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CRITICAL EVALUATION OF SUSTAINABLE LOCAL CONTENT POLICY AND HUMAN CAPACITY DEVELOPMENT IN NIGERIA'S OIL AND GAS INDUSTRY.

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ABSTRACT

A study of the role of sustainable local content policy in human capacity development in Nigeria's oil and gas industry – case for the Petroleum Technology Development Fund (PTDF, the Fund) was carried out to find solutions to three fundamental questions:

a) *"to what extent has PTDF contributed towards achieving human capacity development in Nigeria"*
b) *"to what extent has PTDF intervention impacted the oil and gas industry in the last ten years in Nigeria" and*
c) *"how sustainable is local content policy under the present PTDF mandate in Nigeria".*

This research was predicated on the skills gap audit report (2018 – 2023) of the Fund as a baseline study while leveraging on the secondary data sets of the PTDF trio-capacity development strategies from 2011 – 2021. The research was formulated on both descriptive and analytical statistics methods based on the industry need assessment. A comparative analysis of the Skills Gap Audit (SGA) and Secondary Data Sets (SDS) was carried out using arithmetic mean and deviation from the assumed mean of the unclassified data.

The results established that more key performance indicators were captured in the SDS (mean of 23.04 and deviation of 0.4) against the imputed values in the SGA (mean 4.52 and deviation of 0.5 respectively). The implication therefore is that PTDF has contributed more significantly in human capacity development programmes than indicated in the Skills Gap Audit (SGA) report. However, challenging indicators could be turned into opportunities for the Fund if the extant law is amended to broaden the frontiers of investment-divestment strategies through public-private partnership for sustainable local content policy of the Fund. This research is useful for policy formulation and decision-making on local content in Nigeria.

This research have the potential to also support both creators and evaluators of indices and parameters used in measuring and evaluating the quality of human capacity development programmes and its impact on the growth of the petroleum industry.

Key words: Local Content Policy, Capacity Building, Skills Gap Audit, Secondary Data Sets.

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Introduction

It has become apparent in the past two decades that most high-level jobs in the oil and gas industry are occupied by expatriates against the local content policy of empowering qualified Nigerians to take responsibility in the sector (Abuaya, 2015). This entails capital flight in the process of procuring the expatriates contrary to general ethics of minimizing costs and maximizing profit. The Nigerian local content policy and sustainable development has been in the front burner and there exists an interrelated and interdependent relationship with capacity development of Nigerians (Neeka, 2019). The impact of the Petroleum Technology Development Fund (the Fund) on the implementation of the local content policy and sustainable development is enormous and is here taken up for study. In appreciation of the enormous challenges faced by Nigerian investors and operators in the oil and gas industry, and the outright determination to help reduce huge financial losses cum and wastage of natural resources, there is urgent need to improve on existing knowledge in the field of local content policy and human capital development. The international oil companies (IOC) operating in the Nigerian petroleum industry are substantially populated by expatriate workers. The indigenous oil companies, on the other hand, are implicitly technologically disadvantaged (Okon, 2022). Accordingly, Pigato (2001) emphasized that, except for countries that develop the essential skills and supplier bases, the host country may likely not be able to benefit from foreign direct investments to ascend the value chain and grow other sectors. To deliver the oil industry and its benefits into the hands of Nigerians many studies has shown that the Nigerian Government created the Local Content Policy and signed its enabling legislation which provided a succinct definition of local content as the combined contributions to any of the myriad of activities, operations, or inputs in the crude oil and natural gas extraction processes made by Nigerian registered companies in which Nigerians own major equity.

Table 1.0: Feedback and analysis of PTDF beneficiaries (2017 - 2022), Skills Gap Audit Report.

S/No.	PTDF HUMAN CAPITAL DEVELOPMENT (HCD) PROGRESSION	% COVERAGE
1	Underwater Welding	0.00%
2	Welding & Fabrication	8.70%
3	Advanced Underwater Welding	0.00%
4	Geosciences (Geophysics and Geology)	4.35%
5	Engineering Design/CAD (Computer Aided Design)	17.39%
6	Helicopter Underwater Safety	0.00%
7	Welders Training and Certification Programme	26.09%
8	BOSIET	0.00%
9	Occupational Health and Safety	0.00%
10	Train-The-Trainer Welding Certification Programme	4.35%
11	Instrumentation & Control Systems	0.00%
12	Facilities Engineering & Maintenance Management	0.00%
13	Marine Engineering & Operations	0.00%
14	M.Sc. (OSS)	26.09%
15	Ph.D (OSS)	4.35%
16	M.Sc. (LSS)	0.00%
17	Ph. D (LSS)	0.00%
18	ULSEP (University Lecturers Skills Enhancement Program)	8.70%
19	Logistics & Supply Chain	0.00%
20	Other Related Courses	0.00%

MATERIALS AND METHODS

This work utilizes simple descriptive statistics (qualitative and quantitative) approach on secondary data gathering and investigation for the determination of the role of sustainable local content policy in human capacity development in Nigeria's oil and gas industry with perspectives on the Petroleum Technology Development Fund (PTDF). Skills Gap audit Reports covering the same period was benchmarked with the secondary data set from field

experience. Arithmetic mean and Deviation from assumed mean of the unclassified data provided key indicators between the two data sets used for the analysis. The gathered secondary data span through 2017 - 2022 and consists of numbers and names of institutional upgrade projects, information communication technology (ICT) centers, centers of excellence, professorial chairs, training, overseas undergraduate programs, overseas masters' programs, overseas PhD programs, research grants and patents. The sample sizes are 52, 146, 2, 8, 7510, 2010, 4632, 1788, 8 and 7, for the number of the interventions.

RESULTS AND DISCUSSION

RESULTS

Every raw data remains statistically deceptive, invalid, and non-informative until it is transformed by way of analysis to give reasons for making decision (Ngaage, 2000). The trend requires diligent and persistent effort, systematic thinking, and intelligence of established principles and standards in translating the raw data into useful results with which to do business. A proper and detailed systematic approach of data analysis is required and the outcome clearly stated as shown in tables and figures to give explicit and meaningful explanations to the expected outcomes.

Qualitative Data Analysis

For the purpose of this research, every data set is presented in three cycles to enable the frequency per counts and to apply the principles of descriptive statistics and qualitative analysis. Table 2.0 represents infrastructural interventions (totaling 202) interventions which are classified into three segments. There are 52 institutional upgrades in Nigerian Universities, 146 Information and Communication Technology (ICT) centers and 2 Centers of Excellence (COE) respectively. A total of 7510 skilled persons have been trained in an average of three cycles, with the distributions showing a combined training in capacity enhancement, industry-based training and welders training representing 75.5% of the total trained persons. The fractional representation is shown in the pie-charts (Fig.3). Table 3.0 represents the number of intellectual property and patents registered from two streams of research and development intervention programmes namely, the professorial endowment and the grant research respectively. A total of eight patents are registered and the grant research represents 50% of the patent valuation while endowment has 530% distribution.

Table 2.0: Institutional Upgrades and Infrastructural Development Interventions.

S/N.	PROJECT/LOCATION	NUMBER	REMARK
1.	Institutional Upgrade (provision of structures & Equipment)	52 completed in selected institutions across the country	Component of the University Upgrade Project include: Departmental Building Workshop Equipment Laboratory Equipment IT and Library Facilities Infrastructural and Ancillary Facilities
2.	ICT CENTRES	146 completed across the country	Components of the project include: The ICT building V-sat and Computers Solar Panel or Generator Bore Hole with Over-Head Water Tank
3.	DEVELOPMENT OF CENTERS OF EXCELLENCE - CPES Kaduna - CSDT Port Harcourt	2 On-going	Components of the project include state-of-the-art facilities for low, mid and higher learning in oil and gas skills in equipment designs, welding and fabrication, Artificial Intelligence and Computing, Equipment maintenance etc.

Table 4.0: Patents from Research and Development (Intellectual Intervention).

S/N.	RESEARCH/INSTITUTION	RESEARCH FOCUS	PATENT TITLE
1.	Ahmadu Bello University Zaria, Prof. A.S Ahmed	Potentials and Development of Zeolite Catalyst for Nigerian Oil and Gas Industry from Kankara Clay	Potentials and Development of Zeolite Y Catalysts from kaolin Using Novel Processing Method.
2.	University of Benin, Prof. T.O.K. Audu	Development of Sustainable Technology for Bioenergy from Non-Edible Oil Seeds	Development of Sustainable Technology for Solar Photo-Voltaic Bio-Diesel Production from Non-Edible Oil Seeds
3.	University of Port Harcourt Prof. Adewale Dosunmu	Database for Wellbore Stability Management in the Niger Delta	Development of Stress Detection Software on Database for Wellbore Stability Management in the Niger Delta
4.	University of Port Harcourt (IPS) Prof. Michael Onyekonwu	Control of Fine Migrations in Reservoirs Using Nanoparticles	Control of Fine Migrations Using Aluminium Silicate Nanoparticles
5.	Delta State University Abraka Prof. Frank Oroka	Production of Fuel Briquettes and Biogas from Water Hyacinth Cow-Dung Mixture for Domestic and Industrial Application	Production of Fuel Briquettes and Biogas from Water Hyacinth Cow-Dung Mixture for Domestic and Industrial Application
6.	University of Ibadan Prof. Sunday Isehunwa	Flow Assurance Studies of the Offshore Niger Delta Advance Thermodynamic	Petroleum Products Adulterate Meter
7.	Ahmadu Bello University Zaria, Prof. A.S. Ahmed	Potentials and Development of Zeolite Catalyst for Nigerian Oil and Gas Industry from Kankara Clay	Development of ZSM-5 Zeolite from Kaolin at Low Pressure and Shorter Crystallization time Using Novel Processing
8.	University of Abuja	Study of antioxidant activity, chemical components of Plants and bioactive extracts for the recovery of antioxidants and antimicrobial compounds.	Antioxidant and Antimicrobial Compounds discovered from the roots of Cassia Singueana Plant (Golden Shower Plants)

Quantitative Data Analysis

Due to the nature of the secondary data gathered, tables and figures were used instead of mean and standard deviations as required in quantitative analysis. Accordingly, Table 5.0 represents Overseas Scholarship Programme for the MSc category, with a total of 4632 scholars from three cycles. The distribution had shown histogram represent the comparative analysis between SGA and SDS in Table 6.0.

Table 5.0: O.S.S. MSc. Scholarship - Intellectual interventions.

S/N.	AREA OF STUDY	NUMBER
1.	ENGINEERING	1,770
2.	GEOSCIENCES	348
3.	ENVIRONMENTAL	227
4.	ENERGY STUDIES	319
5.	INSTRUMENTAL ANALYTICAL/NANO SCIENCES	50
6.	INDUSTRY/OFFSHORE & OCEAN TECHNOLOGY	267
7.	GAS REFINING, MINERAL EXPLORATION ANDPETROCHEMICAL	9
8.	CHEMISTRY AND PURE SCIENCE	183
9.	BIOLOGY/MICROBIOLOGY/ BIOTECHNOLOGY	104
10.	OCCUPATIONAL HEALTH AND SAFETY	132
11.	INFORMATION TECHNOLOGY/COMPUTING	314
12.	ELECTRICAL POWER & MECHATRONICS	20
13.	ASSET AND OPERATIONS MANAGEMENT	47
14.	ECONOMICS (PETROLEUM, ENERGY, OIL & GAS)	18
15.	ACCOUNTING/FINANCE	555
16.	LAW AND POLICY	65
17.	SUPPLY CHAIN MANAGEMENT	93
18.	OTHERS (General Studies)	111

Table 6.0: Comparative analysis between Skills Gap Audit and Secondary Data Set (%)

S/No.	SGA_1	SDS_2	D_1	D_2
1	8.70	22.86	-3.3	-0.14
2	4.35	6.98	-7.65	-16.02
3	17.39	22.16	5.39	-0.84
4	26.09	26.29	14.09	3.29
5	4.35	26.33	-7.65	3.33
6	26.09	67.56	14.09	44.56
7	4.35	32.44	-7.65	9.44
8	8.70	8.70	-3.3	-14.30
Σ	100.02/8 =12	187.16/8 = 23	4.02/8 = 0.5	29.32/8= 0.4

The level of comparison between the data sets used for analysis in this work with reference to the Skills Gap Audit report (2017 -2022) as presented in Table 2.0 is further subjected to simple arithmetic mean and deviation using the assumed mean method of the unclassified data from the descriptive statistics.

DISCUSSION

Although the Nigerian Content Act came into effect in 2010, the Petroleum Technology Development Fund had been involved in capacity development programmes from 2000, when the Act that established its existence became operational. Thus, the aggregate data for this work reflects its years of contribution to local content development through capacity development activities enshrined in its core mandate. The structured analysis, however, represents the fractions of the sample data size of the PTDF trio-intervention programmes as shown in the tables, graphs, and charts. Another dimension to the results is the summation of the impact levels of each of the sub-sections of the entire PTDF capacity development programmes which represents the fractional contributions of each sub-sector as a percentage of the whole.

Fig. 1: Trends in trained Professionals. M.Sc Prog.

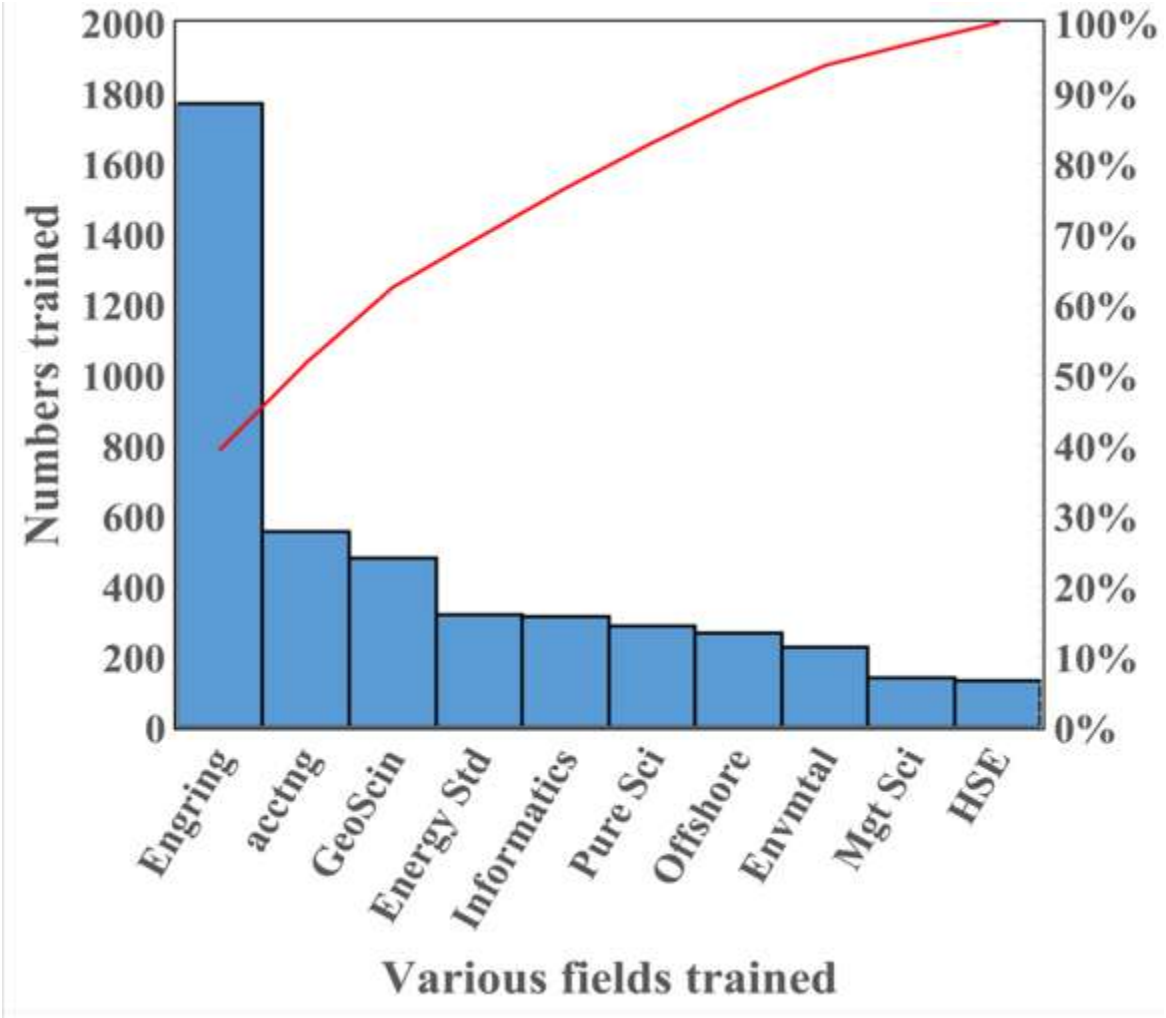

Fig.2: Capacity gaps in percentage from the MSc programme.

Fig.2 represents the stochastic model and defines the actual value (657), the earned value (1770) and the projected value (2225) for the engineering family of scholars using the MSc programme as baseline data. The plot predicts the optimum manpower needs at optimum conditions. The orange line shows the gradual progression from the estimated skills gap audit reports, benchmarking on the highest (engineering) and the lowest (Health and Safety) figures. For the manpower need to be at 100%, it was projected that by 2021, all professions identified in this study should have at least 600 trainees documented. The assumption is based on availability of funds, changing time, changing policy and the culture of beneficiaries' timely completion of their study programmes. In the distribution, accounting scholars grow a little above 550 followed by the geosciences with about 500 while Health and Safety is about 135 respectively. The gaps indicated that there are needs for more human capital development in the various fields sampled for this analysis. The dynamics of the industry requires the growing need for human capital, and that is the core mandate of the PTDF. The orange colour also compares slightly higher on intellectual intervention against the figures from the skills gap audit as a result of the inclusion of undergraduate students and research and development fractions in the computational analysis. Figure.3 indicates that vocational training accounts for 46.5% of the total human capacity development of the Fund, institutional intervention accounts for 0.0123% of the total contributions while intellectual intervention programmes comprising scholarships and research represent 52.3% of the total intervention programmes. Interestingly, the research component has Eight (8) patents registered that could re-produce spinoff for the Fund. This is relatively comparable to the skills-gap audit report, which estimated 56.59% to vocational training programme and 39.14% to the intellectual intervention programme. Two components added to the estimate under the current research increased the intellectual intervention percentage to 52.3% and reduced the vocational intervention percentage to 46.5%. Interestingly, the upgrade fractions of the total estimate were omitted in the audit report, but that represents 0.12% of the overall intervention programme of the Fund.

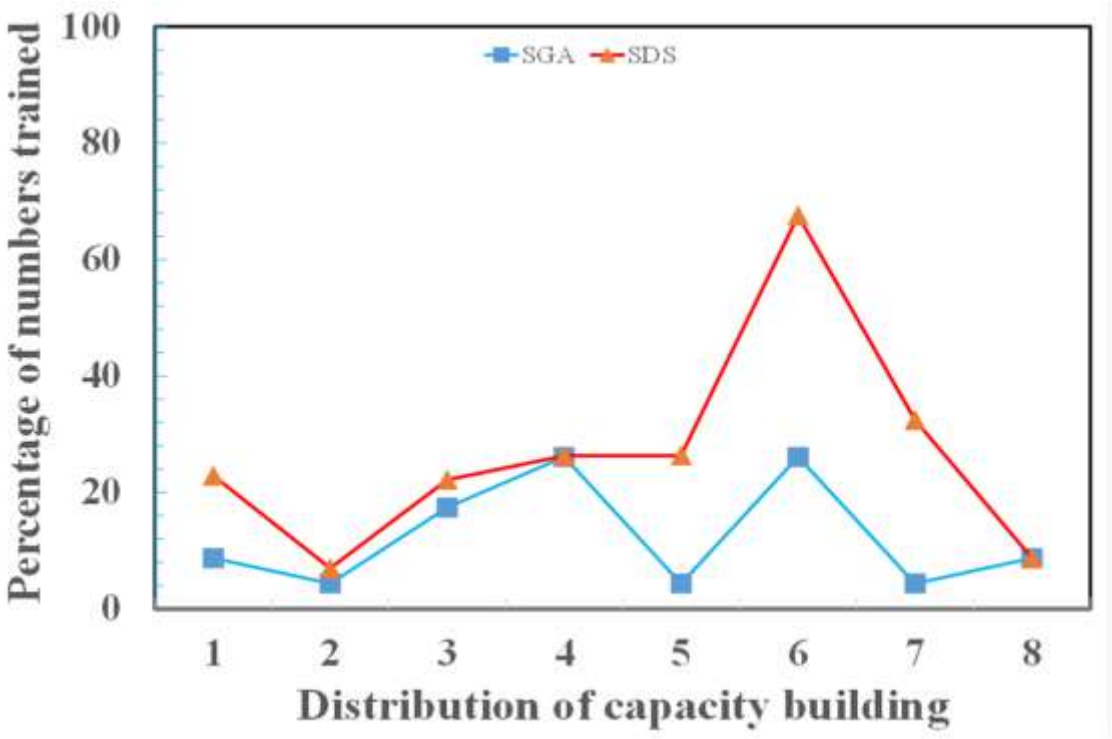

Fig.3: Distribution of trained capacity in percentage

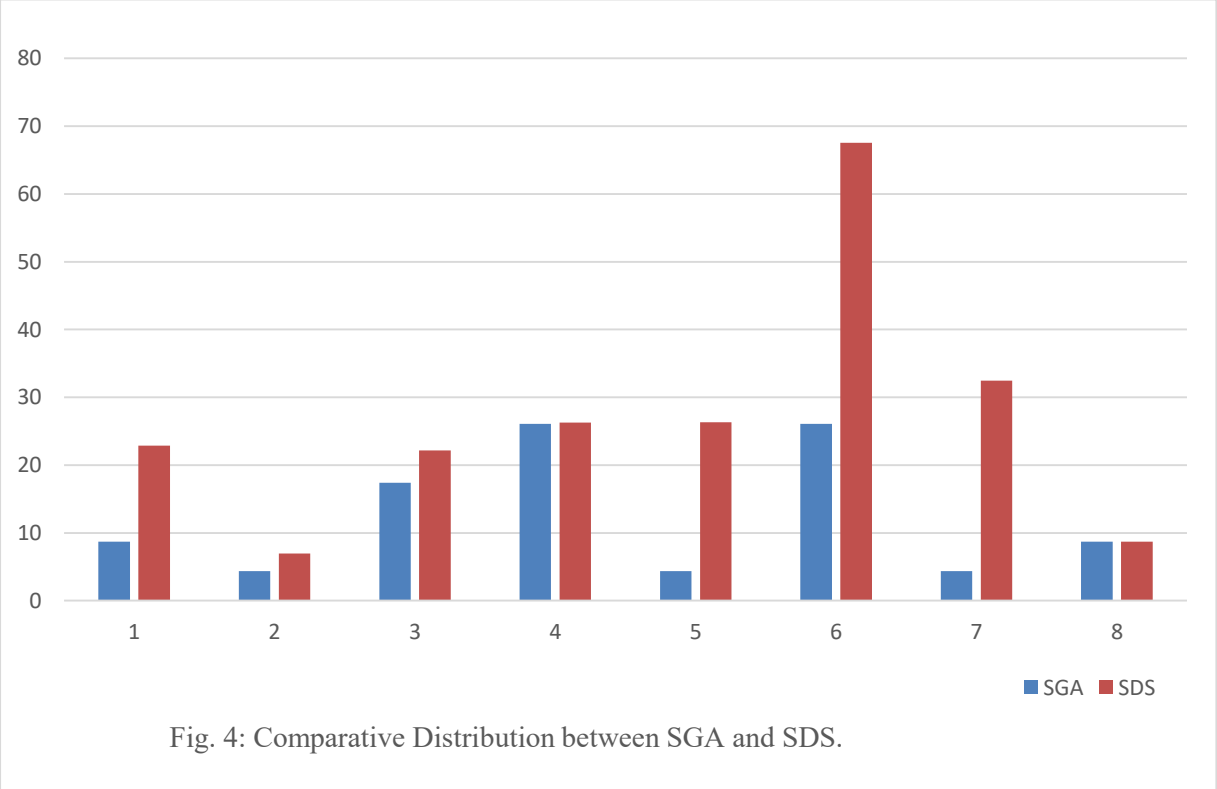

Fig. 4: Comparative Distribution between SGA and SDS.

CONCLUSIONS AND RECOMMENDATIONS

From the secondary data analysed, there are strong indications that the Petroleum Technology Development Fund's consistent capacity development intervention programmes have significantly impacted the Oil and Gas industry in Nigeria. The Fund might adopt the following:

- Develop more infrastructural and skills-based interventions structured on research and innovations for the energy industry in the era of the Petroleum Industry Act and global energy transition.
- Enhance the culture of public private partnership in the implementation of capacity development initiatives from the various streams of intervention programmes for sustainable local content policy in Nigeria.
- Leverage on comprehensive skills-gap audit in future capacity development strategy, with emphasis on key indicators in the determinant matrix such as infrastructure, research, technology, and innovation components for a long-term development plan.
- Be empowered through the policy of government to sustain the various capacity development programmes through expanded frontiers in the extant law as a FUND.
- Deepen public-private partnership policy in mainstreaming the next phases of capacity development programmes for visible revenue generation and sustainable development.
- There is need for strong advocacy on policy Shift and amendment to the core mandate of the Fund to accommodate investment-divestment strategy through commercialization of developed technologies and innovations of the various intervention programmes.
- Engage in strategic manpower aggregation of the past and present beneficiaries of the various intervention programmes and develop strong database for sustainable local content partnership trade-off for alternative revenue generation.
- Deepen the participation in renewable energy development to accommodate the global energy transition and sustainable local content development in that sector.

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