

Technological Capacity Building in the Nigeria's Oil and Gas Industry

Nathaniel C. Ozigbo
University of Abuja, Nigeria
stanozconsult@yahoo.com

ABSTRACT

In spite of the huge investment made by Nigerian government in the oil and gas sector of the economy, the GDP growth has remained insignificant. The local content in the industry is still very low as over 60 percent of the work value in the oil and gas sector is carried out abroad. This has led to dearth in jobs, skills development, capacity building/utilisation and lack of sustained national economic development. With the awaking of local content consciousness, the Nigerian National Petroleum Corporation (NNPC) has put in place a comprehensive Nigerian content development strategy as the prime vehicle for actualising economic derivatives from oil and gas industry. The main thrust of the Nigerian content policy is to promote a framework that guarantee active participation of Nigerians in oil and gas activities without compromising standard in order to stimulate growth of indigenous capacity. This paper emphasizes that the foregoing cannot be realised in the absence of a motivated and knowledgeable workforce. In this paper we noted that human resource development and capacity building should form the major plank of the oil and gas industry. In the paper, we noted also that the oil and gas industry should endeavour to deploy state of the art information and communication technology facilitates to service its operation thereby increasing productivity and profitability. The paper conclude that partnering or alliance formation of various forms are important tools in the development of the oil and gas industry especially where the required capital and indigenous technical capacity are relatively in short supply. The paper recommend among others that the Petroleum Technology Development Funds (PTDF) should sustain partnerships and alliances to areas of low level indigenous competencies and skills. Moreover, that the PTDF should serve as vessel for the development of indigenous manpower and technology transfer/acquisition in the petroleum industry.

INTRODUCTION

Nigeria is arguably the most influential and most strategic country in Africa today in view of its population, its vast hydrocarbon resources and the commitment of the government to democracy, anti-corruption and African Unity. The economy is heavily dependent on its oil sector, which accounts for some 90 percent of export revenues and 41 percent of its Gross Domestic Product (World Bank, 2006). Despite its relative abundance of mineral resources, the expansion of Nigeria's oil sector has been stymied by its antiquated infrastructure and the frustrating slow movement of goods through Nigeria's major ports.

It is on record that the rapid economic development in Nigeria has been largely to the deliberate policy of the government on technological capacity building through investment opportunities that exist in the oil and gas industry, in human capital and institutional building. Technological development in the Nigeria's

oil and gas industry has been facilitated by a number of systematic and deliberate policies directed toward building of a network of institutions for the promotion of technological capacity.

It is also on record that institutional capacity building and co-ordination have remained part of the strategies adopted by the Nigerian government for tackling the questions of technological backwardness. For instance, technological development in Southeast Asia was facilitated by a number of systematic and deliberate policies directed for the building of various institutions. This is not to suggest that Nigeria should follow the same development path to technological capacity building like the Southeast Asia. The important lesson is that Asian experience has confirmed the general view that human and institutional capacity buildings are critical to technological development. In this context, this paper intend to identify and analyse some critical constraints to technological capacity building (TCB) in Nigeria's oil and gas industry with the view to providing solutions to the problems and also to unfold what lessons might be learnt from the developed countries.

Looking back on the eve of the oil phenomenon, the Nigerian economy through agro-based was relatively diversified. There existed self-sufficiency in food production, with enough to feed the population and extra for export. The country had a strong export sector and budding industrial base. There were functioning laws, institutions, social and economic infrastructure as well as limitless job opportunities. Above all, security of life and property was adequate and foreign investors had confidence in the economy. This was the situation on ground before Nigeria's first export of crude oil in February 1958.

Since 1970s, the oil and Gas industry has become the fundamental to the Nigerian economy, providing the bulk of revenue as well as the foreign exchange earnings for the country. The discovery of oil and gas opened up the industry, bring in foreign participations like the Mobil, Agip and Texaco/Chevron respectively to join the exploration efforts both in the onshore and offshore areas of Nigeria. This development was enhanced by the extension of the concessionary rights previously a monopoly of Shell BP.

The aim of the government in doing this was to accelerate the pace of exploration and production of petroleum. Today, the oil and gas industry in Nigeria has risen very fast and steady to host the world's 10th largest reserves at about 25 billion barrels. Within the Organisation of Petroleum Exporting Countries (OPEC), Nigeria is in the 6th position in terms of reserves and daily production. Nigeria daily average production is over two million barrels and has the capacity to exceed her reserves to 30 billion barrels. The aspiration of government is to hit the 40 billion barrels mark in reserves by 2010, with a production of about 4m b/d by the target date. As part of the aspiration, the government through the Nigerian National Petroleum Corporation (NNPC) has targeted the year 2009 as the flare out date when all gas flaring is expected to stop in all oil and gas fields in Nigeria.

RESEARCH PROBLEM

The link between building local technological capacity and the ability to respond to challenges are usually brought about in the process of learning and co-operation between institutions. It is the absence of institutional co-operation and effective co-ordination and how these two major problems can be overcome in Nigeria's oil and gas industry that constitutes the problem of this study. This is because without, the co-operation among the "community of actors" and the necessary institutional framework for co-ordinating their activities, it may be impossible for Nigeria's oil and gas industry to develop the technological capacity that the country would require for the global competition of the 21st century. The research problem therefore is in two facets. The first is the identification and analysis of the environmental factors which serve as constraints to TCB in Nigeria's oil and gas industry. The second

which is derived from the first is the development of an institutional framework for building and sustaining technological capacity as a social process in the industry.

OBJECTIVES OF THE STUDY

The main objective of this paper is to probe through an investigation from the developed countries' experiences and institutionally sustainable framework for TCB adoption in Nigeria's oil and gas industry. Sustainability is critical to the success and effective performance in the Nigeria's oil and gas industry, as history reveals that many institutions in the country have failed to achieve their mandate. The paper is also guided by the following specific objectives:

1. Identify and analyse the determinants of technological capacity building in the Nigeria's oil and gas industry.
2. Examine through document search, direct observation and interview, the role of government, universities, research centres, industry and foundations in the development of effective technological capacity building.
3. To promote avenue that guarantee active local participation without compromising standard.
4. To develop framework for co-ordinating and strengthening fragmental capacity building effort.
5. Suggest an institutionally framework for effective operations of the oil and gas industry.

METHODOLOGY

The methodology adopted in this study involved extensive literature search. The search was complemented with interviews during visit to the industry and other institutions. A representative sample of industries in the technology park were covered, consisting of light engineering, information and communication and others. The information gathered from these sources was subjected to content analysis. Visits were repeated for clarification and consistency.

REVIEW OF LITERATURE

All over the world, the developments of science and technology have been recognised as a necessary condition for economic growth and social progress (World Bank, 2000). In African continent, Wangwe (2002) notes that science and technology indicators show lower values than in other parts of the world and that capacity building is critical to the industrial development as a social process that should be sustained. There is a growing awareness that those societies which are able to increase the productivity of workers in the knowledge industry might control the economic wealth. Because of the obvious structural and dynamic relationship, we argue that a society system of education has a direct and critical bearing on the types of people potentiality available for the management of oil and gas industry. Our examination of the objectives of the Nigerian university system does not suggest that the oil and gas industry might be able to hold its own in the global competition because of lack of skilled manpower.

Capacity building in a abroad development context implies a dynamic process which enable individuals and agencies to develop the critical social/technical capabilities to identify and analyse problems and proffer solutions (Dahman, 1989). As such, a conducive policy environment is a sine qua non for the process of TCB to thrive without hindrance. The policy environment for TCB should be multi-sectoral, involving the universities, research centres and other stake-holders.

This is important in any political environment that is characterised by social and ideological heterogeneity. Broadly defined technology is not necessarily hardware. Adubifa (1990) emphasises that it

is the totality of knowledge and skills embodied in people and institutions which provide them with mastery over their natural environment. The role of capacity building in its context therefore is to harness the capacities within the network of institutions and to enhance organizational interactions to better manage the process of technology acquisition, diffusion, utilisation and skill development (Oni & Akerele, 1997). Notwithstanding, a general policy environment that induces human and institutional interaction and collaboration is necessary for effective technology policy management and capacity building.

UNCED (2000) stated that capacity building encompasses the country's human, scientific, technological, organisational, institutional and resource capacities. In other words, capacity building is the process by which individuals, organisations and societies develop abilities to perform functions, solve problems, set and achieve goals (NNPC, 2004). Capacity building for an organisation refers to its ability to achieve its mission effectively and to sustain itself over the long-term.

Okoye (2004) refers capacity building as activities that improve an organisations ability to achieve its mission or a person's ability to define and realise his/her goals or to do his/her jobs more effectively. For Nigeria's oil and gas industry, capacity building relate to any aspect of work which include (Bossuyt, 1995):

1. Improved governance
2. Leadership
3. Mission and strategy
4. Administration; including human resources, financial management, marketing, positioning and legal matters.
5. For individual, capacity building relate to leadership development, advocacy skills, training/speaking abilities, technical skills and other areas of personal and professional development. For a country, capacity building is a long term continuing process in which all stakeholders participate. It is a choice development of the potentials of the country in a specific or in all areas of economic, political, social, cultural and educational spheres of life. Ayensu (1997) emphasizes that capacity building is much more than training and includes:
6. Human resources development, the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively.
7. Organisational development, the elaboration of management structures, processes and procedures not only within organisations but also the management of relationships between the different organisations and sectors.

Institutional and legal framework development, making legal and regulatory changes to enable organisations, institutions and agencies at all levels and in all sectors to enhance their capacities.

Jaycox (2000) points that capacity building is one of the key plans for achieving government targets and is being pursued through:

1. Training of Nigerians in targeted areas of competency and acquisition of technological and managerial capability.
2. Development of infrastructure and upgrade of facilities
3. Identifying new opportunities for local suppliers.
4. Local Business and supplier's enhancement.

The role of the universities in capacity building in the oil sector cannot be underestimated. Unfortunately, the capacity building potentials of the Nigerian Universities have become unsustainable due to the nature and dynamics of the political and economic environment of these institutions. This is because without the ability to build capacity, sustain the process and ensure the effective utilisation of what has been built, the sector might not be able to achieve the desired integration into the global oil sector. Dahlman (1989) emphasises that the under-utilisation of existing capacity and the loss of skilled personal through brain drain have made Nigeria to remain underdeveloped. There is an urgent need to redirect the focus of some research institutes so that they can make their research facilities available for the purpose of collaborative research to meet the need of industry. Increased funding of the universities and research institutes should be top priority in budget allocation. The government should provide adequate resources for the maintenance of decaying infrastructures, and should address and review all the various policies that have triggered the migration stream of academicians from the universities.

David (2003) explains the rationale for institutional networking for technological capacity building. In his view, co-operation ought to exist between esoteric research for the purpose of expanding the frontiers of knowledge and research directed toward the production of goods and services. Mansell and Wehn (1998) explain that the trend towards institutional networking for the pursuit of technological knowledge has been furthered by the greater availability of standardized procedures embodied in new instruments for generating and analysing data as well as by the availability of high speed digital communication networks for linking spatially separated researchers.

Adebifa (1990) and Bossuyt (1995) emphasises that capacity under-utilisation and low retention due to brain drain constitutes problem area in capacity building in Africa and other developing countries. Hence, Bossuyt suggests that capacity building issues particularly through networking should include governance, quality of leadership, management philosophy, and resources allocation strategies and noted that capacity building through institutional networking should be grounded in an appraisal of the environment. Nigeria's oil and gas industry has the potentials for building and sustaining technological capacity if the right policy framework and institutions exist. Since the attainment of political independence, successive governments in Nigeria have adopted economic growth policies designed to harness both the human and natural resources. While many other sectors of the economy have continued to experience decline, the oil sector has shown dramatic increases over-time. The federal and state governments have continued to see the oil and gas industry as a central pivot of development.

The literature search reveals the simple fact that technological capacity building is a social process that involves the cooperation among different actors, the government, universities, private sector, foundations and others. They all have critical roles to play. The most important actor of course is the government. To promote the necessary culture of cooperation among the community of actors requires appropriate legislation, initial financial investment for take-off and monitoring standards.

THE ROLE OF OIL AND GAS INDUSTRY IN NATIONAL DEVELOPMENT

Since the early 1970s, the Nigerian economy has become more reliant on oil earnings with a negative impact on the non-oil sector of the economy, resulting in the sector's declining contribution to Gross Domestic Product (GDP). Over the period from 1992 – 2002, growth in GDP averaged 2.25 percent with an estimated population growth rate of 2.8 percent per annum. This has resulted in contraction in per capital income. The gravity of the situation was made worse by the high rates of inflation. Infact, fifty years of oil exploration and exploitation in Nigeria have brought nothing but misery, hunger and poverty to the people. Ecological damage has robbed the oil producing regions their present and future hopes. Oil has put permanent scowls on the faces of the oil producing regions and inflicted eternal scars on their psyche. Government's efforts at alleviating the sufferings of the people remain largely insufficient. From

what we are seeing, it is worse now. It is worse because the level of environmental devastation is much worse than when the oil companies started prospecting for oil. The local economy has been virtually destroyed. Fishing and farming which are the local economies for the oil and gas regions, given the environmental devastation are no longer productive ventures. The yield per hectare has tumbled down drastically. The environment has been completely devastated. Unbridled corruption, political instability and poor economic management have reduced the black gold to a curse in Nigeria rather than a blessing as it is in other oil producing countries. It is a known fact that Nigeria has failed to utilise its oil fortunes to improve the welfare of its citizens. Nigeria's oil wealth rather than being a blessing has turned out to be a curse due to rent seeking activities, macroeconomic instability, poor management of oil revenues and unstable and costly business environment. In spite of the relatively huge amount of resources, Nigeria has performed relatively worse in terms of economic growth and development and good governance compared with its peers. The consequent unrest in the Niger Delta region due to factors such as environmental degradation caused by gas flaring and river pollution and the feeling that the inhabitants of the region have a particular claim on the oil and gas resources generate greater activism and agitation by the locals for a better deal in the sharing of revenues generated by the resources.

Since 2003, the Nigeria government has begun to address systematically the problem that has been addressed as resource curse. A number of key measures are being put in place to manage oil revenue and expenditure more effectively in order to cushion unanticipated boom and burst cycles caused by oil prices. These measures are captured in an overall economic reform agenda that has resulted in boosting confidence, credibility, transparency and accountability, rule of Law and corporate governance. The results are beginning to show already. Between 2002 and 2006, the non-oil sectors contribution to GDP rebounded to 7.2 percent from an average of 2.4 percent between 1992 and 1998 and 3.8 percent between 1999 and 2001, compared with the oil sectors contribution of 3.9 percent (CBN Annual Report, 2006).

The Oil and Gas Industry in Nigeria is of strategic importance that the development of highly skilled manpower for the industry is of utmost importance. In the light of this, the petroleum Technology Development Fund (PTDF) was established by Decree Numbers 25 of 1973 and later amended as PTDF Act of 1990 with the purpose of developing the nation's manpower capacity to operatively participate in the development and exploration of the abundant mineral resources available in the country.

PTDF's mandate Centres on equipping Nigerians with the technology and managerial expertise to compete affectively in the petroleum sector and also to indigenize both the technical and manpower that are so crucial to the success of the nations petroleum development policy.

Activities currently under execution include (NNPC 2006):

1. Financing of research development and endowment in institutions
2. Development of specialized skills in the petroleum sector.
3. Upgrading of Petroleum Training Institution (PTI) into a centre of excellence for manpower development in the oil and gas industry.
4. Accelerate human capital building as in train the trainer programme.
5. Skills acquisition programme.

The petroleum technology development fund is an agency of government charged with capacity building and technology transferred/acquisition in the petroleum industry. The mission is to train Nigerians to qualify as graduates, professionals, technicians and craftsmen in the field of engineering, Geology, Science and management in the oil and gas industry.

The agency in its vision serves as vessels for the development of indigenous manpower and technology transfer/acquisition in the petroleum industry.

Nigeria is the most populous country in Africa. It accounts for over half of west African's population and one of the most attractive countries in terms of foreign investment in flow. Foreign direct investment increased from less than \$1 billion in 1990 to \$ 1.2 billion in 2000, \$ 1.9 billion in 2004, \$2.3 billion in 2005 and \$4.5 billion in 2006 (World Bank, 2007). As percent of GDP, foreign direct investment has increased substantially in recent years. The same pattern is witnessed in portfolio investment, which grew from \$0.2 billion in 2003 to \$2.9 billion in 2005 and \$0.92 billion in 2006 (World bank, 2007). The growth is attributable to the economic reforms and the resulting macroeconomic stability, which have instilled greater credibility in the Nigerian economy. Home remittances are also becoming an increasing important catalyst to growth in Nigeria. In 2004, it remittances (CBN, 2007) this has continued to increase remarkably with a recorded figure of over \$7.0 billion in 2006 (CBN, 2007). Several explanation have been advanced as to why with such great promise, the Nigerian economy has failed to achieve take-off. The table I below shows the average prices of Nigeria's Bonny light (1980 - 2005).

Table 1: Average Prices of Nigeria's Bonny Light.

Year	Bonny light (Price \$)	Year	Bonny light (Price \$)
1980	38.82	1993	16.04
1981	37.06	1994	16.20
1982	35.60	1995	17.36
1983	30.00	1996	21.59
1984	29.19	1997	19.40
1985	28.15	1998	12.77
1986	14.16	1999	N/A
1987	18.53	2000	N/A
1988	15.09	2001	24.53
1989	18.61	2002	25.04
1990	24.04	2003	29.20
1991	20.50	2004	38.73
1992	20.00	2005	55.43

Source: CBN Publication various Issues

From the table above, we observed that Nigeria's oil and gas wealth has not been truly translated into meaningful development largely due to poor leadership and corruption. The availability of huge oil revenues and weak political and administrative structures gave rise to high incidence of corruption, more emphasis on oil taxes and less on direct personal taxes which created the problems of lack of accountability and weak linkages between government and the citizens, which in turn led to weakness in democratic institutions and culture. The paradox of the situation is that there appears to be nothing on ground to show except the stark of rural and urban poverty and collapse of infrastructure and institutions like health and education that are vital to sustainable growth and development of any nation.

DEVELOPMENT OF TECHNOLOGICAL CAPACITY BUILDING IN THE NIGERIA'S OIL AND GAS INDUSTRY

The Local content development is an initiative on the part of the Nigerian government to develop local capacity in the oil and gas industry to enable Nigerians participate actively. It is seen as the utilisation of the Nigerian human and material resources in the exploitation and exploration of the Nigeria hydrocarbon resources. The local content development is to ensure that the quantum or percentage of locally produced materials, personnel, goods and services rendered to the industry are increased thereby generating more employment and economic empowerment. Nigeria is reputed to be among the world's leading countries in hydrocarbon production, currently ranked among the first 10 leading producers of oil and gas. The country exports about 2.0 million barrels per day (mbpd) with a daily production capacity of about 2.4 million. Similarly, gas utilisation has equally risen with the country now exporting both natural, gas and liquefied natural gas (LNG). Available records put the country's gas reserves at 180 trillion cubic feet and capable of lasting for the next three decades, assuming that no further discoveries are made.

The global market has continued to witness band shift in crude oil and gas prices. The high prices are likely to be sustained in view of continued robust global economic growth and unrelenting oil demand growth as shown in table 2 below.

Table 2: Growth Demands for Oil.

Year	Production (million barrel)	Revenue (N million)	Year	Production (million barrel)	Revenue (N million)
1958	1.9	0.2	1982	470.6	7815
1959	4.1	3.4	1983	450.9	7253
1960	6.4	2.4	1984	507.5	8269
1961	16.8	17.0	1985	547.1	10,915
1962	24.6	17.0	1986	535.9	8107
1963	27.9	10.0	1987	482.9	19027
1964	44.0	16.0	1988	529.0	20934
1965	99.0	29.2	1989	626.7	39131
1966	152.4	45.0	1990	660.6	55216
1967	116.6	29.6	1991	689.9	60316
1968	51.9	N/A	1992	711.3	115392
1969	196.3	75.4	1993	695.4	106,192
1970	395.8	167	1994	696.2	160.192
1971	558.7	510	1995	715.4	324.55
1972	655.3	764	1996	681.9	369.19
1973	719.4	1016	1997	855	416.81
1974	823.3	3724	1998	806.4	289.53

1975	660.1	4272	1999	774.7	500.00
1976	758.1	5365	2000	828.3	1,340.00
1977	766.1	6081	2001	859.6	1,707.60
1978	696.3	4556	2002	725.9	1,230.90
1979	845.5	8881	2003	844.1	2,074.30
1980	760.1	12354	2004	900.0	3,354.80
1981	525.5	8564	2005	923.5	4,762.40
			2006	814.0	16,109.00
			2007	880.0	6,700.00

Sources: i) Petroleum Inspectorate (NNPC)
 ii) CBN Annual Report and Statement of Account various issues
 iii) Annual abstracts of statistics 2006

The year 2008 mark fifty years of oil production in Nigeria, we have seen degradation of our environment, destabilization of our polity, balkanization of our unity and absence of cohesion arising from jostling for a slice of the oil resource. The situation has not been a very good development for the people. Nigeria's membership of the OPEC has helped to boost the country and also elevated Nigeria's status. But what the country's leadership has done with the oil wealth over the years remains to be seen. With the huge oil and gas resources, Nigeria is one of the world's most blessed nations but paradoxically, it does not have much to show for it. In Nigeria today, the stark paradox of the Nigerian experience is evident in the collapse of infrastructure in virtually every sphere of national life. Roads are in more than deplorable conditions. Hospitals have become glorified consulting centres while the education sectors are another embarrassing story. In a country that thrives on its oil wealth, petrol for local consumption is imported at 100 percent as successive governments have failed to make the country's refineries function. Power supply, the driving force of any meaningful activity and economic development has become a national embarrassment. An estimated \$10 billion was spent by the former President Obasanjo administration between 2000 and 2007 (CBN, 2007). As more money is sunk into the sector, power generation has continued to dwindle. It is obvious that the gains from oil and gas revenues as indicated in table 2 above have not been prudently managed by the past civilian and military leaders for the development of the entire country.

At this juncture, we examine the local content development in Nigeria's oil and gas industry. The Nigerian content development is defined by (NNPC, 2005) as,

The quantum of composite value added or created in the Nigerian economy through the utilisation of human and material resources for the provision of goods and services to the petroleum industry within acceptable quality, health, safety and environmental standards in order to stimulate the development of indigenous capabilities.

The NNPC vision for local content development is to transform the oil and gas industry into the economic engine for job creation and national growth by developing in the country capacity and indigenous capabilities. In this way, greater proportion of the work is done in the industry with active participation of all sectors. Other source of technological capacity building is through the services of the National Engineering and Technical Company Limited (NETCO). The company was established in 1989 to acquire engineering technology through direct involvement in all aspects of engineering in the oil and gas and

non-oil sectors of the economy. NETCO is Nigeria's premier indigenous engineering company with the strategic vision of providing basic/detailed engineering procurement, construction, supervision and project management services, using state of the art technology. The company's main objective is to fulfil NNPC's strategic vision of developing in-country engineering capacity which might enable Nigerians to design and build plants and facilities for the nation's oil and gas industry and other allied industries.

NETCO has executed many significant projects and was awarded the prestigious International Standard Organisation (ISO) 900/Quality Certificate. This achievement was the first by any indigenous engineering company in Nigeria. NETCO displayed its leadership role for training Nigerians engineers as part of its mandates.

SUMMARY AND CONCLUSION

There is no gainsaying that partnering and alliance formulation are important tools in the development of the oil and gas industry especially where the required capital and indigenous technical capacity are relatively in short supply. To a large extent, the industry used the opportunity provided by the increasing importance of oil and gas in the world energy mix to further these alliances and use them as springboard for industrial development and human capacity building. Partnering involves the pooling of operational resources (costs, human and material) assets for jointly executing a project whose proceeds could be shared in accordance with mutually agreed terms and conditions.

Apparently hoping to consolidate its multi-dimensional role as well as streamline training requirements, the Nigerian national Petroleum Corporation (NNPC) has over-time provided the platform for Nigeria's participation as a player in the global oil and gas industry, as well as serve as a vehicle for actualising national aspirations. The aspirations include (NNPC, 2005):

1. Building up the nation's crude oil reserves with the mandate to achieve 40 billion barrels by 2010.
2. Increasing productivity with the objective of achieving 4.5 million barrels per day by 2010.
3. Commercialising the nation's vast natural gas resources estimated at about 168 trillion cubic feet through the development of the domestic and international markets for such products as LNG, Independent Power Production (IPPs), gas to Liquid (GTLs), Liquefied Petroleum gas (LPG) and others.
4. Facilitating local content participation in the industry by fast tracking technology transfer and harnessing linkages with other sectors of the economy.
5. Ensuring continuous institutional capacity building in the industry especially in the upstream sector.
6. Maintaining domestic self sufficiency in the supply and distribution of petroleum products and derivatives through a market oriented downstream sector.
7. Transiting from an oil dependent mono-cultural economy to an industrial poly-cultural economy using the structures in the industry as the basis for industrial take-off.

In the international circles, Nigeria is described as a gas province with droplets of oil. This underlines the abundance of natural gas resources in the country. Several projects are being implemented or developed by government in alliance or partnership with joint ventures and other companies to ensure maximum monetization of the nation's gas resources. The Nigeria LNG project on Bonny Island in which NNPC is in association with Shell, ELF and Agip and which is producing Liquefied natural gas for international market where demand are growing is a classic example of the success that can result from the partnership. Many opportunities exist for either direct private sector investment or in partnership with the NNPC for the development of the gas sub-sector. Such opportunities include gas gathering and transmission to

power local industries which NNPC through the Nigeria Gas Company is involved in, establishment of natural gas infrastructures, manufacturing of both LPG and Natural Gas (CNG) stations to fuel vehicles, conversion of petrol etc. The opportunities to better monetize the nation's gas resources are endless. The future portends enormous growth and business opportunities. The Nigeria's oil and gas industry stands out in Africa as a place of opportunities where all genuine investors should be.

This study therefore suggests that there should be a deliberate collective effort directed towards capacity building in the oil and gas industry. Collective effort should involve the role of the government in promoting and sustaining policy on technological capacity building efforts. It is this that determines the context and behaviours of various structures and the way they relate in a social network. To be able to achieve the goal of technological capacity building (TCB), the Nigerian government should institutionalize and coordinate TCB as an important social engineering process that can be sustained in order to produce the desired result. In building technological capacity, no nation can be an island to itself. Learning from other economies remains a very important component of TCB and national development.

RECOMMENDATIONS

The oil sector is fundamental to the Nigerian economy, providing the bulk of the Country's Foreign Exchange earnings. Most of the oil is destined for world markets in Europe, North America and Asia, although some are consumed locally. Natural gas is also becoming increasingly important to the Nigerian economy. Nigeria is expected to be one of the biggest liquefied natural gas (LNG) producers in the world. The development of the Local gas industry is bringing benefits to the power sector and boosting industrial projects. The oil and gas sector will certainly play a key role in pulling Nigeria out of the poverty trap. The state has annual contractual debt service payments on external debt liabilities of almost 2.8 billion pounds, an unsustainable sum which does nothing to improve the socio-economic conditions of the masses.

The oil and gas industry in Nigeria is of such strategic importance that the development of highly skilled manpower for the industry is of utmost importance. In the light of this, the petroleum Technology Development Fund (PTDF) was established by Degree Number 25 of 1973 and later amended as PTDF Act of 1990 with the purpose of developing the nation's manpower capacity to operatively participate in the development and exploitation of the abundant petroleum resources in Nigeria. As currently restructured, PTDF is set to add value to national capacity building in the industry.

Based on the above overview, we recommend that the PTDF should:

1. Upgrade the Petroleum (PTI) into a centre of excellence for manpower development.
2. Upgrading of curricula and facilities of some selected universities and polytechnics.
3. Accelerate human capacity building as in train the trainer programmes.
4. Should sustain partnerships and alliances to identify areas of low level indigenous competencies and skills.
5. Should sustain support on the part of government for capacity building strategies.

It is important to note that the Nigerian government plan ahead of time in the global oil and gas industry which make the industry one of the most competitive and investors-friendly in the world. The intention of government was to attract more investments. Government realizes that investment can only thrive in a peaceful atmosphere, it is for this reasons that the development of the Niger Delta area has been attracting the attention of the present democratic dispensation. To this end, government set-up the Niger-Delta Development Commission (NDDC) with a board of its own. The Commission is to ensure equitable

development of the Niger Delta. This step is accepted to ensure amity in the region and thereby offer a positive response to the problems which had often disrupted oil industry operations in the area.

In sum, the Petroleum Technology Development Fund (PTDF) is an agency of Government charged with capacity building and technology transfer/acquisition in the petroleum industry. Its mission is to train Nigerians to qualify as graduates, professionals, technicians and craftsmen in the field of engineering, Geology, Sciences and management in the oil and gas industry in Nigeria and abroad. The Agency in its vision intend to serve as a vessel for the development of indigenous manpower and technology transfer/acquisition in the petroleum industry in the West Africa Sub-region.

REFERENCES

- Adam, H. (1980). Policies towards education, Training and manpower, in T.L Maliyamkore (ed). Policy Developments in overseas training, Dare Salaam, Black Star Agencies.
- Adebifa, S.O. (1990). Human Resources Development in the Developing Countries, *Journal of Third World Studies*, 4(2), 45-51.
- Ayensu, E.S. (1997). Haruna Resources Development in Africa, UNESCO, Africa 14/15, 64-72.
- Bossujt L. (1995). Human Capital Flight for Nigeria: An Assessment of Brain drain from Nigeria, *Journal of Development Studies*, 1(2), 15-19.
- Central Bank of Nigeria (CBN) (2007). *Economic and Financial Review*, vol. 35, December, No 3.
- Caffentzis, G. (1994). The World Bank's African Capacity Building Initiative: A Critiques, *Newsletter of the Committee for Academic Freedom in Africa*, 6, 14-19.
- Dahlman E. (1989). Capacity Building in Sub-Saharan Africa: Challenges and Opportunities, *Journal of Social Sciences*, 2(1), 23-27.
- David M. (2003). Transformation in Higher Education in Nigeria, *Journal of Education*, 3(2), 18-26.
- Elu, J. (2000). Human Development in Sub-Saharan Africa; Analysis and Prospects for the Future, *Journal of third world studies*, 17(2), 53 -71.
- Jaycox, E.U.K. (2000). Capacity Building in Africa: Challenge of the decade, in A.A. Kwapong & B. Lesser (eds). *Capacity Building and Human Resources Development*, Dalhousie University.
- Kwapong, A.A. & Lesser (2000). *Capacity Building & Human Resources Development in Africa*, Nova Scotia Canada; Dalhousie University.
- NNPC (2004). *The Nigerian oil and Gas Industry*.
- NNPC (2004). *Transforming the oil sector*, Quarterly magazine, second quarters 2004, 1(2).
- NNPC (2005). *Nigeria: The oil and Gas Industry Investment Opportunities*.1(2).
- NNPC (2005). *Partnering for sustainable growth of Nigerians oil and Gas industry*, 1(1).

- Okoye N. (2004). Capacity Building in Africa, Revitalizing Universities in Africa, Abuja Journal of Management Review, 1(2), 13-24.
- Oladele, A.O.L. (2001). Opportunities for indigenous participation in upstream industries, August, 4-20 .
- Omene, G.E. (2001). Definition of the Scope of Local Content and Indigenous Company in the upstream sector of the petroleum Industry, August, 1-50.
- Oni, B. (2000). Capacity Building Effort and Brain-drain in Nigeria Universities, Ins. Tapsoba et al (eds) Brain-drain and capacity Building in Africa, 208 -224, Daker Senegal: ECA/IDRC/10m.
- Oni B. & Akerele, W.O. (1997). Capacity Building in the Public and Private sectors, in Human Resources Development Department, Projects (NAMRP).
- Wangwe (2002). Capacity Building Efforts in Nigeria: Empirical Insight, Journal of Higher Education in Africa, 3(1).
- World Bank (1998). Knowledge for Development: World Development Report 1998/99, Washington D.C.
- World Bank (2006). The African Capacity Building Initiative toward improved policy Analysis and Development, management in sub-Saharan Africa, Washington D.C.; The World Bank.
- Sacredoti C., Brunschwig, S. & Tang, I (1998). The Impact of Human Capital on Growth: Evidence from West Africa, Washington, D.C. International Monetary Fund, African Development.
- Prewitt, K. (ed) (1998). Networks in International Capacity Building: Cases from Sub-Saharan Africa, SSRC working, paper 2, New York. SSRC.
- Mansell, R. & Wehu, U. (eds) (1998). Knowledge Societies: Information Technology for Sustainable Development, New York, United Nations Commission and Science and Technology for Development.

This Page Left Blank