increased from NGN1.4 trillion in 2010 to NGN3.3 trillion in 2017.

As a share of CHE, estimated household expenditure declined from 77.8% in 2010 to 75.2% in 2016. The decline in household share is driven primarily by increase in donor funding up by 237% over the period from NGN114.4 billion in 2010 to NGN385.3 billion in 2016, equivalent to 6.3% in 2010 and 10.3% in 2016 of CHE, respectively. The Global Alliance for Vaccines and Immunizations (GAVI) and Bill and Melinda Gates Foundation (BMGF) are major contributors to the increase in donor spending. FGN spending also increased significantly by 174% from NGN111.8 billion in 2014 to NGN306.5 billion in 2016.

Corporations' contribution to revenues of financing schemes increased in absolute value from an estimated NGN39.2 billion in 2010 to NGN51.3 billion in 2016 but its share decreased from 2% in 2010 to 1% in 2016. Current health spending from government sources increased at all tiers over the period of analysis, with total government spend rising from NGN248.8 billion in 2010 to NGN613 billion in 2017 (see Table 11).

Table 11: Institutional Financing Sources, 2010-2017

Institutional financing sources	NGN' Billion								
	2010	2011	2012	2013	2014	2015	2016	2017	
Households (HH)	1405.8	1581	1776.9	1965.5	2168.7	2451.1	2813.4	3,332.3	
Corporations	39.2	43.3	42.2	45.5	58.6	48.1	51.3	28.5	
Rest of the world	114.4	166.5	205.4	347.2	410.4	338.1	385.3	323.4	
Federal Government	111.8	136.8	191.5	155.1	195.3	215	306.5	264.7	
State Government	102.3	133.1	162.1	199.9	162.6	201.3	143	295.5	
Local Government	34.6	35.6	41.6	41.4	42.8	41.3	39.9	52.8	
Total (NGN' Billion)	**1,808.1**	**2,096.3**	**2,419.7**	**2,754.6**	**3,038.4**	**3,294.9**	**3,739.4**	**4,297.2**	
FX Rate (NGN:$)	122.2606	155.938	158.7932	159.267	165.15	197.8763	257.6604	333.715	
Total (US$'billion)	**14.8**	**13.4**	**15.2**	**17.3**	**18.4**	**16.7**	**14.5**	**12.9**	
HH as % of Total	77.8%	75.4%	73.4%	71.4%	71.4%	74.4%	75.2%	77.5%	**75%**
Corporations as % of Total	2%	2%	2%	2%	2%	1%	1%	1%	**2%**
Rest of the world as % of Total	6%	8%	8%	13%	14%	10%	10%	8%	**10%**
Federal Government % of Total	6%	7%	8%	6%	6%	7%	8%	6%	**7%**
State Government % Total	6%	6%	7%	7%	5%	6%	4%	7%	**6%**
Local Government % Total	2%	2%	2%	2%	1%	1%	1%	1%	**1%**

DATA SOURCE: National Health Account (NHA), FMoH

Expenditure Classification by Disease Conditions Treated

Based on averages for the period 2010-2016, approximately 60.5% of current health expenditure was spent on infectious and parasitic diseases. In decreasing order of expenditure share, the ranking of infectious diseases was malaria (40.1%); HIV/AIDS and opportunistic infections (9.2%); respiratory infections (6.5%); tuberculosis (3.3%); vaccine-preventable diseases (2.6%) and diarrheal diseases (1.3%).

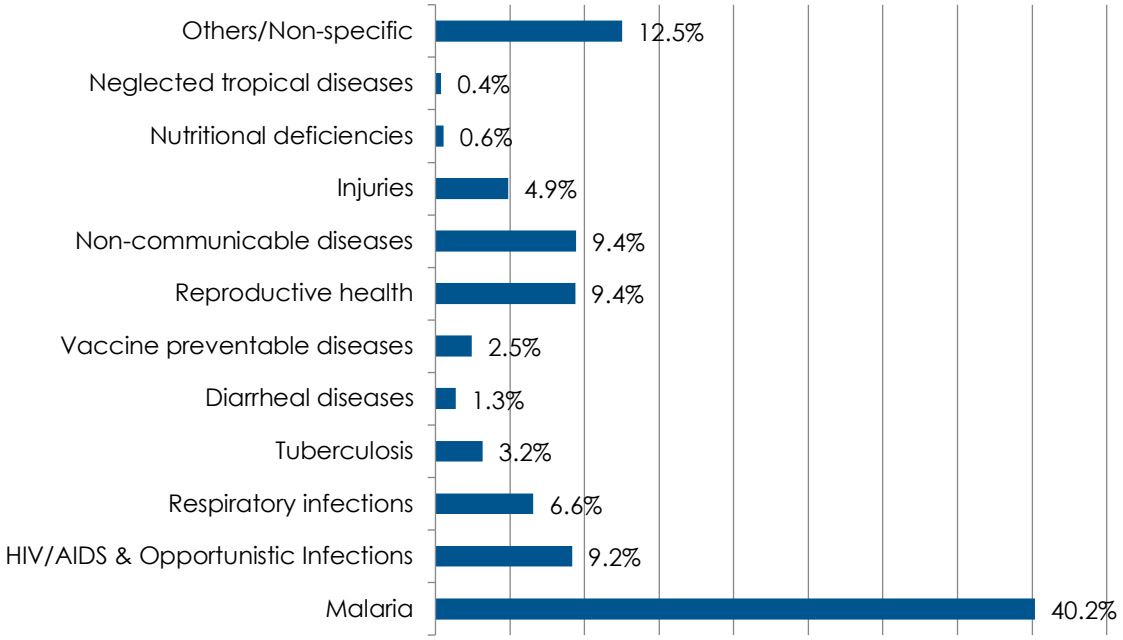
Among the other disease categories, reproductive health was the leading condition, accounting for 9.4% of expenditure. Others are NCDs (9.3%); Injuries (4.9%); nutritional deficiencies (0.6%) and neglected tropical diseases (0.4%). The year-by-year allocation of CHE to factors underlying this distribution is provided in Table 12.

Table 12: Expenditure Distribution by Disease/Conditions, 2010-2016

Diseases	NGN' Billion						
	2010	2011	2012	2013	2014	2015	2016
Malaria	760.9	839.7	943.4	1,080.7	1,196.9	1,354.1	1,512.3
HIV/AIDS & Opportunistic Infections	215.6	189.4	127.3	250.2	288.6	310.8	371.4
Respiratory infections	127.2	139.2	165.6	172.5	189.7	212.6	243.8
Tuberculosis	7.5	75.3	97.0	97.3	109.6	116.0	133.9
Diarrheal diseases	23.9	27.4	43.8	35.0	36.6	38.1	49.0
Vaccine preventable diseases	24.4	47.3	51.9	63.7	78.6	101.8	127.8
Reproductive health	163.2	193.8	219.7	263.8	300.9	303.9	355.1
Non-communicable diseases	164.3	217.8	246.8	267.5	296.2	281.3	310.3
Injuries	94.0	105.7	97.0	137.0	149.5	166.7	181.1
Nutritional deficiencies	3.3	4.6	15.0	45.7	7.1	17.3	16.0
Neglected tropical diseases	6.8	7.1	19.3	8.6	8.7	10.3	12.1
Others/Non-specific	217.1	248.9	393.0	332.7	376.0	381.8	426.8
Grand Total (NGN' Billion)	**1,808.2**	**2,096.2**	**2,419.8**	**2,754.7**	**3,038.4**	**3,294.7**	**3,739.6**
FX Rate (NGN:$)	122.2606	155.938	158.7932	159.267	165.15	197.8763	257.6604
Total (US$'billion)	**14.8**	**13.4**	**15.2**	**17.3**	**18.4**	**16.7**	**14.5**

DATA SOURCE: National Health Account (NHA), FMoH

Fig. 23: % Expenditure Distribution by Disease / Conditions



3.4.9 Access to Financing for the Health Sector

The vast majority of companies in the private health sector are small and medium-sized businesses (SMEs). The SMEs that serve lower income groups face challenges such as sub-standard infrastructure and equipment, a scarcity of skilled medical staff and poor quality of services. Health SMEs have difficulty accessing capital to improve this situation because of their lack of banking history, limited collateral and the perceived high risk of the sector.

The Medical Credit Fund (MCF) was established in 2009 by PharmAccess Group to address these constraints. MCF works to mobilize debt capital for health SMEs and increase their bankability. It combines loans with technical assistance towards quality and business improvement, working with PharmAccess' SafeCare methodology. MCF is operational in Ghana, Nigeria, Kenya, Tanzania and Uganda, and has provided EUR150 million in loans to 2,000 health SMEs. Loans are mainly used to finance working capital, equipment or infrastructure improvement.

In Nigeria MCF and its partners have disbursed 940 loans totaling more than EUR10 million since 2013. Loans in Nigeria have varied from EUR3,000 to EUR1.5 million and reached over 500 companies.

MCF is currently working towards introducing a digital loan product that will allow it to reach a large number of small healthcare providers and pharmacies. In addition, MCF can provide more traditional, secured, term loans up to EUR5 million. Clients are companies with existing operations and can be healthcare providers or suppliers to the health sector, such as distributors of pharmaceuticals or medical equipment.

4. Government Policies & Healthcare Projects in Nigeria

4.1 Government Intervention Policies

The Second National Strategic Health Development Plan (NSHDP II)

This policy was approved in February 2017. The policy is aimed at improving the performance of the national health system. It also lays emphasis on primary healthcare as the bedrock of national health system in addition to providing financial risk protection to all Nigerians, particularly poor and vulnerable populations.

The National Health Insurance Scheme, NHIS*

The NHIS kicked off in 2005 and has only been able to secure a 5% penetration. The Scheme received an allocation of NGN62.99 billion, NGN63.30 billion, and NGN49.46 billion in 2015, 2016, and 2017 respectively. The funding allocations over the years have been grossly inadequate and appear to be on the decline. In the course of this study however, it was revealed that there are plans by the Federal Ministry of Health (FMoH) to review and revitalize the scheme for effective coverage.

The Basic Healthcare Provision Fund, BHCPF

The Fund was officially launched on the 11th January, 2019 though its implementation had commenced much earlier. The establishment of the BHCPF is as provided for in the National Health Act.

The fund will help drive the new targets of increasing access to health facilities, with a specific aim to grow the number of primary health care centers (PHCs).

As part of its goal to ensure access to health care for 100 million Nigerians, the FMoH plans to build 10,000 PHCs throughout the country, with at least one PHC per ward (i.e., an administrative unit with 10,000 people) to facilitate health care access across a wide geographic area. It is understood however, that 4,500 PHCs have been covered so far with support from donor partners.

The National Cancer Control Plan

The Federal Ministry of Health has launched a National Cancer Control plan 2018 – 2022 that provides a clear roadmap on how the government will undertake cancer control efforts in the country over a 5-year period and more. The Minister of Health stressed that the plan involves the government's desire to provide high-quality healthcare for Nigerians by making diagnostic equipment and treatment devices available at healthcare centers. **Based on reports from the Federal Ministry of Health, the National Cancer Control Plan has a budget of $258 million.**

The CBN Health Sector Intervention Fund

The Central Bank of Nigeria (CBN / "the Bank"), introduced the NGN100 billion credit support fund for the healthcare industry. This was done as a proactive measure to cushion the impact of the COVID-19 pandemic on the economy. It is targeted at indigenous pharmaceutical companies, and healthcare providers to support expansion.

*On May 19th, 2022, the National Health Insurance Authority Act was signed into Law. This new law serves to repeal the NHIS Act, 2004. The law aims to provide coverage to 83 million vulnerable people who are unable to pay premiums. Funding to be derived from phone tax, the BHCPF, among other measures.

4.2 Selected Nigeria Healthcare Projects

4.2.1 NSIA Investments

A major investor in healthcare infrastructure development in Nigeria is the Nigerian Sovereign Investment Authority (NSIA / "the Authority"). It does so through its wholly owned subsidiary, the NSIA Healthcare Development and Investment Company Limited (NHDIC).

The subsidiary was established to invest in any company, corporation, authority or body involved in or any arrangement related to healthcare infrastructure or healthcare service delivery and/or management. The company was incorporated in 2014. Table 13 gives an overview of the healthcare projects that have been concluded so far.

Table 13: NSIA Completed Health Infrastructure Projects

S/N	PROJECT TYPE	DESCRIPTION	LOCATION	INVESTMENT SIZE	INVESTMENT TYPE	SPECIAL PURPOSE VEHICLE (SPV)	STATUS
1.	Diagnostic Centre	FMC Umuahia (FMCU)Diagnostic Centre designed to conduct modern medical pathology laboratory, radiography, and ancillary healthcare services	Abia State	US$5.5 million	PPP	FMCU Advanced Medical Diagnostics Limited (2016*) NSIA (90%); FMCU (10%)	Completed
2.	Diagnostic Centre	Aminu Kano Teaching Hospital (AKTH) Diagnostics Centre established to carry out business as providers of modern medical pathology laboratory, radiography, and ancillary healthcare services.	Kano State	US$4.5 million	PPP	AKTH Advanced Medical Diagnostics Limited (2017*) NSIA (90%); AKTH (10%)	Completed
3.	Diagnostic & Cancer Centre	Lagos University Teaching Hospital (LUTH) Centre was established to provide modern medical pathology laboratory services, provide modern radiography services, provide healthcare services, establish other medical diagnostic centers as may be determined from time to time by the board of directors and to encourage the discovery of new medical and/or surgical	Lagos State	US$11 million	PPP	LUTH Advanced Medical Services Limited (LAMSL), 2016*. The Company was incorporated in 2016 as a joint venture between NHDIC and Lagos University Teaching Hospital (LUTH), each with 50% ownership interest. Following the transfer of the 50% ownership interest held by LUTH to NHDIC, LUTH Advanced Medical	Completed

* Year of incorporation of SPV

		management of diseases and afflictions.				Services Limited became a fully owned subsidiary of NHDIC and consequently, an indirect subsidiary of the Authority in December 2020.	

4.2.2 ICRC Pipeline Healthcare Projects

There are a number of health infrastructure projects going on across the country many of which are not published in the public domain. This section however examines some pipeline large ticket healthcare infrastructure projects under the supervision of the Infrastructure Concession and Regulatory Commission, ICRC, based on a recent official Gazette.

These projects were considered in this study effort as part of key potential areas of collaborations that Dutch businesses may want to consider in their engagement with Nigeria. **The suggested strategy is for the Dutch investment structure to engage the ICRC, NSIA, and FMoH to work out modalities for collaborations on any of these projects and/or jointly come up with complimentary initiatives that are of mutual benefits to parties. See Table 14.**

Dutch firms with advanced capacity in providing advisory services on large turnkey healthcare projects across the country can also position themselves to support the government and investors in this regard.

The ICRC was established by an Act in 2005 to regulate PPP transactions over the FGN assets aimed at addressing huge infrastructure deficit.

Table 14: FGN/FMoH Pipeline PPP Health Infrastructure Projects

S/N	MDA	PROJECT	SECTOR	ESTIMATED PROJECT COST	PHASE
1.	FMoH	Upgrade of the 3rd Phase of Teaching Hospital Rehabilitation Project: The contracts for rehabilitation and modernization of select Federal Teaching Hospitals (8 in Phase 1 and 6 in Phase 2) were awarded in November 2002 and September 2006 respectively to VAMED Engineering Ltd and a Presidential Project Implementation Committee was set up to monitor proper and timely execution of the projects. The remaining 7 Teaching Hospitals were supposed to be rehabilitated and modernized through PPP and a Technical Working Group (TWG) with membership drawn from FMoH, NSIA, ICRC, and 4 members from the private sector was set up to deliberate and agree with VAMED /CPL Group on the most suitable PPP model to be adopted for Phase 3.	Health	NGN924.614 billion	Procurement Re-issue OBC Certificate of compliance
2.	FMoH	Establishment of Anti-Snake Venom Production Facility in Nigeria through PPP	Health	NGN6.157 billion US$13.1 million	Development to re-submit OBC
3.	FMoH	Radiotherapy & Oncology Centre and Operation of Oxygen Gas Plant at Aminu Kano Teaching Hospital, Kano:	Health	NGN150.7 million	Development to re-submit OBC
4.	FMoH	Abuja Healthcare City Project	Health	US$102 million Phase 1	Development to re-submit OBC
5	FMoH	National Orthopedic Hospital, Enugu	Health	NGN900 billion	Development to re-submit OBC
6.	FMoH / Usmanu Danfodio University, Sokoto	PPP Initiative on Pharmaceutical Products and Surgical Consumables and Diagnostic Laboratory Services, Usmanu Danfodio University Teaching Hospital, Sokoto	Health		Development to re-submit OBC
7.	FMoH	Development of Advanced Surgeries Centers in Nigeria Government Hospitals:	Health	NGN200 million	Development to re-submit OBC

S/N	MDA	PROJECT	SECTOR	ESTIMATED PROJECT COST	PHASE
		The FMoH submitted an unsolicited proposal developed by LAANJ International Ltd, requesting the FGN to allocate specific departments in three (3) Nigerian Public Hospitals, one each in Abuja, Jos, and Port Harcourt, where they can bring in experts from India at intervals to perform advanced surgeries. The proposal aimed to be established as an Operation and Management (O&M) PPP model			

SOURCE: FGN Official Gazette, No. 58, Vol. 108, April 2021

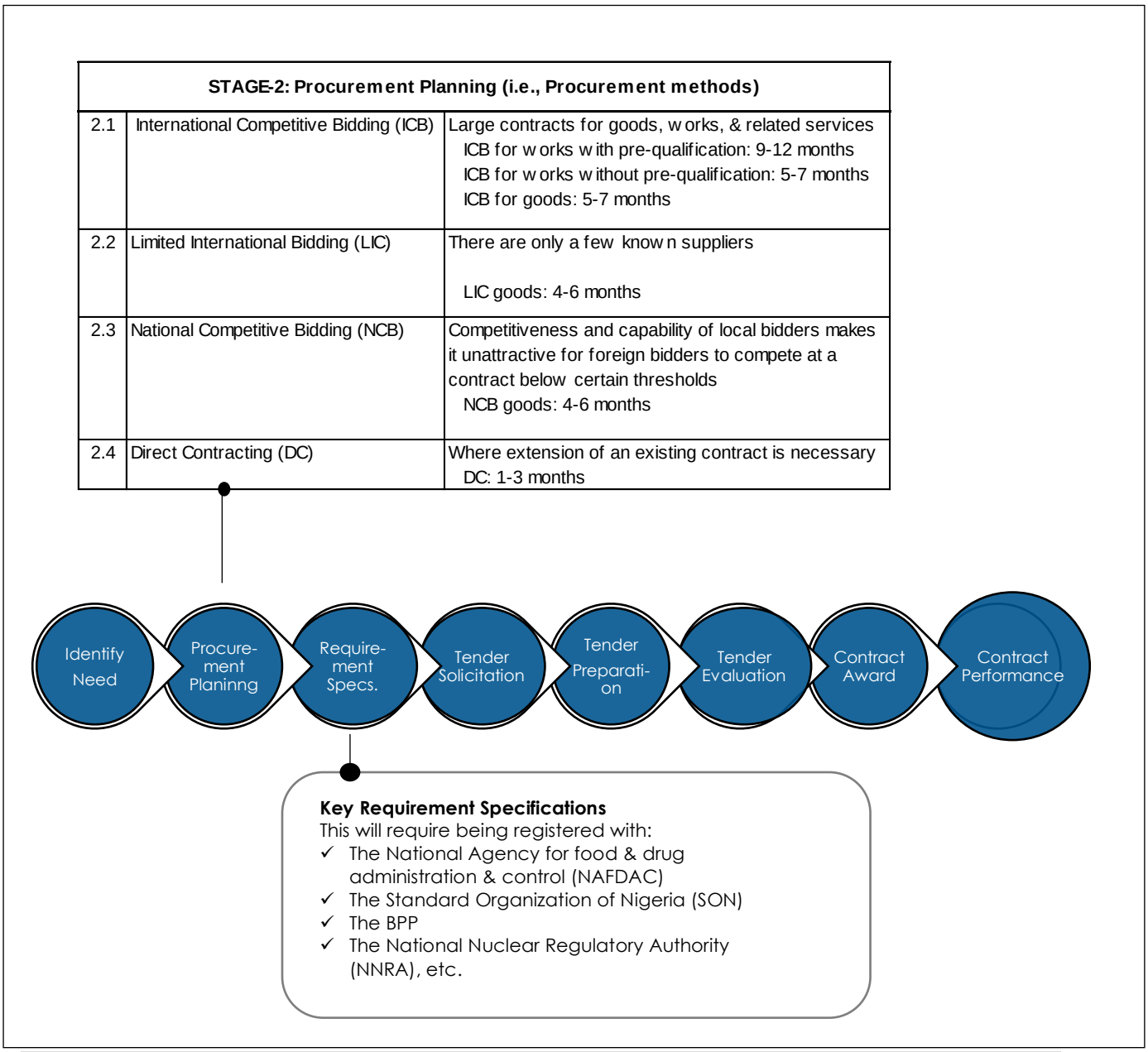
4.3 Procurement & Tendering Process in Nigeria

4.3.1 Public Sector Engagement

Public tender process in Nigeria is based on the provisions of the Bureau of Public Procurement (BPP) Act, 2007. This law has been domesticated across the sub-national levels in Nigeria's 36 States and is enforced by each State's Public Procurement Agency (PPA).

The procurement and tender framework are in alignment with the World Bank standard as indicated in Fig. 24. For the PPP process, see Fig. 34, Section 5.8.

Fig. 24: NG Public Procurement Framework



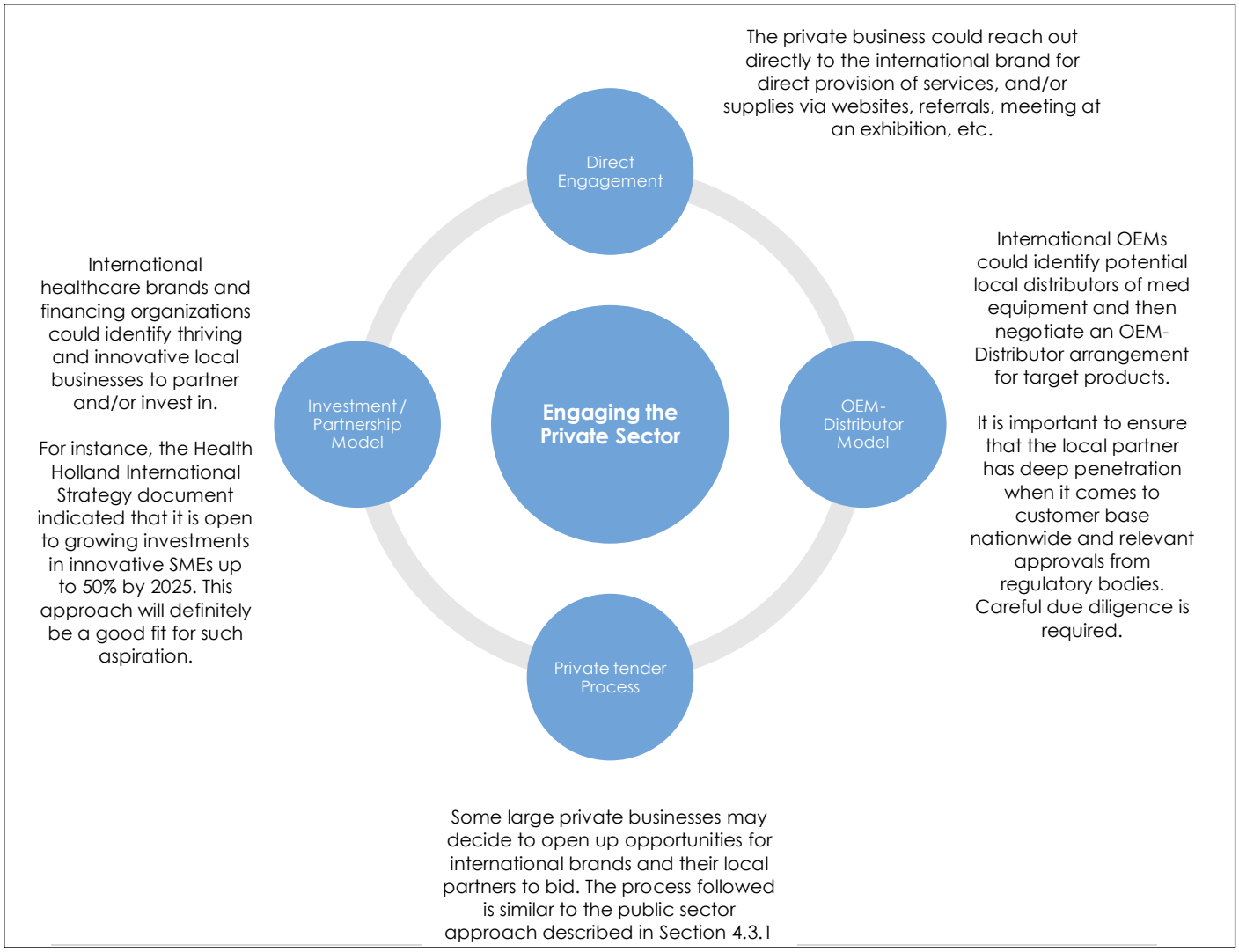
International players are enjoined to pay particular attention to the key requirement specifications and procurement methods that may be adopted by the procuring entity depending on the context of the opportunity available.

4.3.2 Private Sector Engagement

Active participation in trade exhibitions and conferences is a strategic approach to jumpstarting engagement with private health businesses in Nigeria. A good example is the Medic West Africa exhibition that takes place every 4th quarter of the year. This allows international brands to showcase their products and services. Essentially, private sector engagement runs largely on relationships in Nigeria.

Fig. 25 provides the four possible routes for accessing private business opportunities in Nigeria. It is however important to stress that proper due diligence must be conducted prior to making any commitment.

Fig. 25: Private Sector Engagement Framework




X-RAY

Market Opportunity Case Studies

Case Study Summary by Partnership type

PPP Opportunity Case Study		Private Partnership (PP) Opportunity Case Study	
SECTION	DESCRIPTION	SECTION	DESCRIPTION
5.1	**Case Study 1:** Revitalization of Dysfunctional PHCs	5.4.2	**Case Study 4B:** Telemedicine Opportunity with large hospital facilities
5.2	**Case Study 2:** ICT Integration of NHIA Processes *(this is similar to a B2B in principle as it only involves an agency of Government)*	5.4.3	**Case Study 4C:** Partnership with Existing Digital Health Start-ups
5.3	**Case Study 3:** Deployment of Solar Systems across target PHCs	5.5	**Case Study 5:** Med Equipment Leasing & Maintenance
5.4.1	**Case Study 4A:** Telemedicine *(in conjunction with Government & development partners)*	5.6	**Case Study 6:** Domesticated Vaccine production
5.8	**Case Study 8:** Turnkey Health Infrastructure Opportunities	5.7	**Case Study 7:** Pharma Import Opportunity
		5.9	**Case Study 9:** Local production of LLINs
		5.10	**Case Study 10:** Cold Chain Storage & Logistics

5. Market Opportunity Case Study

Having identified potential opportunities for investments across the healthcare value chain, and some major pipeline PPP projects, this section seeks to establish selected case studies for investment considerations by the Dutch health and allied business community seeking to partner with the Nigerian Government (national and/or sub-national) and organized private health sector groups in the country.

NOTE: *These case studies are no substitute to the investor's due diligence and/or feasibility study effort. They serve to provide insights into potential market performance (based on certain assumptions) for identified opportunities and are subject to simulations and/or sensitivity checks and adjustments depending on investor risk tolerance.*

5.1 **Case Study 1:** Revitalization of Dysfunctional PHCs

Baseline Situation

- There are 34,076 PHCs in Nigeria
- PHCs account for 85.3% of total number of hospitals / clinics in Nigeria
- Only 20% of PHCs are reported to be functional
- Due to this, an estimated 2,300 U-5 children and 145 women of child-bearing age are reported to die on a daily basis
- A pilot PHC Revitalization project, the Access to finance (A2F) Scheme, was initiated in 2019 in Delta State with support of PharmAccess Foundation as the implementing partner. Currently, 15 PHCs have been revived. Available data show that the scheme has been impactful and is worth expanding across the country

Opportunity

- FGN's commitment toward the revitalization of 10,000 PHCs across the country as contained in the ERGP
- Passage of the National Health Act and activation of the BHCPF
- Expanded social health insurance schemes across the country for demand creation

Entry Strategy

- NPHCDA/FMoH, NHIA, HFN to set up a PPP framework in conjunction with private health players
- NPHCDA (from 45% BHCPF gateway) & related agencies to fund rehabilitation via loans to providers
- Dutch OEMs position to provide med equipment for facilities
- HFN providers to access loan and operate facilities & repay
- NHIA to deliver enrollees and support marketing & advocacies

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	Weak demand side	▪ Social health insurance programs to ramp up advocacies and enrollments
2.	Loan default by private providers	▪ Debt capital secured by Health Insurance Fund held by the NHIA / BHCPF

5.2 **Case Study 2:** ICT Integration of NHIA Processes

Baseline Situation:

The NHIA (formerly NHIS) is the regulator for health insurance activities in Nigeria and the leading social health insurance agency at the national level. The body is a receiving channel / gateway for 50% of BHCPF through which it supports state health insurance schemes (SHIS) at the sub-national level across the country as per the provisions of the National Health Act.

Opportunity:

The NHIA is currently working on promoting the ICT integration of its processes towards maximizing efficiency and enabling innovation to advance its strategic goals.

Table 15: Strategic Objectives of NHIA ICT Integration Opportunity

Strategic Objectives		Key Result Areas	
		Indicators	Targets
1.	To achieve deployment of ICT infrastructure that meet established standards including data security, integration, and interoperability in 70% of NHIA Zones and States, SSHIAs, accredited HMOs and Providers.	% of states and zones with ICT infrastructure that meet established standard in data security, integration, and interoperability.	70%
2.	To achieve 70% reduction in lead time for carrying out key internal NHIA processes, such as accreditation, claims management, access to enrollee register and referral management.	% of key internal business processes that achieve 70% reduction in lead time.	70%

SOURCE: NHIA 2020-2030 Strategic Plan

Entry Strategy

Dutch turnkey ICT firms in conjunction with the Dutch Government to set-up a working partnership agreement(s) with the FMoH and the management of NHIA on areas of technical support / collaboration, leveraging the Implementation Plan designed by the NHIA.

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	Non-securing of the ICT Integration deal	▪ Timely implementation of the entry strategy as suggested
2.	Ability of the NHIA to fund the process	▪ Securing a payment guarantee from the NHIA team as a follow up to the partnership agreement in (1)
3.	Absence of political will and legal framework to follow through on the opportunity	▪ Leverage the newly signed National Health Insurance Authority Act which allows for the authority and state governments to develop information management systems and digital records for better data collection, monitoring and quality assurance

CarePay

Currently there are a number of Dutch entities that could provide strategic support to the NHIA in this regard. One of such reputable Dutch companies is **CarePay**.

CarePay's digital platform supports private and public health plans, in the health insurance space, with smart mobile health wallets to provide access to quality healthcare as well as process optimization capabilities. This €30million-technology-company already has a footprint in Nigeria and could serve as an innovative partner assisting the NHIA realize its strategic objectives as set out in this section.

As an added value, CarePay will also be leveraging the competencies of another Dutch organization, **PharmAccess Foundation** (PAF), which currently supports the NHIA in the deployment of digital tools for accreditation and effective monitoring of quality of care across health facilities to ensure that optimal health outcomes are realized across the country.

5.3 Case Study 3: Deployment of Solar Energy Systems Across Target PHCs

Baseline Situation:

- Aside from manpower, energy consumption is the next highest OPEX driver for most PHCs
- Based on recently-concluded research on PHCs in rural areas, average annual energy consumption cost per facility stood at NGN1.36 million ($3,287.40) – *Delta State Access-to-Finance program*
- Daily energy consumption per bed space for PHCs in rural areas is estimated at 6.76KWh/day
- Ceiling fans and bulbs account for over 51% of load items in a typical rural PHC facility
- Average on-hours for load items per facility is estimated at about 8 hours per day or less thus impacting negatively on health outcomes

Opportunity:

- There is a growing demand for sustainable alternative energy sources that work around the clock
- The demand for preservation of vaccines for immunizations is also a key driver for such demand
- Nigeria's over 34,000 PHCs is a huge attraction and indicator for decent return on investment
- Many of the states are very open to alternative energy interventions on the basis of its positive health and cost-saving impacts

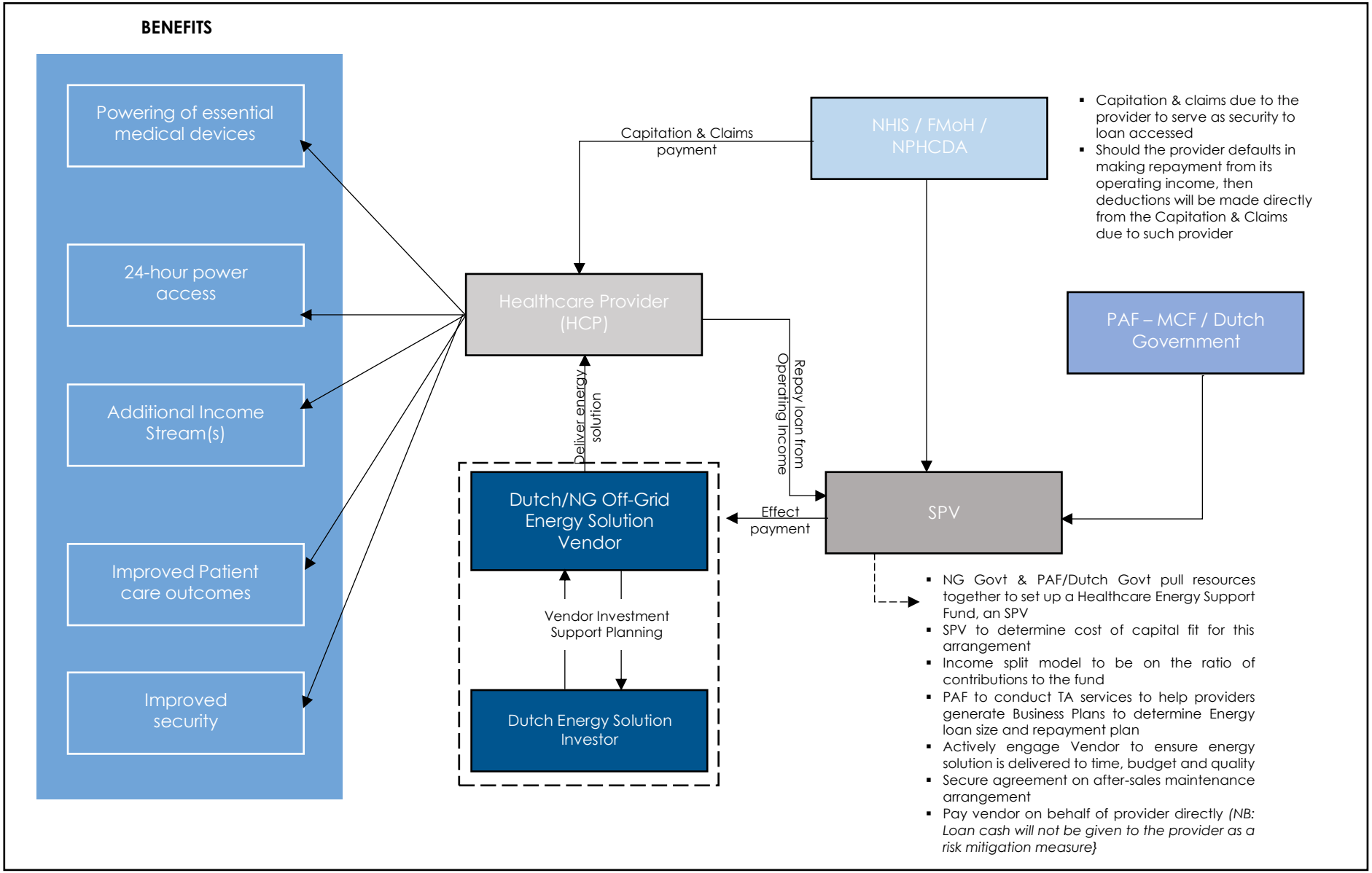
Entry Strategy

Collaboration with the Ministry of Health and associated agencies and departments is a secure entry channel for activating this opportunity. Fig. 28 provides details the operating model for such collaboration.

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	Inability to access the number of PHCs to be covered	▪ Forge a partnership agreement with the NPHCDA and SPHCDA to deliver on target number of PHCs
2.	Payment default by PHCs	▪ Payment for energy solution provided to be done by an SPV (see Fig. 26) – the Dutch solution provider is shielded from the risk of payment default by providers

Fig. 26: Investment Framework for Alternative Energy Solution for PHCs



5.4 **Case Study 4:** Telemedicine

Telemedicine is pretty much in its growth phase in Nigeria. According to data presented in Appendix 9 of this report, Nigeria has an aggregate Digital Health Index rating of 3 across key assessment categories. In terms of standards and interoperability, Nigeria's digital health system got a rating of 1 out of a maximum 5. Implying that a lot needs to be done to bridge this gap. Notwithstanding, performances of Nigeria's digital health start-ups have shown that investment returns on digital health in Nigeria can be very attractive - see Section 3.4.5.

For the purpose of this study, telemedicine investments are treated as a B2B. Three options have been suggested in this section and they include potential arrangements with -

- Development Partners & Government (i.e., the FMoH and associated agencies and departments)
- Large Hospital Facilities, and
- Digital Health Start-ups

5.4.1 Telemedicine Opportunity with Government & Development Partners

Key Focus: Access to remote specialist care in rural and difficult to reach areas in the country

For this arrangement, Dutch telemedicine firms are expected to deploy their expertise in assisting the government and development partners (the client) in setting up telemedicine centers in target PHCs across states in the country for the purpose of ensuring that patients in rural and difficult to reach areas are able to access specialist care remotely.

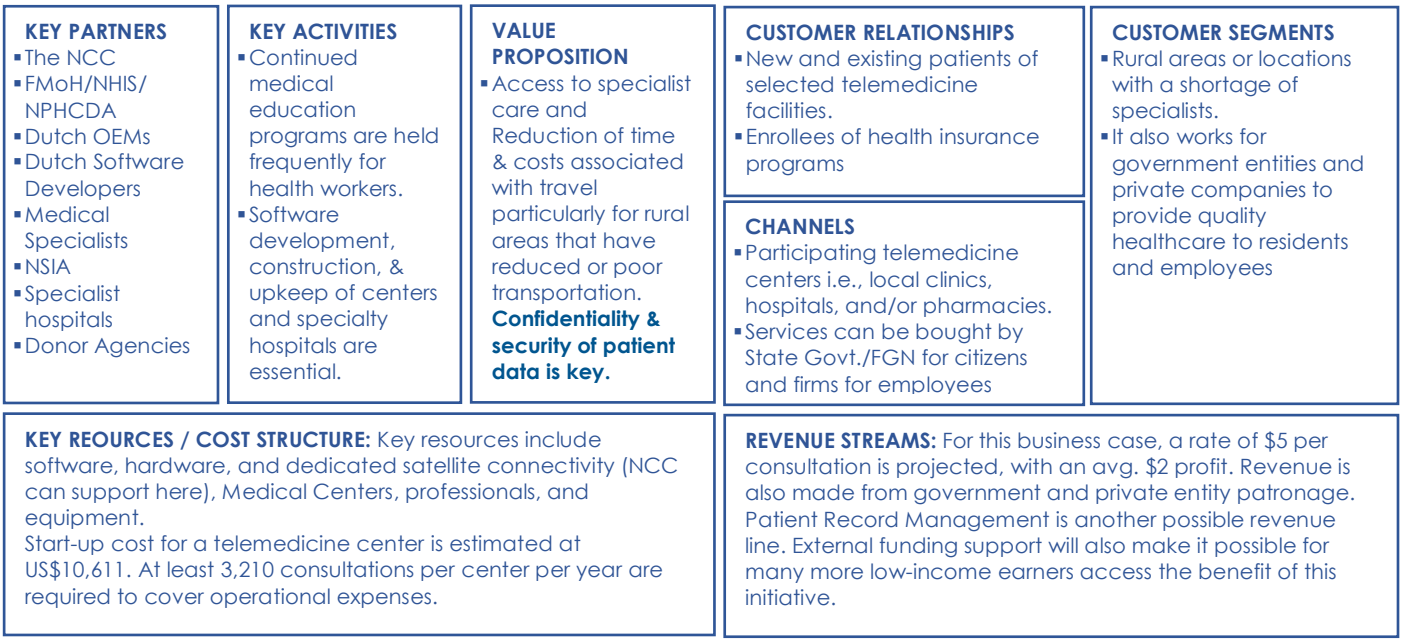
Baseline Situation:

- Most PHCs in Nigeria do not offer specialist care
- Accessing specialist care by rural dwellers requires travelling long distances usually to city centers at a huge cost
- Most health workers in the rural areas do not have access to continuing medical education programs to enhance capacity

Opportunity:

- There's an urgent need for a remote arrangement that will ensure that identified baseline issues are addressed and improved health outcomes secured
- There is a growing willingness by government and donor partners to support and fund telemedicine centers that provide access to specialist care in rural and difficult-to-reach areas

Fig. 27: Business Model Canvass for Telemedicine Intervention for Rural Poor



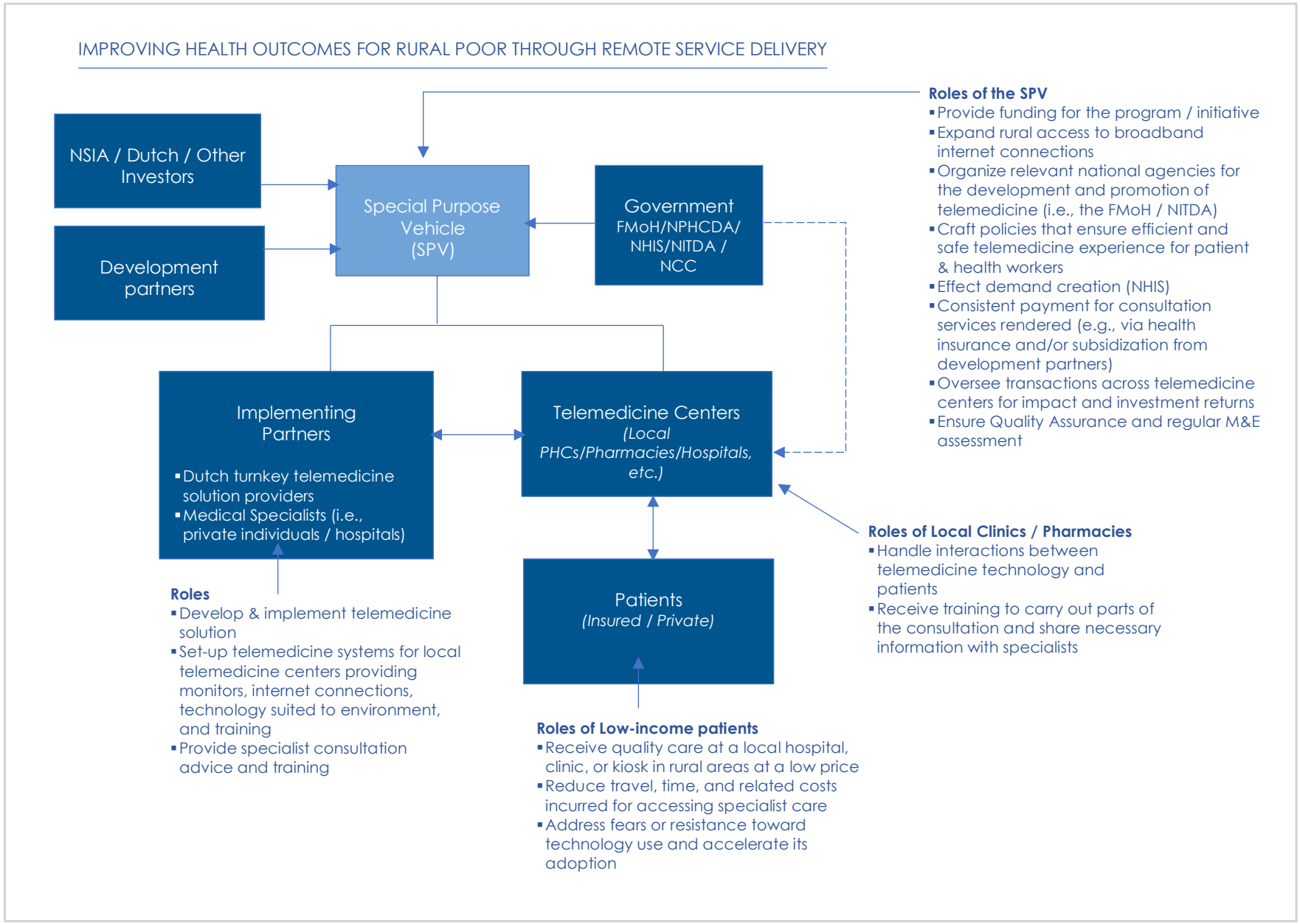
Entry Strategy

A review of Fig. 27 shows that collaboration with Government's Ministry of Health and associated agencies could serve as a channel for activating this opportunity. Fig. 28 provides insight into the operating mechanism that will drive this opportunity.

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	Shortfall in the target number of telemedicine centers to be covered	▪ Forge a partnership agreement with the SPV set up to drive the initiative ▪ Parties to sign up on key performance metrics ▪ SPV to deliver on the target numbers centers as per framework in Fig. 28
2.	Delay and/or default in payment for services rendered	▪ The SPV to see to direct payment for services rendered on a B2B basis as per agreement signed up in (1)

Fig. 28: Operating Framework for Telemedicine Opportunity



5.4.2 Telemedicine Opportunity with Large Hospital Facilities

Key Focus: Provision of digital care solutions for large private hospital chains and tertiary health facilities in Nigeria

This opportunity is of a larger ticket size than that described in Section 5.4.1. In this case, the large facilities are able to directly fund the setting up of a turnkey telemedicine solution end-to-end. The telehealth system to be implemented should cover the following modules depending on the need of the client –

- Appointment booking
- Virtual consultations
- Imaging and Visual diagnostics
- Patient file storage
- Patient accounts, and
- Drug dispensing

5.4.3 Partnership with Existing Digital Health Start-Ups

Key Focus: This arrangement seeks to encourage Dutch investments in successful digital health companies in Nigeria.

Refer to the case study detailed in Table 8, Section 3.4.5. Dutch telemedicine firms may want to also position as backend service providers to these businesses. Cost implications and potential returns depend largely on the context of potential agreements that can be reached.

5.5 **Case Study 5:** Medical Equipment Leasing & Maintenance

Baseline Situation:

- The outbreak of the COVID-19 pandemic has highlighted the importance of having a sustainable and technologically advanced health care infrastructure.
- Post pandemic, the health sector has witnessed an exponential rise in the demand for high-tech medical technology. More customers are becoming health conscious and seeking advanced diagnostics and pre-emptive medical treatments.
- Obsolete equipment can significantly hamper productivity and impede the revenue-generating capacity of any business, and health care centers are no exception.

- In Nigeria, the average healthcare business is highly cost sensitive. Procuring new medical equipment is usually a challenge as most health facilities prefer to deploy their operating income than taking loans. As a result, refurbished and/or fairly used medical equipment is receiving high patronage.

Opportunity:

- Equipment leasing is a lucrative option to invest prudently in state-of-the-art equipment and enhance productivity and efficiency of health facilities without affecting their capital reserves
- Leasing equipment is an effective tool to adapt to changing market conditions with an edge over the competition
- Demand for medical equipment lease is on an upward swing in Nigeria
- Leasing also provides room for outsourced maintenance services which will also serve as an additional income stream

Entry Strategy:

- Equipment Leasing is an agreement between the lessor (OEM) and lessee (health facility) wherein the lessor allows the lessee to utilize equipment for a specified period in exchange for lease rentals.
- Leasing companies can finance expensive medical equipment like MRI machines, X-Ray machines, ventilators without investing large sums of capital upfront. The equipment obtained can be returned to the lessor or purchased at the prevailing market price at the end of the lease tenure.
- For the purpose of this business case, Dutch OEMs can enter into partnership arrangements with governments (National / Sub-national), medical equipment distributors, and private health facilities to position as their preferred equipment lessors

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	Lack of capacity of the lessee to honor the lease agreement	▪ Conduct a due diligence (DD) on commercial performance capabilities of the lessee ▪ The Lease Agreement must be anchored on the DD Outcome ▪ If possible, certain securities should be in place as a guarantee

5.6 Case Study 6: Domesticated Vaccine Production

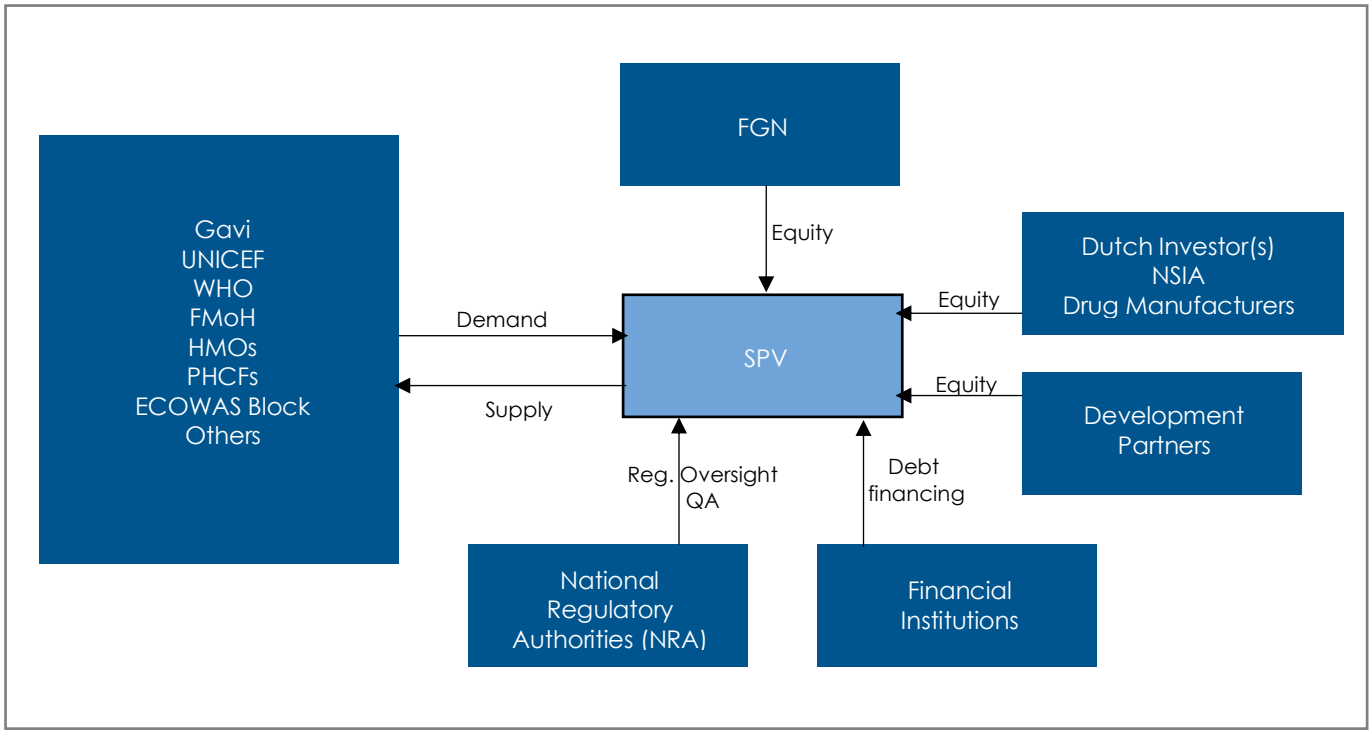
Baseline Situation:

- Nigeria does not produce the legacy DTP3 and COVID-19 vaccines (Vx) locally
- Africa's Vx market is projected to grow at a rate of 6% to 15% annually from 2020 to 2030
- The Vx market value is expected to trend as follows[14]:
  - Legacy Vx routine: US$0.6 – 1.3 billion in 2030 up from US$0.5 billion in 2020
  - Expanding Vx routine: US$1.7 – 2.6 billion in 2030 from US$0.8 billion in 2020
  - Novel Vx routine: US$0.1 – 1.2 billion in 2030
  - Number of Vx doses is projected from 1 billion units in 2020 to 1.2-1.4 billion units in 2030
  - Weighted average price per dose across product categories is projected to increase from US$1.2 to US$2-3.9
    - ✓ In ECOWAS, average price stood at US$0.9 per dose in 2019

Opportunity:

- There is a push for the domestication of vaccine production in-country
- The FGN is open to partnerships and investments that will help realize this goal
- Availability of ready market, see Fig. 29 and Table 9, Section 3.4.7

Fig. 29: Operating Framework for PPP Model



14. Reference: UK Aid

Entry Strategy:

- Entry can be secured via a PPP arrangement as detailed in Fig. 29
- The SPV to be set-up will oversee production, supply chain, and transaction management and reporting
- Table 16 provides insight into the various operating model options to be considered alongside corresponding risk levels

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	High-cost exposure	▪ Forge a partnership agreement to set up an SPV for risk sharing with other interested parties as indicated in Fig. 29
2.	Possible low return on investment	▪ Consider the risk levels associated with the 5 possible investment models in Table 16 ▪ Dutch Investor to conduct own risk tolerance assessment viz-a-viz NPV, IRR, Investment size numbers provided in Table 16 ▪ Conduct own parallel market due diligence and business modeling to guide investment decision ▪ Assess strength of market demand for variety of vaccine needs and concentrate on area(s) of own competencies leveraging Fig. 29

- The 5 model options described in Table 16 have the capacity of yielding an IRR of between 25%-40% and a positive NPV – an indication of the viability of the Vx production case
- The NPV provides insight into the discounted cashflow of each model net of the investment capital outlay
- Required start-up capital varies according to adopted production model and same applies to duration for set-up

	Model Reference		Investment Opportunity	*Description	Initial High Level Evaluation of Economics				
					IRR (Pre-tax), %	Investment Size per facility ($'m)	NPV (not risk adjusted, 10 yrs.), $'m	Risk level ○ Low ● High	Timeframe for setting up
Short term	1.	Downstream model with pack/label only	**Greenfield:** Setup a product agnostic packaging facility	▪ Facility imports unlabeled/labeled filled vaccines (e.g., vials, syringes) from MNCs/DCVMs and handles labelling, packaging and distribution of several finished product with capacity of >60 mn doses p.a. ▪ Secondary packaging materials sourced locally, competitively priced ▪ Facility has strong local ties with distributors and regulators	30 - 35	50	50 - 60		4 years
	2.	Downstream model with fill/finish and packaging/labelling	**Brownfield:** Expansion of downstream capacity (F/F, VI and P/L) of existing manufacturers	▪ Reverse integration of packaging and labeling activities towards Fill and Finish using existing vaccine or mAbs manufacturers capacity of >60 mn doses p.a. ▪ Brownfield expansion of facility that is focused on downstream steps for routine immunization products or has sterile filling capabilities for non-Vx products (e.g., due to mAbs production)	25 - 30	80	40 - 50		4-6 years
	3.	Routine model with full domestic production	**Brownfield:** Expand existing downstream capacity to include end-to-end value chain production (incl. drug substance production)	▪ Expansion of existing facility to include domestic drug substance production capabilities with aspiration to setup large-scale, end-to-end plant (e.g., >60mn doses p.a.) that achieves cost competitiveness for routine products ▪ Significant additional CAPEX required for drug substance production (Bioreactors and purification line) as well as need for additional skilled employees (e.g., microbiologists etc.)	25 - 30	190	90 - 120		5–10 years
	4.	Leapfrog model with full domestic Production	**Greenfield:** Establish new site producing end-to-end product(s) leveraging novel	▪ Smaller footprint facility producing products on novel vaccine technology using (e.g., mRNA, DNA) that requires lower CAPEX investment for drug substance production due to process efficiency of novel	30 - 40	190	170-210		5-10years

Table 16: Operating Model Options & Investment Evaluation

	Model Reference		Investment Opportunity	*Description	Initial High Level Evaluation of Economics				
					IRR (Pre-tax), %	Investment Size per facility ($'m)	NPV (not risk adjusted, 10 yrs.), $'m	Risk level ○ Low ● High	Timeframe for setting up
			platform technology (e.g., mRNA)	technologies (e.g., smaller bioreactors) capacity of >60 mn doses p.a. ▪ Highly-skilled labor necessary given novel, complex technologies (e.g., mRNA, DNA)					
Long terms	5.	Addition of small-scale Outbreak model to full domestic Production	**Brownfield:** Expansion of existing manufacturers to incorporate outbreak products into existing plants (incremental investment)	▪ Introduce additional production line to existing facility that focuses on outbreak products (e.g., Ebola) for stockpile production with capacity of >0.5 mn doses p.a. Possibility to further ramp-up production quickly if necessary. ▪ Upskilling and training of labor required to manufacture novel products / work across products. Ideally developed alongside manufacturers with existing production on same platform technology as the outbreak product	20 - 25	25	10-15	Add-on to existing Vx production	5-10years

*Scale of plant was set to 60 million doses p.a. to be in a competitive range to current market prices for Vx
SOURCE: UKAID Research

5.7 **Case Study 7:** Pharmaceutical Import Opportunity

Baseline Situation:

- See Section 3.4.7 and Fig. 20 for detailed baseline situation

Opportunity:

- The Nigerian pharma is largely import dependent to meet growing local demands
- Analysis of Nigeria pharma Import-Export data from 2009 to 2020 revealed that the ratio of import to export values averaged 99:1
- Dutch pharma manufacturers can leverage this gap in the market, helping to bridge local shortfall in supplies through the import window

Entry Strategy:

- Partnership with any of the over 5,700 licensed local distributors in Nigeria (see Fig. 20, Section 3.4.7)
- The partner distributor(s) must be such that they have significant nationwide footprint
- This partnership must be in alignment with the legal requirements of national regulatory authorities, particularly NAFDAC, and SON

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	Impact of activities of competitors particularly those from India and China	▪ Forge workable agreements with a select sub-set of the 5,795 licensed pharma distributors in Nigeria o Preference should be for those of them with a wide national coverage o See Fig. 20, Section 3.4.7 for more details
2.	Potential regulatory sanctions, and, by extension, brand damage	▪ Work with local partners and regulatory authorities such as the National Agency for Food and Drug Administration and Control (NAFDAC) and Standard Organization of Nigeria (SON) to stay abreast of latest regulatory guidelines and/or restrictions as well as potential penalties
3.	Drug counterfeiting	▪ Work with local partners and regulators on measures for identifying counterfeited versions of Dutch pharma products including sensitization and advocacies
4.	FX Risk exposure of local importers	▪ Discuss and agree on FX Risk hedging measures as appropriate.

5.8 **Case Study 8:** Turnkey Health Infrastructure Advisory Opportunities

The business case opportunity in this section draws largely from Section 4.2.2, Table 14 of this report. The ICRC's PPP pipeline health infrastructure projects identified are large ticket transactions that Dutch turnkey infrastructure advisory firms, such as AMPC International Consultants, and EPCs can position to explore as the opportunities are largely at the Outline Business Case (OBC) stage.

Baseline Situation:

- See Section 4 of this report

Opportunity:

- See Section 4.2.2 and Table 14
- Turnkey Advisory Services, OEMs, and EPC bids will be needed to achieve FBC and eventually secure contract for project execution

Entry Strategy:

- Dutch turnkey infrastructure advisory firms, OEMs, and EPCs need to forge a working partnership with the originating MDA, in this case the FMoH, and the ICRC
- This will enable them gain entry into the PPP process loop from Phase 4, see Fig. 30 i.e., the bidding component of the process
- By the end of Phase 6, chances are that they can emerge as the preferred bidder (should they position as a consortium)
- In Phase 7, the Dutch consortium's bid will be used to develop a full business case (FBC) and when approved by FEC, contract can then be awarded for them to execute the turnkey project

NOTE: As earlier identified in Fig.4, Section 1.1 of this report, Dutch OEMs needs to ensure that they get as much of their medical equipment offerings registered with the FGN to fully explore turnkey opportunities such as those listed in Tables 14 and 17.

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	Potential barrier to entry	▪ Dutch firms to consider understudying the ICRC Manual to have a clear contextual knowledge of the processes of PPP transactions at the federal and state levels ▪ Enter into a mutually beneficial MoU with the FMoH, relevant Departments & Agencies, and ICRC on health-related PPP projects
2.	PPP Projects not being viable	▪ Dutch firms to conduct a robust due diligence, and viability assessment of PPP prospects before putting forward bids or expression of interest

Fig. 30: ICRC PPP Process Framework

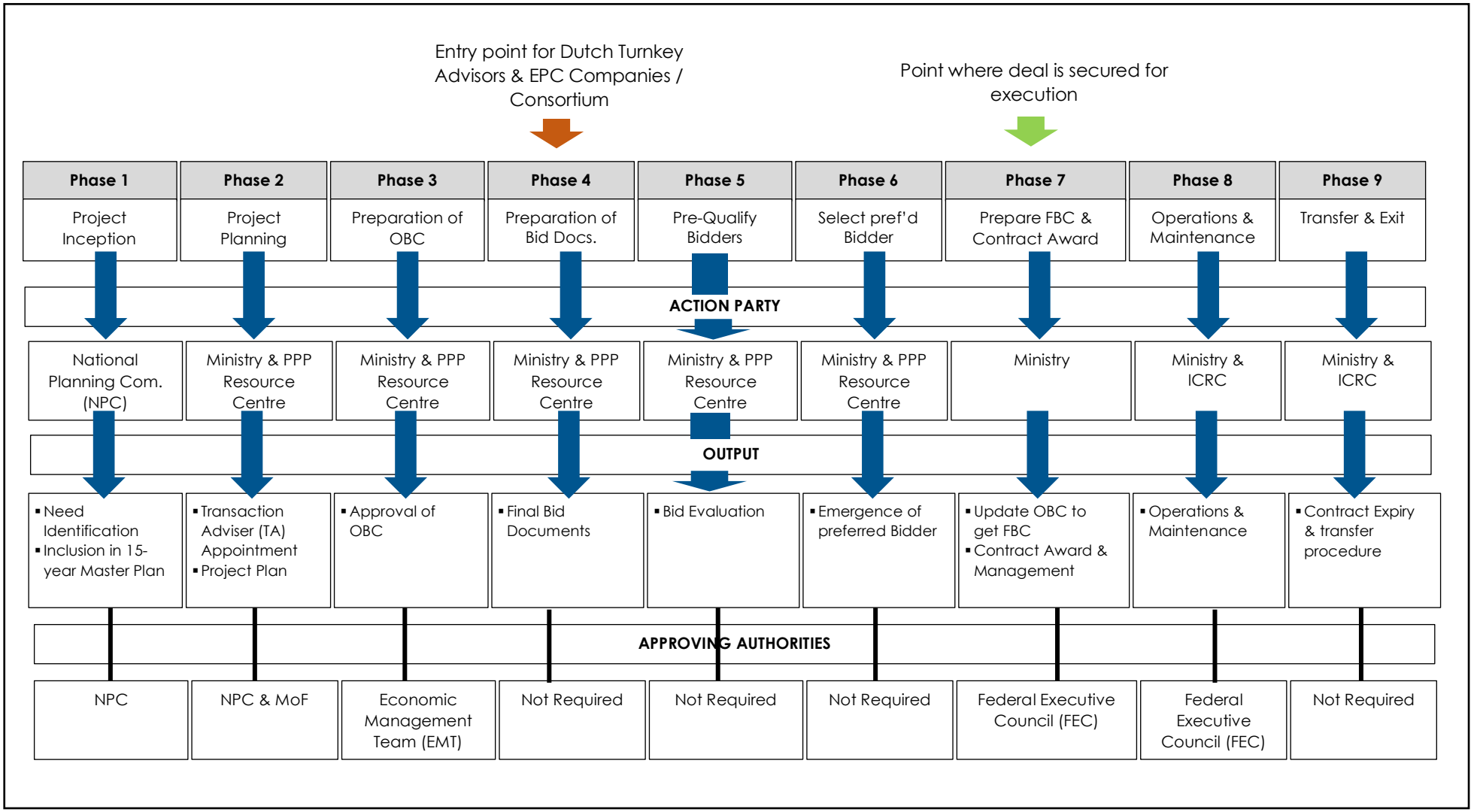


Table 17: Dutch Infrastructure Turnkey Advisory & EPC PPP Opportunity Capture

S/N	MDA	PROJECT	ESTIMATED PROJECT COST	PHASE	ASSUMED CAPTURED VALUE FOR DUTCH CONSORTIUM
1.	FMoH	Upgrade of the 3rd Phase of Teaching Hospital Rehabilitation Project: The contracts for rehabilitation and modernization of select Federal Teaching Hospitals (8 in Phase 1 and 6 in Phase 2) were awarded in November 2002 and September 2006 respectively to VAMED Engineering Ltd and a Presidential Project Implementation Committee was set up to monitor proper and timely execution of the projects. The remaining 7 Teaching Hospitals were supposed to be rehabilitated and modernized through PPP and a Technical Working Group (TWG) with membership drawn from FMoH, NSIA, ICRC, and 4 members from the private sector was set up to deliberate and agree with VAMED /CPL Group on the most suitable PPP model to be adopted for Phase 3.	NGN924.614 billion	Procurement Re-issue OBC Certificate of compliance	▪ Dutch consortium may want to position to explore opportunities in Phase 3 of the project ▪ A conservative Value capture of say 15% of the project cost yields about NGN138.69 billion (i.e., $332.86 million)
2.	FMoH	Establishment of Anti-Snake Venom Production Facility in Nigeria through PPP	NGN6.157 billion US$13.1 million	Development to re-submit OBC	▪ This prospect is an opportunity worth considering
3.	FMoH	Radiotherapy & Oncology Centre and Operation of Oxygen Gas Plant at Aminu Kano Teaching Hospital, Kano	NGN150.7 million	Development to re-submit OBC	▪ Dutch OEMs & Turnkey Solution Advisors can position to capture this prospect ▪ Transaction in US$: $361,680

S/N	MDA	PROJECT	ESTIMATED PROJECT COST	PHASE	ASSUMED CAPTURED VALUE FOR DUTCH CONSORTIUM
4.	FMoH	Abuja Healthcare City Project	US$102 million Phase 1	Development to re-submit OBC	▪ Dutch consortium may want to position to explore this opportunity
5	FMoH	National Orthopedic Hospital, Enugu	NGN900 billion	Development to re-submit OBC	▪ Dutch consortium may want to position to explore opportunity ▪ Transaction size in US$: $2.16 billion
6.	FMoH	Development of Advanced Surgery Centers in Nigeria Government Hospitals: The FMoH submitted an unsolicited proposal developed by LAANJ International Ltd, requesting the FGN to allocate specific departments in three (3) Nigerian Public Hospitals, one each in Abuja, Jos, and Port Harcourt, where they can bring in experts from India at intervals to perform advanced surgeries. The proposal aimed to be established as an Operation and Management (O&M) PPP model	NGN200 million	Development to re-submit OBC	▪ N/A

5.9 **Case Study 9:** Local Production of LLINs

LLINs refer to Long-lasting Insecticide-treated Nets. An intervention product deployed for the control of the spread and impact of malaria particularly in the tropics. The situational analysis conducted indicates that the local production of LLINs in Nigeria is a promising venture with capacity to generate attractive investment outcomes. Besides, the market fundamentals particularly the population at risk and government policies are in strong support of this opportunity.

Baseline Situation

- Population at risk of malaria in Nigeria – 100%[14]
  - 76% of the population live in high transmission areas while 24% of the population live in low transmission areas
  - According to the 2020 World Malaria Report, Nigeria had the highest number of global malaria cases (27%) in 2019 and accounted for the highest number of deaths (23% of global malaria deaths)
  - Case numbers increased 3.5% between 2016 and 2019, from 293 to 303 per 1000 of the population at risk
  - Deaths fell 16%, however, from 0.57 to 0.47 per 1000 of the population at risk during that same period
  - Microscopy data from the 2018 Nigeria Demographic and Health Survey (NDHS) show that the prevalence of malaria parasitemia in children under five years of age is 23% (a decrease from 27% in 2015 and 42% in 2010)
  - The 2018 NDHS also indicated that 43% of the population slept under an insecticide-treated net (ITN) the previous night
  - The FGN has secured credits from three multilateral banks (the World Bank, African Development Bank, and Islamic Development Bank) totaling $364 million to fund health sector interventions in 13 states of the Federation for five years (2020–2024) for malaria

- UNICEF LLIN Supply data
  - 80%-90% of LLINs procured and distributed goes to sub-Saharan Africa (SSA)
  - There appear to be no LLIN manufacturer locally in Nigeria that is patronized by the likes of UNICEF
  - UNICEF signed a long-term agreement (LTA) with A-to-Z Textile Mills of Tanzania. No Nigerian firm has an LTA with UNICEF on LLINs
  - Major LLIN Manufacturers having LTAs with UNICEF, 2019-2020, are from USA, China, Germany, Dubai, Tanzania, India, Japan, and Switzerland. No Dutch firm has such LTA arrangement with UNICEF
  - Weighted Average Pricing per net
    - ✓ The WAP per LLIN secured by UNICEF declined by 31% over 4 years from $2.90 in 2014 to $1.81 in 2018, and $1.88 in 2019
    - ✓ The WAP UNICEF secured for piperonyl butoxides (PBOs) also saw a reduction by 50% from $5.00 in 2016 to $2.50 in 2019

14. This is based on data published on severemalaria.org

Opportunity:

- The need for domesticated capacity to manufacture LLINs in Nigeria
- Potential access to portions of the US$384 million dollars multilateral funding secured by the FGN to fight malaria
- Access to Africa's largest market as far as malaria control is concerned

Entry Strategy:

- **Greenfield Option:** Dutch manufacturers may want to consider coming into the market as a greenfield serving both Nigeria and other countries in the ECOWAS block
- **Brownfield Option:** Dutch Investors or manufacturers may want to consider partnering any of the local pharma / textile manufacturing companies for local production of the LLINs
- **Distributorship:** Dutch manufacturers may want to consider identifying leading private distributors for in-country distribution of LLINs to hospitals / clinics in Nigeria while production takes place in the Netherlands
- **Partnership with Development Institutions:** Dutch LLIN manufacturers can also consider signing up an LTA with development institutions such as UNICEF, WHO, BMGF, and even the FMoH for the production and/or distribution of LLINs in Nigeria leveraging any of the three models earlier described

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	Absence of ready market locally	▪ Explore partnership with the FMoH and development institutions to domesticate production and service local market ▪ Sign-up of LTAs to access a decent portion of the US$384 million fund for tackling malaria in Nigeria
2.	Potential distribution and logistics challenges	▪ Appraise the supply chain system for LLINs in Nigeria ▪ Identify and partner with local supply chain firms to push the product across all the 36 States of the federation

5.10 **Case Study 10:** Cold Chain Storage & Logistics

In Section 5.6, a case was made for the domestication of local production of vaccines in Nigeria. Complementary to such an opportunity is the need to ensure the optimal storage, and delivery of vaccines and other biological products to the final consumer in a manner that preserves their potency and ensures a high positive impact of such commodities on the wellbeing of target consumers.

According to UNICEF, it takes a chain of precisely coordinated events in temperature-controlled environments to store, manage and transport these life-saving products. This is called a cold chain.

Baseline Situation

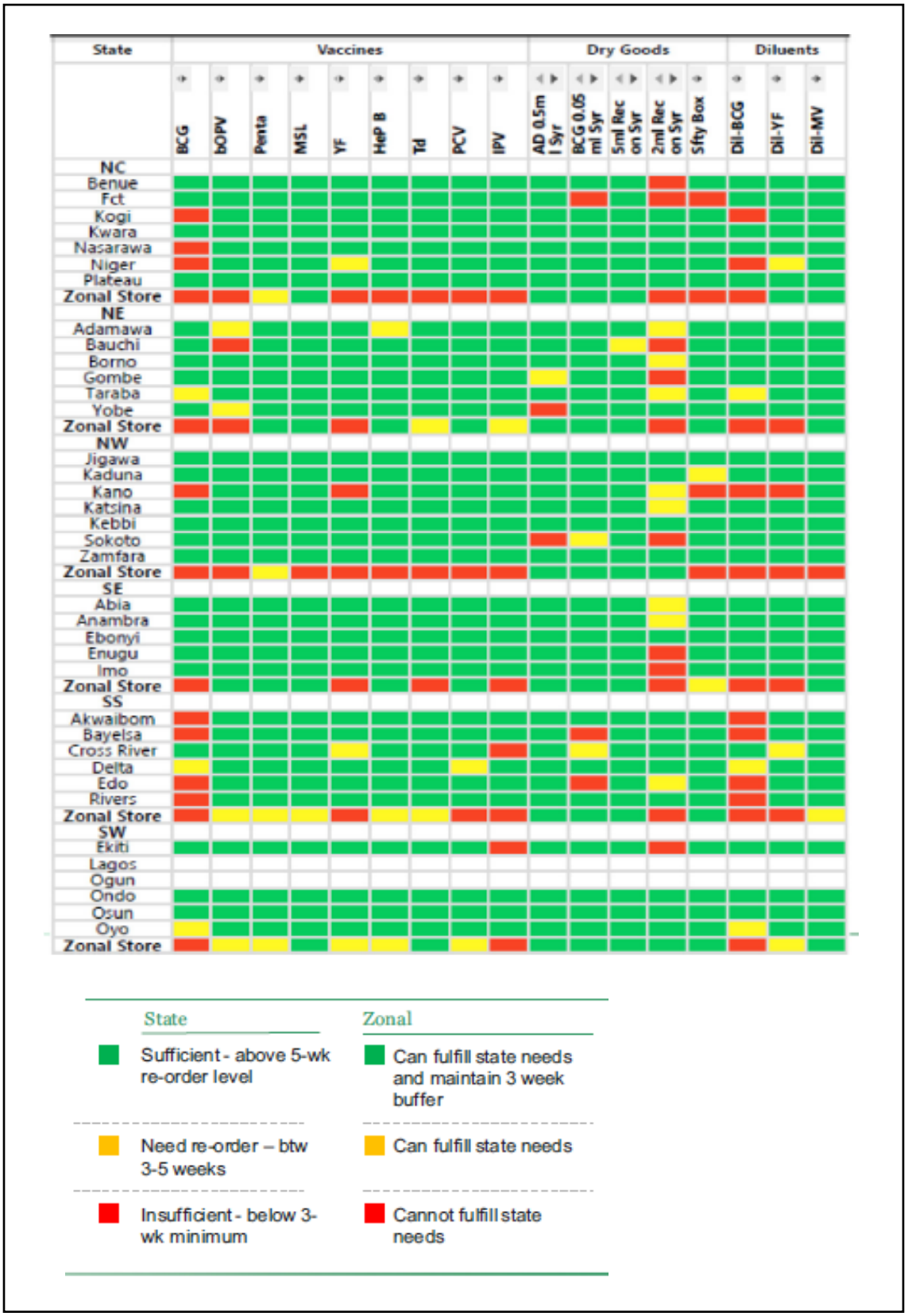
- Nigeria loses at least NGN3.7 trillion [$8.8 billion] to food wastage and poor cold chain logistics yearly according to the Chairman, Governing Council of the Nigerian Institute of Transport Technology (NITT)
- Nigeria's historic cold chain system consist of five administrative levels:
  - A National Strategic Cold Store - the first storage location for all vaccines in country
  - This in turn supplies six (6) zonal stores, located in each of Nigeria's six geopolitical zones
  - Each Zonal store then supplies six states within its zones
  - Historically, LGA stores collect their vaccines from their state store.
  - While PHCs collect their vaccines from their respective LGA store
- Key immunization indicators impacted, in part, by the state of cold chain logistic delivery and storage of vaccines and available manpower capacity, according to Gavi:
  - DTP1 coverage at the national level (2021): 70%
  - DTP3 coverage at the national level (2021): 56%
  - MCV1 coverage at the national level (2021): 59%
  - Drop out from DTP1 to DTP3 at national level (2021): 14%
  - Geographic equity: Drop out from DTP1 to last routine dose of MCV at national level (2021): 49%

Opportunity[15]

- For a country of Nigeria's size, there is need to equip over 9,565 primary health care centers with working cold chain equipment to ensure one equipped facility in every ward
- While progress has been made, there is still a cold chain equipment (CCE) gap of 3,225 and direct deliveries are only happening in 5 out of 36 States including the Federal Capital Territory (FCT)
- At the national and zonal levels, more than twice of 2016's capacity is estimated to meet 2020 storage needs (i.e., 2016 capacity of 201 m^3 for positive net storage versus 672 m^3 needed for 2020, representing a storage gap of 471 m^3).

15. Reference: "Transforming vaccines supply chains in Nigeria", 2016 by David Sarley, Jide Idris, Peter Okebukola, et al

Fig. 31: NPHCDA National Vaccines Dashboard on October 21, 2016



SOURCE: NPHCDA

Entry Strategy:

- Interface with the NPHCDA and the State Primary Healthcare Development Agencies (SPHCDAs) to identify existing storage and logistics gaps
- Sign-up a working agreement with the aforementioned agencies for possible provision of expertise e.g., sale and/or outsourcing of warehouses, CCEs, and training of healthcare workers on the handling of stored vaccines and other biological products

Risk Management

S/N	POSSIBLE RISK	MITIGATION
1.	Challenges with market penetration	▪ Explore partnership with NPHCDA, and SPHCDAs ▪ Position as a certified Cold Storage logistics and service provider with UNICEF and other multilateral agencies involved in procurement and distribution of vaccines to target locations in Nigeria

6. Conclusion

The Nigerian health market may be described as largely disjointed, under-developed and in urgent need of partnerships. The identified gaps and challenges in the market offer a huge opportunity for investments with prospects for decent returns. This is however dependent on having a clear understanding of the market landscape, inherent opportunities and associated risks, appreciation of relevant government policies, and engagement of key stakeholders – which this market study report has tried to provide deep insights into.

Available market data[16] indicates that demand for healthcare services in Nigeria is expected to grow, over a 5-year period, from US$15 billion in 2018 to over US$18 billion in 2023. The nation's young population (206 million people with a median age 18 years) is a major attraction for investments and is projected to more than double by 2050 – this is expected to trigger a significant increase in demand for healthcare services in the foreseeable future.

As a result, it is safe to posit that the outcomes of this study will be of immense benefit to would-be investors in terms of how they position to harness the opportunities the market has to offer.

Diligent efforts have been made to assess the health market ecosystem on a component-by-component basis – providing detailed baseline information, identifying opportunities and risks, recommending strategic market entry approach as well as projecting the possible values derivable from investing in the market as per select business cases.

It is important to mention that the key findings of this Market Study were duly reviewed and validated by industry leaders at a Validation Workshop conducted to secure the buy-in of stakeholders in the Nigerian healthcare market (see Appendix 4). The stakeholders also provided insights into additional focus areas for investments and possible government intervention as a means of improving the lot of the market.

It is hoped that the key market information provided in this report alongside the Case Studies will trigger the influx of investments that will improve the fortune of the Nigerian health market, and, by extension, the health indices of the people.

Leveraging the optimism and commitments expressed by representatives of the Federal Ministry of Health, the NHIA, and other senior government functionaries that participated in the workshop for this study, it is expected that investment friendly policies, and engagements that allow for an expanded private sector[17] involvement in policy formulation, will be generated going forward.

16. Reference: https://2016.export.gov/industry/health/eg_main_130219.asp
17. The private health sector accounts for about 60% of healthcare delivery in Nigeria.

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Appendix

Appendix 1: Dutch OEMs Registered with FGN for Tertiary Care Supply Projects

S/N	MEDICAL EQUIPMENT CLASS	MEDICAL EQUIPMENT DESCRIPTION (SUB-CLASSES)		DUTCH FOOTPRINT	REGISTERED DUTCH FIRM
1	HOSPITAL FURNITURE	1.1	Examination Room Furniture	X	
		1.2	Patient Handling	X	
		1.3	Ward Furniture	X	
		1.4	ICU Beds	X	
2	OPERATION THEATRE EQUIPMENT	2.1	Operations Table	X	
		2.2	Anesthetic Machines	X	
		2.3	Electrosurgical Machines	X	
		2.4	Operation Lamps	X	
		2.5	Surgical Microscopes	X	
		2.6	Surgical Suction	X	
3	STAINLESS STEEL TROLLEYS & HOLLOW WARES	3.1	Medical Trolleys (Medication, Instrument, Dressing, Mayo Table, Instrument Cupboards, Drug Cupboards)	X	
4	SURGICAL INSTRUMENTS	4.1	Surgical Instruments	X	
5	MEDICAL DIAGNOSTICS	5.1	Ophthalmoscopes, Otoscopes, Diagnostic sets, Laryngoscopes, Anoscopes, Proctoscopes, Laryngoscopes	X	
		5.2	Sphygmomanometers, Stethoscopes	X	
		5.3	Cardiac Care	X	
		5.3.1	Cardiac Monitors	X	
		5.3.1.1	ECG Machines	X	
		5.3.1.2	Holter System	X	
		5.4	Pulmonary Care	X	
		5.4.1	Nebulizers	X	
		5.4.2	Spirometers	X	
		5.4.3	Oxygen Concentrators	X	
6	ACUTE CARE	6.1	Patient Monitors & Monitoring Stations	X	
		6.2	Defibrillators	X	
		6.3	Pulse Oximeters	√	Philips Medical
		6.4	ICU Ventilators	X	
		6.5	Infusion Pumps, Syringe Pumps, Feeding Pumps & Infusion Warmers Pumps	X	
		6.5.1	Pump	X	
		6.5.2	Warmers	X	
		6.5.3	Renal Dialysis	X	
7	OBSTETRIC & GYNAECOLOGY	7.1	Maternal & Fetal Monitors	X	
		7.2	Birthing/Delivery Beds	X	
		7.3	Colposcopes	X	
		7.4	Suction/Evacuation	X	
8	MEDICAL IMAGING	8.1	Computed Tomography	√	Philips Medical
		8.2	X-Ray	X	
		8.3	Mobile C-Arm	√	Philips Medical
		8.4	Mammography	X	
		8.5	Ultrasonography	√	Philips Medical
		8.6	MRI	√	Philips Medical
9	NEONATAL CARE (SBCU)	9.1	Open Care	X	

S/N	MEDICAL EQUIPMENT CLASS	MEDICAL EQUIPMENT DESCRIPTION (SUB-CLASSES)		DUTCH FOOTPRINT	REGISTERED DUTCH FIRM
		9.2	Close Care	X	
		9.3	Ventilation	X	
		9.4	Warming & Phototherapy	X	
10	OPHTHALMIC	10.1	Diagnostics	X	
		10.2	Keratometers/Refractometers	X	
		10.3	Slit Lamps	X	
		10.4	Yag Laser System	X	
		10.5	Phacoemulsification	X	
		10.6	Lensometers	X	
		10.7	Vision Testing	X	
		10.8	Ophthalmic Operation Microscopes & Loupes	X	
		10.9	Lens Making & Finishing	X	
11	DENTAL EQUIPMENT	11.1	Dental Therapy & Orthodontics	X	
		11.1.1	Dental Operatories & Orthodontic Chairs	X	
		11.1.2	Handpieces & Other Small Instruments	X	
		11.1.3	Dental Laboratory	X	
		11.1.4	Dental X-Ray & Imaging	X	
		11.1.4.1	Intraoral X-Ray, Panoramic & Pancephalic X-Ray Systems	X	
		11.1.4.2	Intraoral Camera	X	
		11.1.4.3	Film Processors	X	
		11.1.4.4	Dental Instruments Including Burrs, Surgical Instruments	X	
		11.2	Autoclaves & Ultrasonic Cleaners	X	
12	ENT	12.1	Diagnostics	X	
		12.1.1	Audiometers, Tympanometers, Auroscope, Acoustic Hood	X	
		12.1.2	Laryngoscope	√	Entermed, Hauten
		12.1.3	Fiber Bronchoscope	√	Entermed, Hauten
		12.1.4	Nasophayrangoscope	√	Entermed, Hauten
		12.1.5	Oesophagoscope	√	Entermed, Hauten
		12.2	Treatment		
		12.2.1	Treatment Units	√	Entermed, Hauten
		12.2.2	Operating Microscopes	X	
		12.2.3	Loupes & Head Sets	X	
		12.2.4	Surgical Instruments	√	Entermed, Hauten
13	PHYSIOTHERAPY AND PHYSICAL REHABILITATION	13.1	Physiotherapy & Physical Rehabilitation	√	Enraf Nonius
14	NEUROLOGY AND NEUROSURGERY	14.1	Neurological Monitoring and Diagnosis	X	
		14.1.1	EEG, Evoked Potential, EMG (stand-alone)	X	
		14.1.2	Electroconvulsive Therapy	X	
15	ORTHOPAEDICS	15.1	Trauma Instruments	X	
		15.2	Trauma Implants	X	
16	ENDOSCOPY	16.1	Rigid	X	
		16.2	Orthopedic Endoscopy (Arthroscopy)	X	
		16.3	Flexible and Videoscopes	X	
17	LABORATORY	17.1	Histopathology, Histology, Cytology	X	
		17.2	Chemistry & Hematology	X	
		17.2.1	Hematology Analyzers	X	
		17.2.2	Coagulation Analyzers	X	
		17.2.3	Spectrophotometers & Colorimeters	X	
		17.2.4	Elisaplate Systems	X	

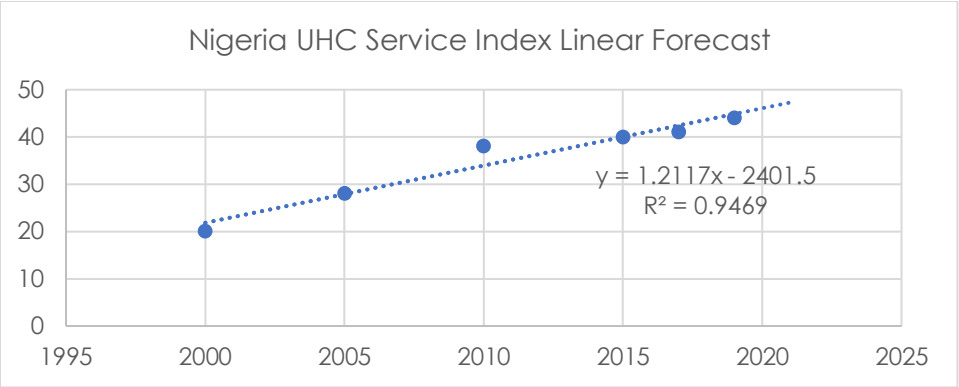
S/N	MEDICAL EQUIPMENT CLASS	MEDICAL EQUIPMENT DESCRIPTION (SUB-CLASSES)		DUTCH FOOTPRINT	REGISTERED DUTCH FIRM
		17.2.4.1	Washers	X	
		17.2.4.2	Readers	X	
		17.2.4.3	Shakers	√	Sanyo Medical
		17.2.5	Chemistry Analyzers	X	
		17.2.6	Blood Gas Analyzers	X	
		17.3	Microscopy	X	
		17.4	Material Handling	X	
		17.4.1	Micro Pipettes	X	
		17.4.2	Anaerobic Chambers	X	
		17.4.3	Centrifuges	X	
		17.4.4	Shakers	√	Sanyo Medical
		17.5	Safety	X	
		17.5.1	Fume Cupboards	X	
		17.5.2	Class II Laminar Flow Chambers	X	
		17.6	Incubators, Ovens, Water Baths	√	Sanyo Medical
		17.7	Scales/Balances	X	
		17.8	Point Of Care	X	
		17.9	Immunoassay	X	
		17.10	Electrophoresis	X	
18	STERILISATION & DISINFECTION	18.1	Autoclaves	√	Sanyo Medical
		18.2	Ultrasonic Cleaners	√	Sanyo Medical
		18.3	Incinerators	X	
		18.4	Plasma Sterilizer	X	
		18.5	Steam Sterilizer	X	
		18.6	Disinfector	X	
19	MEDICAL REFRIGERATION	19.1	Blood Bank	√	Sanyo Medical
		19.2	Mortuary	X	
		19.3	Drug Refrigerators	√	Sanyo Medical
20	PATIENT TRANSPORT	20.1	Auto Ambulances	X	
21	ONCOLOGY	21.1	Linear Accelerators	X	

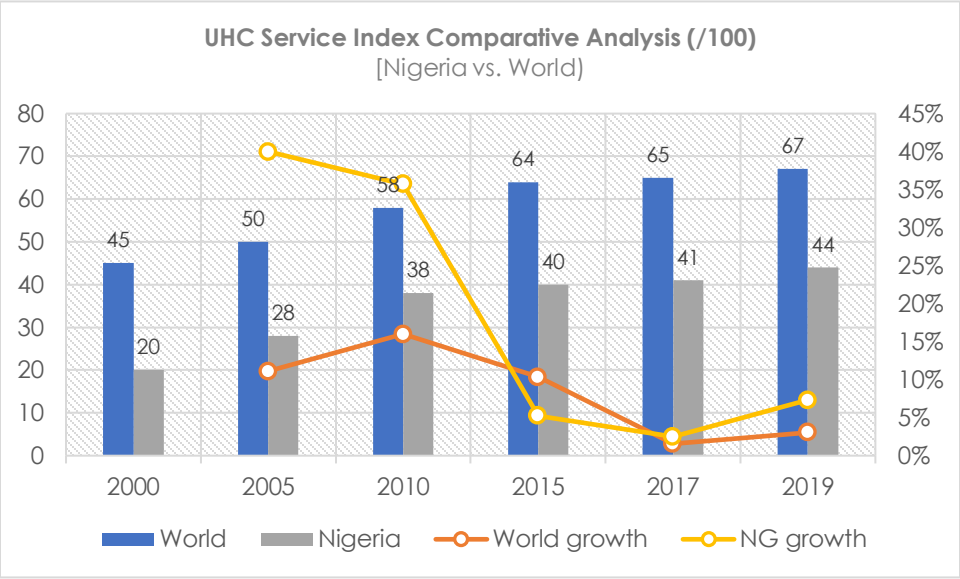
NB: X: Dutch OEMs not registered
√: Dutch OEMs registered

Appendix 2: Nigeria Health Insurance Coverage & UHC Service Index

Population Coverage Category	Projected Coverage Rates (%)									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Children Under 5	5.0%	12.2%	19.4%	26.7%	33.9%	41.1%	48.3%	55.6%	62.8%	70.0%
Pregnant Women	5.0%	12.2%	19.4%	26.7%	33.9%	41.1%	48.3%	55.6%	62.8%	70.0%
Elderly	5.0%	12.2%	19.4%	26.7%	33.9%	41.1%	48.3%	55.6%	62.8%	70.0%
Indigent	5.0%	12.2%	19.4%	26.7%	33.9%	41.1%	48.3%	55.6%	62.8%	70.0%
Non-Vulnerable Informal	5.0%	11.0%	17.0%	23.0%	29.0%	35.0%	41.0%	47.0%	53.0%	59.0%
Formal Public and dependent	68.0%	78.0%	86.0%	93.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Formal Private & dependent	3.0%	16.0%	24.0%	32.0%	40.0%	48.0%	56.0%	64.0%	72.0%	80.0%
Total Coverage	8.8%	16.1%	23.0%	29.9%	36.9%	43.4%	50.1%	56.7%	63.4%	70.2%

SOURCE: National Health Insurance Authority (NHIA), 2021-2030 Strategic Plan





The UHC-SI refers to the average coverage of essential services that include reproductive, maternal, newborn and child health, infectious diseases, NCDs and service capacity and access, among the general and the most disadvantaged population.

- NG UHC-SI Value, 2019: 44
  - ***Indication***: Major challenges remain
  - As a remedy, a good way to start is to enhance the impact of health insurance while reducing OOP as the dominant means of funding access to care by households (see Appendix 6)
- Growth in the Index (2000-2019):
  - Nigeria Avg. (18%)
  - World Avg. (8%)
- UHC-SI for Nigeria projected to hit 58 by 2030 at current rate

Data SOURCE: World Bank. PAF Analysis

Appendix 3: Some Major Medical Equipment Distributors in Nigeria

Link: https://www.pharmaccess.org/files/appendix_3-some_major_medical_equipment_distributors_in_nigeria.pdf

Appendix 4: Nigerian Stakeholder Validation Workshop Outcome (Lagos)

A key requirement for the Nigeria Health Market Study 2.0 exercise is the need to subject the findings of the study to debate and validation of industry stakeholders. The Validation Stakeholder Workshop took place on May 17th, 2022 at the Radisson Blue Hotel, Victoria Island, Lagos.

The session was attended by over 40 participants both in-person and virtually. Among the very important personalities that graced the occasion were the honorable Commissioner for Health, Lagos State, Prof. A. Abayomi; Head Policy, Planning & Int'l Collaboration of the NHIS, Dr. Kurfi Abubakar and his team who flew in from Abuja, amongst other dignitaries.

Outcome Summary: Virtually all the key findings and opportunity for investment recommendations put forward were duly affirmed by stakeholders. They also brought up other associated issues and/or measures for consideration by investors and government. See details in the "Stakeholder Validation Inputs" table attached to this Appendix section.

H.E. Mr. Mitchel Deleen, CG Dutch Consulate, addressing stakeholders at the workshop.

The Hon. Commissioner for Health, Lagos State, Prof. A. Abayomi, addressing stakeholders.

Group Pictures of participating healthcare Stakeholders at the Workshop

STAKEHOLDER VALIDATION INPUTS & RECOMMENDATIONS

Value chain Component	Findings [Baseline Situation & Opportunities]	Identified Business Cases	Validation Comments [Group work at Validation Meeting]
Clinics & Hospitals	Baseline Situation: ▪ There are over 39,000 hospitals and clinics in Nigeria with PHCs accounting for over 85% ▪ About 20% of the PHCs are reportedly said to be functional ▪ Due to this development, ₦1.95 trillion (US$5.4 billion), representing 84% of primary health care expenditures, were spent in non-PHC facilities i.e., Secondary and Tertiary care in 2017 (According to the NHA) Opportunities for Investment: ▪ Nigeria requires 386,000 additional beds and $82 billion of investments in healthcare real estate assets to reach the global average of 2.7 beds per thousand people in 2019. To sustain this ratio however, Nigeria will actually require 646,000 additional beds by end of 2035 ▪ Revitalization of non-functional PHCs across the country: leveraging 2017 revenue performance, this has the capacity of boosting expenditure receipts to US$ 5.54 billion up from US$ 1.1 1 billion	1. Revitalization of Dysfunctional PHCs: Upgrade, equipping, & private sector management of 1,000 moribund PHCs in Nigeria ✓ Projected Investment Size: $42 million ✓ 8.7 million patients by end of year-10 from 370,000 in year-1 ✓ Breakeven period: 3 years ✓ Net ROI: 747% 2. Deployment of Solar Energy Solutions across target PHCs: ✓ Target #PHCs: 2,500 ✓ Projected Net Energy Savings for PHCs: US$2.05 million ✓ Projected Profit Margin for Investors: 25% over a 5-year period	Key findings are indeed valid. The following key points should however be considered among other things – ▪ Advocacy and community buy-in ▪ Manpower and human resource issues in rural areas ▪ Need for local capacity in revitalizing PHCs ▪ Delineate facilities and readiness to show rural and urban spread ▪ PPP Model: Although PPPs are beneficial, Government must run their own facilities properly to drive competition and benchmarking ▪ There is need for the study to reflect efforts of other key stakeholders such as the PSHAN, PAF, and NPHCDA to check duplication of efforts ▪ Private health sector to be involved in policy making for inclusion purposes – since the sector accounts for about 60% share in service delivery ▪ Group practice for physicians should be encouraged ▪ There is need to emphasis the importance of renewable energy at the PHC level
Medical Tourism	Baseline Situation: ▪ Avg. spend per year: US$1.9 billion as of 2019 ▪ No. of medical travels per month: 9,000 ▪ Key destinations: ✓ India (5,000 visitors per month) ✓ Other countries (6,000 per month) ▪ Annual Growth Rate: 20% ▪ Customer Distribution: ✓ Cash paying (75%) ✓ Government paid (15%) ✓ Insurance Company (6%)	▪ Collaboration of Dutch turnkey health infrastructure advisory and EPC firms with FMoH, ICRC, and NSIA on pipeline PPP projects currently at the Outline Business Case (OBC) stage. A couple of them have been identified. E.g.: ✓ Abuja Healthcare City Project ($102 million – Phase 1) ✓ National Orthopedic Hospital, Enugu (NGN900 billion)	Key findings are valid. Kindly consider the following: ▪ Leverage diaspora resources to supplement local capacity ▪ Investment in tele-radiology, telecardiology, etc. ▪ We validate the need for investments for the outlined projects ▪ We believe the projects will help reverse the current rate of brain drain we see in our society

Value chain Component	Findings [Baseline Situation & Opportunities]	Identified Business Cases	Validation Comments [Group work at Validation Meeting]
	✓ Employer paid (4%) ▪ 60% of Nigeria's medical tourism spend goes to four key specialties namely: oncology, orthopedics, nephrology, and cardiology Opportunities for Investment: ▪ COVID-19 restriction on foreign travels for medical care ▪ Domestication of investments to trap medical tourism spend locally ▪ Large turnkey pipeline projects for healthcare led by leading private and Government institutions e.g., the NSIA, Afreximbank, etc. ▪ Growing cases of NCDs e.g., Nigeria projected to account for 40% of cancer cases in Africa	✓ Afreximbank's $300 million Medical Centre of Excellence, Abuja	▪ We believe healthcare delivery as a service is the way out as against outright purchasing of medical equipment
Health Insurance	Baseline Situation: ▪ 5.1% Health Insurance penetration as of 2018 as per Agusto Report ▪ NHIS projected health insurance coverage of 8.8% in 2021 and 70% by the end of 2030 ▪ Average MLR of 86.6% in 2017 as driver for low profitability for private HMOs ▪ Total Private Insurance spending for 2010, 2016, and 2021 were estimated to be US$300 million, US$400 million, and US$500 million respectively (EY / Oxford Economics) Opportunities for Investment: ▪ Digitization of health insurance services ▪ Activation of the National Health Act – BHCPF, etc. ▪ ICT Integration of NHIS processes, 2021-2030	1. ICT Integration of NHIS Processes ✓ Project to span 2021-2030 at a cost of N19.86 billion (i.e., $48 million) ✓ Dutch turnkey ICT firms to position in assisting the NHIS realize its strategic objectives	Key findings are in order. Kindly consider the following: ▪ Strong need to address OOPs by prioritizing health insurance ▪ Advocacy to address unfavorable provisions in the NHIS Law which appears to discourage private sector / HMO involvement ▪ Health Insurance needs to be re-designed to reflect a win-win situation for participating stakeholders ▪ People can be compelled to see the advantage of health insurance through some incentives ▪ Relevant laws need to be upgraded to make health insurance mandatory as against the voluntary option practiced - this will help to improve possible investment business cases
Nigeria Medical Devices Market	Baseline Situation: ▪ About 99% of Nigeria's use of medical devices and equipment are imported from foreign countries	1. Medical Equipment Leasing & Maintenance	▪ Provision of equipment leasing must take into cognizance challenges in the ecosystem ▪ Need for regulation which provides realistic interest rates to players in the industry

Value chain Component	Findings [Baseline Situation & Opportunities]	Identified Business Cases	Validation Comments [Group work at Validation Meeting]
	▪ In 2018, the total medical devices sales figure was about US$134.7 million, up by 10.8% from the NGN 37 billion total sales in 2017 ▪ The market is expected to reach US$201.8 million by 2023 ▪ Over 60% of X-ray equipment in Nigeria are obsolete and age 10 to 60 years Opportunities for Investment: ▪ Digitization of health insurance services	2. Debt financing arrangement for private health facilities i.e., MCF Model	▪ Improved regulation / structuring of the med devices/equipment industry e.g., trade insurance ▪ Provision of Government grants as catalytic funding ▪ Local assembly / production of med devices should be encouraged
Telemedicine & Digital Health Start-ups	Baseline Situation: ▪ HealthTech in Africa projected to be valued at US$11 billion in 2025 ▪ There are an estimated 136 HealthTech start-ups in Nigeria ▪ Of the US$4 billion raised by start-ups in Africa in 2021, Nigerian digital start-ups accounted for US$1.37 billion (34.25%) placing the country as number one on the continent ▪ At the end of Q3 2021, Nigerian HealthTech start-ups raised US$27.3 million in capital next only to financial services firms (US$113 million), and Venture Capitalist firms (US$40.1 million) ▪ Nigeria's Digital Health Index performance as of 2021, on a scale of 1 (lowest) to 5 (highest) – ✓ Standard and Interoperability (1) ✓ Infrastructure (2) ✓ Strategy and Investment (3) ✓ Workforce (2) Opportunities for Investment: ▪ Growing investments needs of digital health start-ups in Nigeria ▪ Need for remote delivery of care ▪ Digital healthcare investments will quicken UHC leveraging improvements recorded in Nigeria's digital economy ▪ Management of health informatics, etc.	1. Development of turnkey telemedicine solutions for Large Health Facility chains 2. Partnership with / investment in successful Digital Health Start-ups 3. Execution of turnkey telemedicine solutions for Government & Development partners – *to ensure access to remote specialist care in rural and difficult to reach areas in the country*	▪ Prioritization of tech that links PHCs to secondary and tertiary facilities to strengthen service delivery ▪ Need to provide investors with guidance on due diligence to ensure transparency in use of seed funds and prevent investor fatigue ▪ Development of "low level" technology for healthcare fit-for-purpose to our environment
Nigeria Pharmaceutical Market	Baseline Situation:	1. Domestication of Vx Production: ✓ Business case focused on the economics of having a plant	▪ Highlight need for value chain efficiency e.g., use of waste from food industries to agro-allied industries

Value chain Component	Findings [Baseline Situation & Opportunities]	Identified Business Cases	Validation Comments [Group work at Validation Meeting]
	▪ Over the counter (OTC) medicines such as analgesics, antimalarials and multivitamins make up a large share of the Nigerian pharma market ▪ PMG-MAN estimated the size of the total pharmaceuticals and healthcare products market to be in excess of US$ 2 billion annually ▪ Nigeria accounts for 60% of the health products consumed in the Economic Community of West African States (ECOWAS) by volume ▪ Local firms rely on imports for 98% of their inputs ▪ From 2009 to 2020, for every $1 pharma export Nigeria made, $99 worth of import is recorded ▪ There are 132 pharmaceutical manufacturers licensed to operate in the country ▪ There are more than 5,795 licensed pharma distributors and vendors in Nigeria with over 1,500 in Lagos alone ▪ COVID-19 and the regular DTP3 Vaccines are not manufactured locally ▪ Gavi's budget for Nigeria, 2001-2023, US$1.09 billion. 93% has been disbursed as of September 2019 ▪ Long-lasting Insecticide treated Nets (LLINs)are mostly shipped into Nigeria from abroad by development partners – 147 million units have been shipped in between 2004 and 2021 Opportunities for Investment: ▪ Domestication of Vaccine (Vx) production ▪ Local manufacturing of LLINS ▪ Partnership for pharma imports	Greenfield / Brownfield, with a capacity of 60 million doses per annum ✓ 5 Business Model options were considered as per UKAID analysis ✓ IRR, Capital Outlay per option, NPV, Risk level, and timelines were considered as well 2. Local Manufacturing of LLINs: ✓ Estimated Investment Size - $6 million ✓ Gross Capacity – over 20 million units ✓ Projected ROI – 1254% ✓ Breakeven Period estimate: 2 years 3. Partnership for Pharma Imports leveraging strong local distribution network and requirements of NAFDAC and SON	▪ Investment in research and development ▪ Adoption of best practices in vaccine and medication production ▪ Revitalization of textile production to contribute towards stimulation of manufacturing of LLINs ▪ If we can focus on the local production of malaria medicines alone, 40% of the market would have been secured

Appendix 5: Ongoing & Proposed Projects in Nigeria Tertiary Health Facilities

<table>
<tr><th>S/N</th><th>TERTIARY HEALTH FACILITY</th><th>STATE</th><th>DESCRIPTION</th><th>ONGOING/PROPOSED PROJECTS</th></tr>
<tr><td>1</td><td>Abubakar Tafawa Balewa University Teaching Hospital</td><td>Bauchi</td><td>No. of Beds: 700
Patient traffic: Avg. 3,400 per week
Bed Occupancy Rate: 72.8%</td><td>i. Construction of nutritional rehabilitation center & post-graduate laboratory
ii. Expansion of male psychiatric ward
iii. Purchase utility vehicles
iv. TB program
v. New Vaccines surveillance (Pediatrics)
vi. Revitalization of HIV program</td></tr>
<tr><td>2</td><td>Federal Teaching Hospital, Gombe</td><td>Gombe</td><td>No. of Beds: 450
Staff Strength: 1,817
• 175 Medical Doctors (including 58 Permanent Consultants)
• 329 Nurses
• 35 Lab Scientists
• 19 Pharmacists
• 8 Physiotherapists
• Others
Bed Occupancy Rate: 90%</td><td>i. Construction of Pediatrics complex
ii. General repairs of the hospital complex
iii. Construction/rehabilitation of road networks within the hospital complex and staff quarters
iv. Construction of Trauma Centre</td></tr>
<tr><td>3</td><td>Jos University Teaching Hospital</td><td>Plateau</td><td>▪ No. of Beds: 500
▪ Bed Occupancy Rate:
<table><tr><th>ACTIVITIES</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>GOPD Visits</td><td>31,614</td><td>33,836</td><td>20271</td><td>25,143</td><td>23,876</td><td>32,202</td><td>28,530</td><td>48,355</td></tr><tr><td>Consultant Clinic Visits</td><td>164,901</td><td>157,628</td><td>108,318</td><td>117,703</td><td>112,690</td><td>162,227</td><td>142,984</td><td>177,115</td></tr><tr><td>Accident & Emergencies</td><td>9,646</td><td>11,885</td><td>8,019</td><td>5,897</td><td>6,785</td><td>7,707</td><td>7,164</td><td>7,153</td></tr><tr><td>In & Out-patient Deaths</td><td>1,023</td><td>978</td><td>702</td><td>643</td><td>564</td><td>625</td><td>792</td><td>1,113</td></tr><tr><td>Patient Admissions (IPD)</td><td>13,382</td><td>14,520</td><td>10,541</td><td>10,469</td><td>9,172</td><td>9,198</td><td>10,349</td><td>14,821</td></tr><tr><td>No. of Deliveries</td><td>4,127</td><td>2,234</td><td>4,799</td><td>2,818</td><td>2,315</td><td>2,014</td><td>2,170</td><td>3,327</td></tr><tr><td>No. of Surgical Operations</td><td>2,760</td><td>1,424</td><td>1,894</td><td>2,408</td><td>1,608</td><td>2,803</td><td>3,130</td><td>4,564</td></tr></table></td><td>Ongoing
i. The setting-up of Orthopedic implant store following MoU with two implant vendors.
ii. Acquisition of Arthroplasty and spine instruments for diversification of procedures.
iii. Strengthening of the drug revolving fund program for efficiency.
iv. Establishment of e-pharmacy platform for improved patient care.
v. Purchase of Utility vehicles.
vi. Completion of Pharmacy complex in the permanent site of the hospital.
vii. Establishment of drug quality control laboratory.
viii. Establishment of Intravenous fluid manufacturing plant.</td></tr>
</table>

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				ix. Increase number of permanent physiotherapists in line with the requirements provided by Medical Rehabilitation Therapist Board of Nigeria (MRTB). x. To Improve clinic and surgical services to our patients and at the same time, open new areas in surgical research. xi. Organize a workshop on cardiopulmonary resuscitation for all hospital staff especially those in the clinical areas. xii. The total renovation/upgrade of the Abuja Guest House. xiii. The provision of washing machines and extractors of JUTH and comprehensive health center at Gindiri. xiv. Organize in-service and on the job training for staff development. xv. Evaluation of out-sourced services will continue to be strengthened through vigorous monitoring and evaluation. xvi. To expand research activities and increase publications. xvii. Demarcation of mini-libraries in all the clinics in-order to maintain short-time appointment case-notes, for possible reduction of patients waiting time in the clinics.
4	University of Calabar Teaching Hospital	Cross River	Built in 1979 No. of Beds: 700 Bed occupancy rate: 75%	i. Upgrade of the hospital records system to an Electronic Medical Records (EMR) system using the health-in a box-initiative. ii. Renovation and remodeling of the Antenatal Clinic and labor ward with ten (10) ensuite delivery suites. iii. Construction work at main theatre suite VI

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				iv. Rehabilitation and remodeling work at Radiology department. v. Construction of secured car park and revamping of existing roads. vi. Construction of Access Road X-ray and Theatre phase II. vii. Refurbishing of 18nos (6000 litres) Braithwaite surface tanks. viii. Completion of House officers' quarters ix. Procurement of 1nos 500KVA generator x. Renovation of UCTH comprehensive health Centre Okoyong xi. Procurement of Medical/Hospital equipment.
5	Federal Teaching Hospital Ido-Ekiti	Ekiti	No. of Beds: 300 25 Clinical departments managed by 78 Consultants 142 Resident doctors 350 Nurses 30 Pharmacists and other health professionals.	**Ongoing** i. Construction of modern adult accident and emergency building ii. Construction of house officers' quarters iii. Upgrading (and staff training) of operating theatre and laboratory equipment iv. Construction of an ultra-modern radio diagnostic center v. Procurement and installation of 6 set of dialysis equipment. vi. Procurement and installation of set of 250kva Perkins diesel generators vii. Procurement of utility and operational vehicles viii. Procurement and installation of medical oxygen gas plant. ix. Renovation of Medical Rehabilitation building, construction of House Officers quarters **Proposed** i. Procurement and installation of surgical equipment

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				ii. Procurement and installation of medical equipment iii. Construction of internal and access road iv. Construction of health information management building v. Construction of works and services department building vi. Provision of reproductive assisted facilities vii. Procurement and installation of radio diagnostic equipment viii. Construction of VIP and amenity wards ix. Construction and installation of medical oxygen plant x. Procurement of operational vehicles and ambulances.
6	Obafemi Awolowo University Teaching Hospital	Osun	Founded in 1975 No. Of Beds: 800	i. Construction of Male and Female Surgical Wards at Wesley Guild Hospital, Ilesha (a unit of the OAUTHC) ii. Furnishing and Equipping of the Dental (Centre) iii. Completion, Furnishing and Equipping of the Cardiac Centre iv. Completion, furnishing and equipping of 75-Bed Orthopedic Ward with One Theatre Suite. v. Construction and Equipping of Theatre Complex at Wesley Guild Hospital, Ilesha vi. Supply of Medical Equipment, drugs and Consumables. vii. Purchase and Installation of 1No.1.5T MRI scanner.
7	University Of Uyo Teaching Hospital	Akwa Ibom	Founded in 1995 No. of Beds: 520	**Ongoing** i. Completion of construction of 2-storey General Outpatient Department ii. Completion of construction of 2-storey Laboratory Building iii. C.T Scan and Accessories Phase II

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				iv. Expansion of water storage capacity to 200,000 liters v. Computerization of Finance/Stores and health record departments. **Proposed** i. Centre of Excellence for Renal disease. The plan is to establish place for Renal Transplant in Nigeria. ii. Transfusion Machine to help in the transfusion of blood and its components. iii. Establishment of in Vitro-Fertilization Centre. iv. Building of Eye Centre/ExxonMobil has also planned to build a trauma center to help in handling surgical emergencies. v. ExxonMobil was assigned a site for construction of Trauma Centre which would assist emergency services in the hospital vi. Establishment of new research Laboratory vii. Equipping of 4 new theatres and Arthroplasty for Hip-replacement within first quarter of 2020. viii. Endoscopy Surgery within the first quarter 2020
8	University College Hospital, Ibadan	Oyo	Founded 1956 No. of Beds: 800	**Ongoing** i. Completion of House Officer residence III(Phase 1) ii. Extension of Emergency clinic (Phase 1) iii. First Phase of establishment of the Bioequivalence study center iv. Procurement and installation of patients lifts with UPS v. Telemedicine inventory implementation at MOP

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				Proposed i. Overhauling of the sewers, water supply reticulation, fittings & installation of accessories for various building within the hospital. ii. Painting the interior of all hospital wards with mosquito repellant paint. iii. NYSC – Construction of medical (service) center 2019 capital project iv. Design and development of procurement and supplier database by the informatics unit of the department. v. Computerization of the suppliers' price list vi. Rehabilitation of critical hardware resources. vii. Modification and maintenance of the theatre pack reporting tool viii. A radical workflow change is being deliberated on to ensure synchronization of the Ledger, bin card, Computer and SIV/SRV in the pharmacy store. ix. A new requisition schedule from the store is to be developed
9	University of Benin Teaching Hospital	Edo	No. of Bed: Average patient visits per annum: 23,500	i. Installation of a linear Accelerator. ii. Installation of computerized Tomography Scan (CT-scan) and Magnetic Resonance Imaging (MRI) machine. iii. Installation of an Oxygen Gas Plant. iv. Installation of Trio-SLT +YAG+Green Laser with delivery systems v. Installation of operating Microscope with binocular indirect Ophthalmo Microscope plus. vi. Full computerization of hospital services (second phase)

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				vii. Installation of Hydro Extracting machine. viii. Construction of proposed office block for Radiology department.
10	Ahmadu Bello University Teaching Hospital	Kaduna	Founded 1967 No. of Beds:	i. Construction of Bunkers for linear and Brachytherapy machines. ii. Supply and installation of a full range of MRI machines in the Radiology department. iii. Establishment of Quality Control Laboratory for Department of Pharmacy. iv. General rehabilitation of the hospital under special intervention by the Federal Government.
11	National Hospital Abuja	FCT	No. of Beds:200	i. Redesign and redevelopment of the hospital website to accommodate new features and be user friendly to patients and relatives ii. The construction of a 200 bedded building is 20% completion based on the released fund. Substructure work is almost 100% completed. iii. The ultra-modern cancer center (phase 11) is 90% completion and to be equipped with state-of the art equipment. iv. Prostate cancer project sponsored by PENCOM is 80% complete. However, the contractor has abandoned the site. v. Networking and computerization of the entire hospital for full implementation of Electronic Medical records System (EMRS) is ongoing.
12	University of Maiduguri Teaching Hospital	Borno	No. of Beds: 630	i. Construction/ Equipping of Trauma center ii. Completion of Radiotherapy center) Construction of Linear Accelerator Bunker and Brachy Room)

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				iii. Procurement of Equipment and Furnishing of Radio therapy Centre iv. Construction/Equipping of GOPD/NHIS & retainership complex v. Construction of child & Adolescent Institute (Blocks A&B) vi. Construction of Two (2) Nos. of One (1) Storey Hostel blocks of 40 rooms each for the schools vii. Furnishing of student hostels viii. University of Maiduguri Teaching Hospital Outreach Centre at Potiskum ix. Procurement/Fencing of 6 plots of land x. Construction of 4 Nos. One-bedroom (Self-Contained) bungalows xi. Construction of 1 No. Semi-detached twin 2bedroom bungalow. xii. Extension, furnishing and Equipping of University of Maiduguri Teaching Hospital Health center at Potiskum xiii. Procurement of General Medical Equipment xiv. Expansion/Upgrading of Kidney center xv. ICRC is supporting with construction and staffing of physical Rehabilitation Centre
FEDERAL MEDICAL CENTRES				
1	Federal Medical Centre, Nguru	Yobe	No. of Beds: 400 Patient traffic: 18,392 per month Inpatient Admissions: 909 per month New patient registration: 16,650	Nothing on the report
2	Federal Medical Centre, Birnin-Kebbi	Kebbi	No. of Beds: 300 Total staff strength: 1,250 • Directorate of Clinical Services (985), • Directorate of Administration (265)	i. Completion and furnishing of Pediatrics Orthopedic ward ii. Completion and furnishing of house officers' quarters iii. Completion of power house iv. Construction of Maternity complex v. Completion of Trauma center

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				vi. Completion of walkways and landscaping vii. Construction/Rehabilitation of road network viii. Rehabilitation and renovation of Laboratory complex ix. Renovation and upgrade of accidents and emergency, Medical Records Library and Physiotherapy Department. x. Upgrading of Pediatrics EPU & ward xi. Completion of Administrative block xii. Procurement of medical and office equipment such as Static X-ray, CT scan, theatre Equipment Oxygen Plant and Back alert EEG Machine, Electronic Records System and Air conditioners. xiii. Upgrading of internet cloud system, Website and computers. xiv. Increasing the number of patients to be seen as a result of increased and upgraded facilities. xv. Increasing efficiency in the services to reduce complications and mortality rate. xvi. Introduction of residency training on Pediatrics, Internal Medicine and Anesthesia. xvii. Commencement of internship for Nursing officers. xviii. Expansion in capacity building with a productivity-based direction.
3	Federal Medical Centre Birnin-Kudu	Jigawa	Total staff strength: 785 41 different consultants	i. Construction of the entrance gate ii. Construction of Medical center at Dutse NYSC orientation camp
4	Federal Medical Centre Yenagoa	Bayelsa	No. Of Beds: 461 Total staff strength: • 2000 regular staffs • 485 non-regular staff Services:	i. Construction of Radiotherapy center/Multipurpose Hall ii. Construction of infectious disease buildings and clinics iii. Purchase of vehicles and Bus

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
			• General in/out-patient services • Emergency services • Laboratory diagnosis and Heart 2 Heart services.	iv. Procurement of inverters for special care Baby Unit, Intensive care unit, Labor ward, children and Emergency ward and adult accident and emergency ward v. Healthcare enlightenment program for selected youths of Ohaji/Egbema & Oguta West Federal Constituency of Imo state. vi. Skill acquisition/ training program in poutry/feeds for selected women of Ohaji/Egbema & Outa/Our west Federal constituency of Imo.
5	Federal Medical Centre Gusau	Zamfara	Founded 1999	i. Procurement of 1No. 500KVa generator ii. Furnishing and equipping of newly completed specialty complex iii. Construction, Furnishing and equipping of Dialysis center iv. Supplying of CT scanning Machine and its accessories v. Purchase of Medical Equipment vi. Completion of construction of CT scanning and MRI suites.
6	Federal Medical Centre Ebute-Metta	Lagos	No. of Beds: 210 3 Residency programs • Obstetrics & Gynaecology • Family medicine • Anesthesia	**Ongoing** i. Revamping and equipping of Dental Clinic ii. Equipping of Physiotherapy iii. Renovation & Expansion/Equipping of A&E including 2 Nos Emergency Theatres iv. Building of New Oxygen plant v. Installation of CSSD vi. Refurbishment of compound/Roads vii. Roofing of main Hospital Building. **Proposed** i. Renovation of house officers' quarters ii. Completion of in-house Unions Building iii. Completion of In-house Unions Building

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				iv. Supply of utility vehicles
7	Federal Medical Centre, Makurdi	Benue	Founded 1995	**Ongoing** i. Commencement of residency program ii. DOTS being in the plan to be extended to other Federal Medical Centre Satellites (i.e., Federal Medical Centre Apir, NHIS Unit, Psychiatric/Dental Unit, Federal Staff Clinic) iii. DOTS Unit collaborating with BSTBLCP and Global fund to surge TB screening throughout Federal Medical Centre Satellite Unit iv. Renovation of Obstetrics and Gynecology theatre, creation of a call room for female Doctors. v. Free Medical Outreach to Gboko and Tarka LGA **Proposed** i. Full automation of the center including the provision of EMR (e-Health) information system. ii. Provision of additional medical equipment: MRI, Cystoscopy incubators, Digital X-ray machines, Microtomic machine, incubators
8	Federal Medical Centre Umuahia	Abia	Founded 1991	i. Construction of new ultra-modern 2 Storey Accident & Emergency complex ii. Construction of 30-room interns' quarters iii. Upgrade and equipping of Physiotherapy department iv. Upgrade of department of community medicine department v. Strengthening VHF surveillance and response
9	Federal Medical Centre Owerri	Imo	Founded 1903	i. To become a teaching hospital ii. To achieve attitudinal change/ownership spirit among staff

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				iii. To achieve and sustain effective inter-professional communication and collaboration in achieving desired/expected patient outcomes. iv. To improve quality of care to our esteemed clients (patients) v. To complete abandoned MRI building and ongoing projects in the center vi. To recover the services of the CT-scan machine installed in center
10	Federal Medical Centre Bida	Niger		i. Preliminaries and site preparation at permanent site. This work is in progress and it is at about 80% completion. ii. Construction of 2km standard asphalt road network iii. Construction of drainage and sewage system, run off water network and culverts iv. Establishment of water supply line from public supply and internal reticulation v. Renovation and conversion of old central stores to operating theatre vi. Expansion of male surgical ward.
11	Federal Medical Centre Keffi	Nasarawa		i. Drosophila and import of insects ii. Training workshop on Echocardiography (ECG) iii. Training and Resources in Research Ethics and Evaluation an online Ethics training course. iv. Introduction to the principles and practice of clinical Research course (On going) v. Secured United States Government Approval for seeking research grant.
12	Federal Medical Centre Asaba	Delta		
13	Federal Medical Yola	Adamawa		i. Construction of 1No. Storey building of 114 Beds space ward with 48% completion

S/N	TERTIARY HEALTH FACILITY	STATE	DESCRIPTION	ONGOING/PROPOSED PROJECTS
				ii. Perimeter Fencing of 1256m of the hospital permanent site (Ongoing) iii. Procurement of utility vehicles iv. Procurement of Hospital Equipment v. Research and Development.
14	Federal Medical Centre Jalingo	Taraba	No. of Beds: 260 17 Consultants	i. Construction of New imaging Unit by Petroleum Equalization/North East Development Commission. ii. Construction of Lassa isolation ward by NCDC iii. Upgrading of the Laboratory to meet up with international accreditation standards in terms of antimicrobial resistance in collaboration with Fleming's grant iv. Re-constituting and activation of HREC through staff training, financial empowerment etc. v. Step down training for all MRO's on handling of the version of the NHMIS. vi. Printing of data tools to mitigate shortage vii. Preparation and printing of quarterly/annual reports viii. Computerization of the Medical Records Departments.

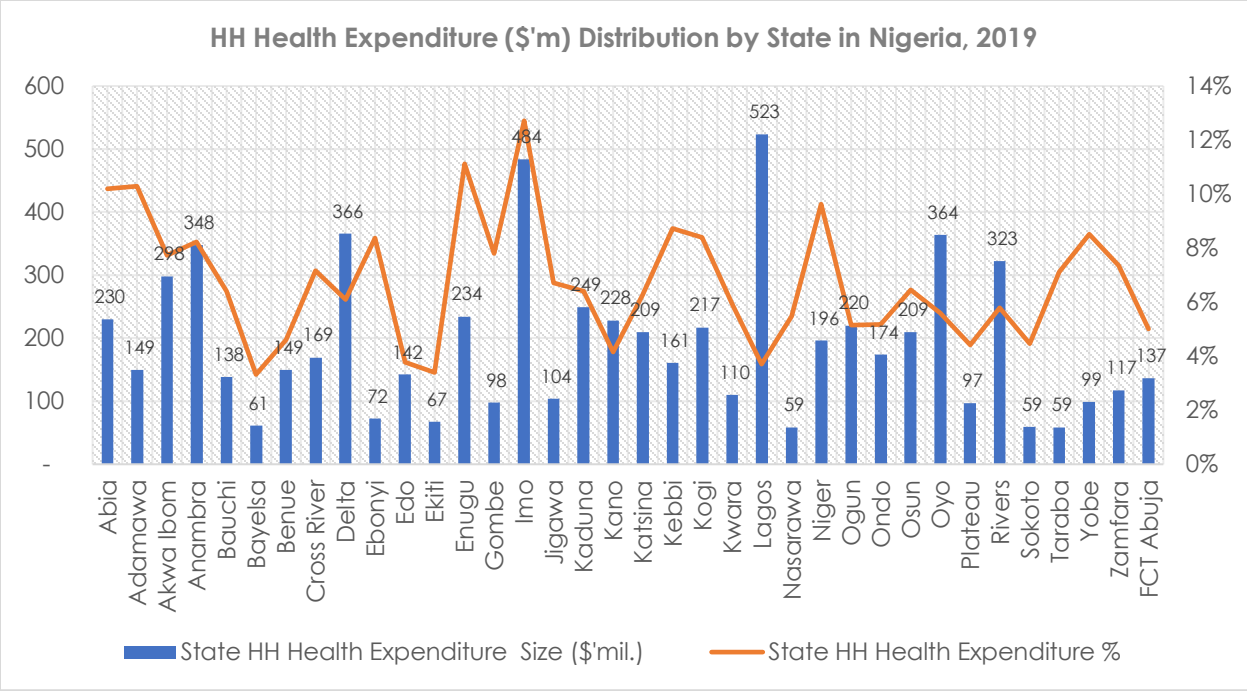
SOURCE: FMoH, "Annual Health Sector Report"

Appendix 6: Nigeria Household (HH) Health Expenditure Distribution by State

#	State	2019 Total HH Expenditure		% of Nat'l HH Expenditure	2019 State HH Health Expenditure		
		Expenditure (N)	Expenditure ($)		Size (N)	Size ($)	%
1	Abia	813,634,010,722	2,260,094,474	2%	82,879,323,518	230,220,343	10%
2	Adamawa	522,682,907,927	1,451,896,966	1%	53,803,659,020	149,454,608	10%
3	Akwa Ibom	1,386,518,656,756	3,851,440,713	3%	107,328,434,150	298,134,539	8%
4	Anambra	1,520,596,564,187	4,223,879,345	4%	125,218,881,660	347,830,227	8%
5	Bauchi	778,800,177,840	2,163,333,827	2%	49,826,042,620	138,405,674	6%
6	Bayelsa	659,221,500,452	1,831,170,835	2%	21,902,320,022	60,839,778	3%
7	Benue	1,167,164,798,735	3,242,124,441	3%	53,759,332,952	149,331,480	5%
8	Cross River	849,722,193,074	2,360,339,425	2%	60,914,393,897	169,206,650	7%
9	Delta	2,162,280,433,421	6,006,334,537	5%	131,648,205,451	365,689,460	6%
10	Ebonyi	310,188,581,667	861,634,949	1%	26,000,864,559	72,224,624	8%
11	Edo	1,353,119,141,425	3,758,664,282	3%	51,150,492,455	142,084,701	4%
12	Ekiti	712,782,686,349	1,979,951,907	2%	24,266,809,558	67,407,804	3%
13	Enugu	758,978,851,885	2,108,274,589	2%	84,321,504,691	234,226,402	11%
14	Gombe	451,097,648,452	1,253,049,023	1%	35,159,204,291	97,664,456	8%
15	Imo	1,369,770,692,729	3,804,918,591	3%	174,141,168,398	483,725,468	13%
16	Jigawa	555,759,368,739	1,543,776,024	1%	37,310,289,464	103,639,693	7%
17	Kaduna	1,398,703,206,293	3,885,286,684	3%	89,586,042,072	248,850,117	6%
18	Kano	1,973,211,897,149	5,481,144,159	5%	82,017,643,905	227,826,789	4%
19	Katsina	1,204,110,669,458	3,344,751,860	3%	75,359,892,740	209,333,035	6%
20	Kebbi	663,256,674,675	1,842,379,652	2%	57,815,668,376	160,599,079	9%
21	Kogi	930,328,403,018	2,584,245,564	2%	78,026,237,017	216,739,547	8%
22	Kwara	668,235,451,684	1,856,209,588	2%	39,644,985,564	110,124,960	6%
23	Lagos	5,068,032,243,934	14,077,867,344	13%	188,242,253,212	522,895,148	4%
24	Nasarawa	383,580,908,871	1,065,502,525	1%	21,067,463,188	58,520,731	5%
25	Niger	732,641,742,213	2,035,115,951	2%	70,552,628,224	195,979,523	10%
26	Ogun	1,541,007,821,592	4,280,577,282	4%	79,252,021,320	220,144,504	5%
27	Ondo	1,209,485,741,701	3,359,682,616	3%	62,488,463,743	173,579,066	5%
28	Osun	1,169,698,340,835	3,249,162,058	3%	75,408,967,295	209,469,354	6%
29	Oyo	2,342,400,084,558	6,506,666,902	6%	131,047,477,794	364,020,772	6%
30	Plateau	790,751,198,150	2,196,531,106	2%	34,941,834,357	97,060,651	4%
31	Rivers	2,008,077,246,294	5,577,992,351	5%	116,163,382,601	322,676,063	6%
32	Sokoto	476,215,207,384	1,322,820,021	1%	21,257,465,981	59,048,517	4%
33	Taraba	297,379,724,360	826,054,790	1%	21,139,895,114	58,721,931	7%
34	Yobe	420,019,880,698	1,166,721,891	1%	35,747,091,368	99,297,476	9%
35	Zamfara	572,373,084,455	1,589,925,235	1%	42,132,841,776	117,035,672	7%
36	FCT Abuja	985,560,717,684	2,737,668,660	2%	49,278,521,092	136,884,781	5%
		40,207,388,459,366	**111,687,190,165**	**100%**	**2,490,801,703,445**	**6,918,893,621**	
						6%	*% of total HH Expenditure*

Data SOURCE: NBS, PAF Analysis (FX: $1: N360, 2019)

Healthcare spend accounted for 6% of aggregate expenditure of households across states in Nigeria for 2019. Lagos HHs spent over $0.5 billion on healthcare for the year under review.



#	State	HH Health Expenditure ($'million)		
		2019	2020	2021
1	Abia	230.2	227.9	286
2	Adamawa	149.5	148.0	186
3	Akwa Ibom	298.1	295.2	371
4	Anambra	347.8	344.4	433
5	Bauchi	138.4	137.0	172
6	Bayelsa	60.8	60.2	76
7	Benue	149.3	147.8	186
8	Cross River	169.2	167.5	210
9	Delta	365.7	362.0	455
10	Ebonyi	72.2	71.5	90
11	Edo	142.1	140.7	177
12	Ekiti	67.4	66.7	84
13	Enugu	234.2	231.9	291
14	Gombe	97.7	96.7	121
15	Imo	483.7	478.9	601
16	Jigawa	103.6	102.6	129
17	Kaduna	248.9	246.4	309
18	Kano	227.8	225.5	283
19	Katsina	209.3	207.2	260
20	Kebbi	160.6	159.0	200
21	Kogi	216.7	214.6	270
22	Kwara	110.1	109.0	137
23	Lagos	522.9	517.7	650
24	Nasarawa	58.5	57.9	73
25	Niger	196.0	194.0	244
26	Ogun	220.1	217.9	274
27	Ondo	173.6	171.8	216
28	Osun	209.5	207.4	260
29	Oyo	364.0	360.4	453
30	Plateau	97.1	96.1	121
31	Rivers	322.7	319.4	401
32	Sokoto	59.0	58.5	73
33	Taraba	58.7	58.1	73
34	Yobe	99.3	98.3	123
35	Zamfara	117.0	115.9	146
36	FCT Abuja	136.9	135.5	170
Total		**6,918.9**	**6,850**	**8,603**
Growth		*5.2%*	*-1.0%*	*25.6%*

Data SOURCE: NBS, World Bank, PAF Analysis

Appendix 7: Nigeria Health Budgets by State, 2020-2022

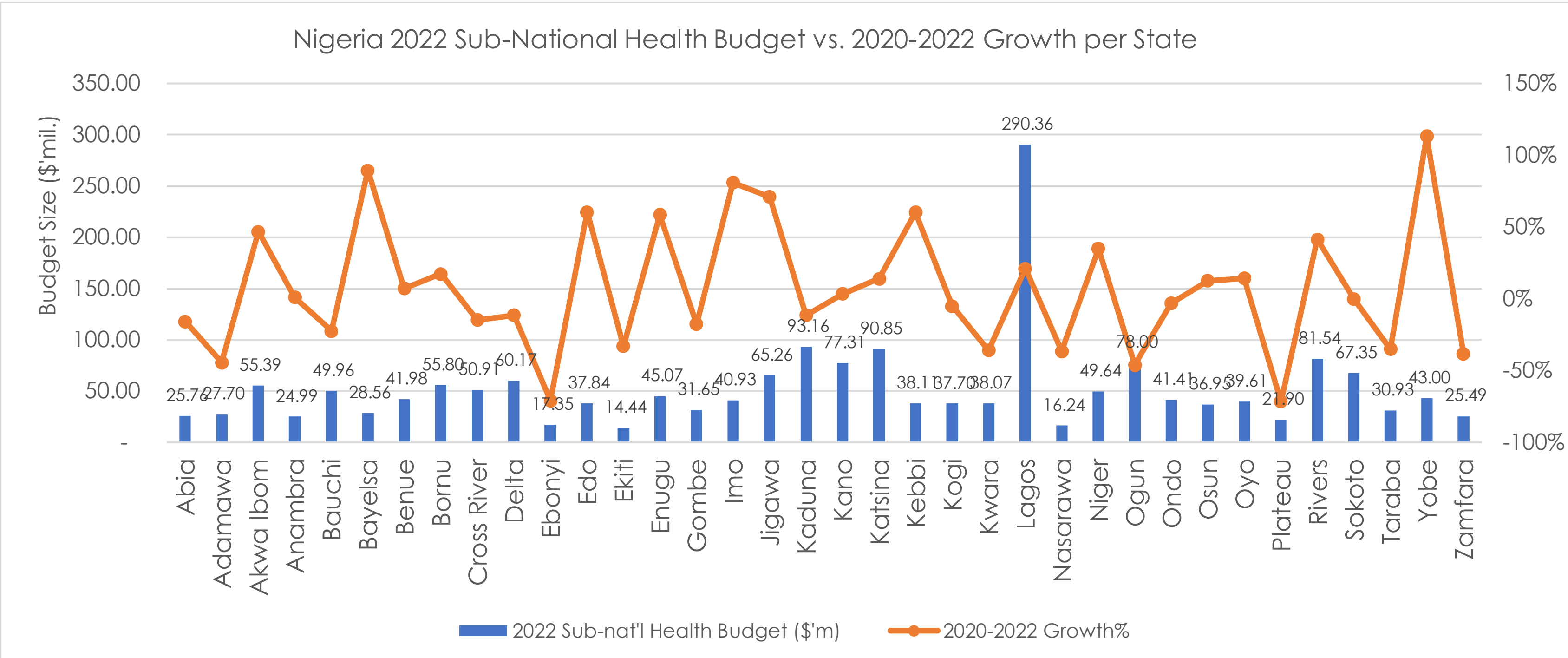
#	State	Nigeria Sub-national Health Budget Distribution ($'mil.)			Growth% (2020-2022)
		2020	2021	2022	
1	Abia	30.59	26.51	25.76	-15.8%
2	Adamawa	49.78	22.54	27.70	-44.4%
3	Akwa Ibom	37.73	40.73	55.39	46.8%
4	Anambra	24.74	24.87	24.99	1.0%
5	Bauchi	64.43	62.16	49.96	-22.5%
6	Bayelsa	15.07	38.38	28.56	89.5%
7	Benue	39.18	42.03	41.98	7.1%
8	Bornu	47.54	40.10	55.80	17.4%
9	Cross River	59.66	38.26	50.91	-14.7%
10	Delta	67.93	54.87	60.17	-11.4%
11	Ebonyi	59.74	36.88	17.35	-71.0%
12	Edo	23.58	24.89	37.84	60.4%
13	Ekiti	21.53	20.41	14.44	-32.9%
14	Enugu	28.41	36.64	45.07	58.7%
15	Gombe	38.42	29.40	31.65	-17.6%
16	Imo	22.61	48.62	40.93	81.0%
17	Jigawa	38.16	29.40	65.26	71.0%
18	Kaduna	105.11	93.42	93.16	-11.4%
19	Kano	74.68	70.29	77.31	3.5%
20	Katsina	79.71	87.12	90.85	14.0%
21	Kebbi	23.79	30.65	38.11	60.2%
22	Kogi	39.66	41.62	37.70	-4.9%
23	Kwara	59.34	42.25	38.07	-35.9%
24	Lagos	239.84	240.15	290.36	21.1%
25	Nasarawa	25.61	17.02	16.24	-36.6%
26	Niger	36.76	38.57	49.64	35.0%
27	Ogun	144.66	84.70	78.00	-46.1%
28	Ondo	42.74	38.79	41.41	-3.1%
29	Osun	32.83	46.03	36.95	12.5%
30	Oyo	34.65	31.77	39.61	14.3%
31	Plateau	77.00	33.87	21.90	-71.6%
32	Rivers	57.63	82.42	81.54	41.5%
33	Sokoto	67.59	74.36	67.35	-0.3%
34	Taraba	47.59	33.97	30.93	-35.0%
35	Yobe	20.16	24.63	43.00	113.3%
36	Zamfara	41.26	31.43	25.49	-38.2%
Total		**1,919.7**	**1,759.8**	**1,871.4**	**-2.5%**

Data SOURCE: One.org, PAF Analysis

- Post-pandemic (i.e., after 2020), budget allocation by states declined by 2.5% on aggregate from $1.92 billion in 2020 to $1.87 billion in 2022
- Of the 36 States in the country, 18 states experienced decline in their budget allocations to the health sector
  - Plateau State's health budget declined the most by over 71% across the period under review
  - Yobe State however increased its allocation by over 113% during the same period
- In value terms, Lagos State had the highest allocation to health, growing from $239.8 million in 2020 to over $290 million in 2022

NB: CBN Official FX Rates used:

- *FY-2020: NGN379.50 to the $ (Dec. 31, 2020)*
- *FY-2021: NGN412.99 to the $ (Dec. 31, 2021)*
- *FY-2022: NGN439.76 to the $ (Nov. 4th, 2022)*


Nigeria 2022 Sub-National Health Budget vs. 2020-2022 Growth per State
Budget Size ($'mil.)
350.00
300.00
250.00
200.00
150.00
100.00
50.00
-
150%
100%
50%
0%
-50%
-100%
Abia 25.76
Adamawa 27.70
Akwa Ibom 55.39
Anambra 24.99
Bauchi 49.96
Bayelsa 28.56
Benue 41.98
Bornu 55.80
Cross River 50.91
Delta 60.17
Ebonyi 17.35
Edo 37.84
Ekiti 14.44
Enugu 45.07
Gombe 31.65
Imo 40.93
Jigawa 65.26
Kaduna 93.16
Kano 77.31
Katsina 90.85
Kebbi 38.11
Kogi 37.70
Kwara 38.07
Lagos 290.36
Nasarawa 16.24
Niger 49.64
Ogun 78.00
Ondo 41.41
Osun 36.95
Oyo 39.61
Plateau 21.90
Rivers 81.54
Sokoto 67.35
Taraba 30.93
Yobe 43.00
Zamfara 25.49
2022 Sub-nat'l Health Budget ($'m)
2020-2022 Growth%

Appendix 8: Nigeria eHealth Market Segment Analysis

#	Market Segment	2022 Revenue Projection	2022-2027 Revenue Projection	User Penetration	Expected Average Revenue per User (ARPU)
1.	eHealth Segment (General Overview)	US$315.2 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 17.42%, resulting in a projected market volume of US$703.70m by 2027	User penetration will be 13.37% in 2022 and is expected to hit 19.20% by 2027	US$10.88
2.	eHealth Devices	US$102.40 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 15.71%, resulting in a projected market volume of US$212.40m by 2027	N/A	US$62.34
3.	Blood Pressure Meters	US$28.57 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 15.20%, resulting in a projected market volume of US$57.97m by 2027	User penetration will be 0.52% in 2022 and is expected to hit 0.69% by 2027	US$25.23
4.	Fever Meters	US$42.48 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 17.97%, resulting in a projected market volume of US$97.05m by 2027	User penetration will be 0.61% in 2022 and is expected to hit 0.85% by 2027	US$32.04
5.	Glucose Meters	US$6.45 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 13.83%, resulting in a projected market volume of US$12.33m by 2027	User penetration will be 0.21% in 2022 and is expected to hit 0.29% by 2027	US$13.88
6.	Care phone/Social Alarms	US$24.89 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 12.58%, resulting in	User penetration will be 0.55% in 2022 and is expected to hit 0.74% by 2027	US$21.03

#	Market Segment	2022 Revenue Projection	2022-2027 Revenue Projection	User Penetration	Expected Average Revenue per User (ARPU)
			a projected market volume of US$45.01m by 2027		
7.	Online Pharmacy	US$175.90 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 17.67%, resulting in a projected market volume of US$396.90m by 2027	User penetration will be 10.11% in 2022 and is expected to hit 14.93% by 2027	US$8.03
8.	Online Doctor Consultations	US$23.68 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 15.74%, resulting in a projected market volume of US$49.18m by 2027	User penetration will be 0.87% in 2022 and is expected to hit 1.12% by 2027	US$12.59
9.	eHealth Apps	US$13.23 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 27.89%, resulting in a projected market volume of US$45.26m by 2027	N/A	US$3.73
10.	Contraception & Fertility Apps	US$3.48 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 14.06%, resulting in a projected market volume of US$6.72m by 2027	User penetration will be 0.41% in 2022 and is expected to hit 0.55% by 2027	US$3.90
11.	Medication Checker Apps	US$9.75 million	Revenue is expected to show an annual growth rate (CAGR 2022-2027) of 31.64%, resulting in a projected market volume of US$38.55m by 2027	User penetration will be 2.43% in 2022 and is expected to hit 3.15% by 2027	US$1.85

SOURCE: *Statista,* 2022

Appendix 9: Nigeria Digital Health Index Analysis

S/N	PARAMETER	PHASE (/5)	INDICATOR			
			GLOBAL DIGITAL HEALTH STANDARD		NIGERIA PERFORMANCE	SCORE (/5)
1.	LEADERSHIP & GOVERNANCE	4	1.1	Digital health prioritized at the national level through dedicated bodies / mechanisms for governance	Governance structure is fully-functional, government-led, consults with other ministries, and monitors implementation of digital health based on a work plan.	4
			1.2	Digital Health prioritized at the national level through planning	Digital health is included in national health or relevant national strategies and/or plans.	3
2.	STRATEGY & INVESTMENT	3	2.1	National eHealth/ Digital Health Strategy or Framework	National digital health costed plan developed and approved.	3
			2.2	Public funding for digital health	1% of Annual public spending on health	2
3.	LEGISLATION, POLICY, AND COMPLIANCE	3	3.1	Legal Framework for Data Protection (Security)	There is a law on data security (storage, transmission, use) that is relevant to digital health that has been implemented, but not consistently enforced.	4
			3.2	Laws or Regulations for privacy, confidentiality and access to health information (Privacy)	Such a law exists and has been implemented, but not consistently enforced.	4
			3.3	Protocol for regulating or certifying devices and/or digital health services	Proposals have been made and are under review.	2
			3.4	Cross-border data security and sharing	There are no protocols, policies, frameworks or accepted processes in place to support secure cross-border data exchange and storage.	1
4.	WORKFORCE	2	4.1	Digital health integrated in health and related professional pre-service training (prior to deployment)	Digital health curriculum proposed and under review as part of pre-service training requirements.	2

			4.2	Digital health integrated in health and related professional in-service training (after deployment)	There is no digital health curriculum as part of in-service (continuing education) training for health professionals in the workforce.	1
			4.3	Training of digital health workforce	Digital health workforce needs assessed, gaps identified and training options under development	2
			4.4	Maturity of public sector digital health professional careers	No workforce strategy, policy, or guide that recognizes digital health is in place. Distribution of digital health workforce is ad hoc.	1
5.	STANDARDS AND INTEROPERABILITY	1	5.1	National digital health architecture and/or health information exchange	There is no national digital health (eHealth) architectural framework and/or health information exchange (HIE) established.	1
			5.2	Health information standards	There are no digital health / health information standards for data exchange, transmission, messaging, security, privacy, and hardware.	1
6.	INFRASTRUCTURE	2	6.1	Network readiness	Nigeria's WEF Network readiness Index: 1.0 - 3.3	1
			6.2	Planning and support for ongoing digital health infrastructure maintenance	A plan for supporting digital health infrastructure (including equipment- computers/ tablets/ phones, supplies, software, devices, etc.) provision and maintenance has been developed, but not implemented.	2
7.	SERVICES AND APPLICATIONS	2	7.1	Nationally scaled digital health systems	National priority areas are not supported by digital health at any scale.	1
			7.2	Digital identity management of service providers, administrators, and facilities for digital health, including location data for GIS mapping	Health system registries of uniquely identifiable providers, administrators, and public facilities (and private if applicable) are being developed but not available for use.	2
			7.3	Digital identity management of individuals for health	A secure registry exists, but is incomplete / partially available, used, and irregularly maintained.	2
			7.3.1	Digital identity management of individuals for health (Master Patient Index)	No secure master patient index exists.	1

			7.3.2	Digital identity management of individuals for health (Birth Registry)	A secure birth registry exists, but is incomplete / partially available, used, and irregularly maintained.	2
			7.3.3	Digital identity management of individuals for health (Death Registry)	No secure death registry exists.	1
			7.3.4	Digital identity management of individuals for health (Immunization Registry)	A secure immunization registry exists, but is incomplete / partially available, used, and irregularly maintained.	2

Appendix 10: HHIS 2020-23 & NG Case Study Mapping

S/N	HHIS Themes in Value chains	NG Case Studies
1.	**Digital Transformation of health & care** ▪ eHealth/Digital Health: products and services in the area of ICT that contribute to the efficiency, effectiveness and digitalization of the care sector (e.g., in the area of cost-effectiveness, interoperability and artificial intelligence)	▪ Case Study-2: ICT Integration of NHIS Processes ▪ Case Study -4: Telemedicine
2.	**Accessible medical technology for sustainable health & care** ▪ Medical products & devices ▪ (Imaging) diagnostics and Point of Care diagnostics ▪ Disposables and consumables, surgical instruments	▪ Case Study -5: Med Equipment Leasing & Maintenance
3.	**Biopharmaceutical developments / personalized medicine** ▪ Drug development ▪ Clinical research ▪ Drug delivery methods, etc.	▪ Case Study -6: Domesticated Vaccine production (see Row-4 and Row-7 as well) ▪ Case Study -7: Pharma Import Opportunity ▪ Case Study 10: Cold Chain Storage & Logistics
4.	**Product Development & High tech** ▪ Scientific research and validation ▪ Design and engineering ▪ Prototyping and testing ▪ Large-scale production ▪ Packaging and distribution	▪ The likes of Case Study -9 (local production of LLINs potentially falls in here). ▪ Case Study -6: Domesticated Vaccine production
5.	**Care Infrastructure** ▪ Products and services in the area of designing, constructing, furnishing, providing equipment for, operating and maintaining hospitals and clinics ▪ Smart and sustainable building and operating of care facilities	▪ Case Study -8: Turnkey Health Infrastructure Opportunities
6.	**Public Health/Strengthening health(care) systems** ▪ Strengthening health(care) systems: knowledge, products and services in the areas of education, policy, **funding**, training, consultancy and advising to realize better and more accessible care systems ▪ Prevention ▪ Screening/managing infectious and non-infectious diseases ▪ Primary care ▪ Maternity care ▪ Emergency care and disaster care	▪ Case Study -1: Revitalization of Dysfunctional PHCs ▪ Case Study -3: Deployment of Solar Systems across target PHCs **(The NL Consulate had already kicked-off an initiative that trains young Nigerians in building capacity in renewable energy including solar systems. Such efforts can be leveraged here.)**
7.	**One health** ▪ Infectious diseases, zoonoses (interaction between human health, animal health and environment), nature, ecosystems ▪ Antimicrobial resistance, **vaccines**, (new) antibiotics and alternatives	▪ Case Study -6: Domesticated Vaccine production

PharmAccess

The PharmAccess Group promotes access to affordable and quality health care in Africa, by leveraging digital technology and data and stimulating investments through partnerships with the private sector and government institutions. The Group has a shared goal, working towards achieving inclusive health care for Africa. In doing so, it contributes to healthier populations and social and economic development.

PharmAccess, its partners and programs have been recognized by governments and donors alike as frontrunners in innovative health financing and delivery. The multidisciplinary team of PharmAccess consists of specialists in fields such as quality improvements (SafeCare), investments in quality healthcare (Medical Credit Fund), digital health ecosystems, health insurance, research and advocacy for policy change and scaling of interventions.

For further enquiries on this report, contact PharmAccess Foundation via infong@pharmaccess-ng.org

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