

The lack of adequate infrastructure, such as airports, runways and air traffic control systems, has negatively impacted the industry's growth. Also, poor maintenance culture of aircraft and facilities has also hindered growth in the sector, resulting in flight delays and cancellations.

In a publication by Business day in August 2019, it was revealed that the absence of aircraft maintenance (MRO) facilities in Nigeria have cost the country over \$170 billion in the last 10 years. Also, data wheel developed by The Observatory of Economic Complexity (OEC) revealed that Nigerian Aviation has imported 188 thousand dollars in fixed wing aircraft [4].

Experts has projected that the importations of aircraft parts by Nigerian Aviation is set to reach \$117 Million by 2026 at a raise of 3% yearly.

Although the current state of Nigerian Aviation is not encouraging, experts has projected a huge surge in the operational and financial growth, should the industry invest more in 3D printing technologies.

Expert in the field has predicted a future projection of an estimated economical value of \$600 to \$900 billion to the country GDP in the next 10 years. projecting that the involvement Additive Manufacturing in the Nigerian Aviation could improve the industry's revenue turnover by 42% [2].

Additive Manufacturing can be used to produce aircraft maintenance facilities (MRO) which will improve the life-span of aircraft and lower the cost of maintenance over the years. Also, Additive Manufacturing has the potential of lowering the barrier of entry in the world of aircraft manufacturing, therefore boosting the GDP of Nigeria.

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MANAGEMENT OF OIL EXPLORATION IN NIGERIA

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Nigeria is the second largest oil and gas producer in Africa. Crude oil from the Niger Delta basin comes in two types: Light - the lighter has around 36 gravity; comparatively heavy –

the heavier has 20–25 gravity. Both types are paraffinic and low in sulphur. Nigeria's economy and budget have been largely supported from income and revenues generated from the petroleum industry since 1960. Statistics as at February 2021 shows that the Nigerian oil sector contributes to about 9% of the entire GDP of the nation. Nigeria is a major exporter of crude oil and petroleum products to the United States of America

Oil producing states in Nigeria

There are 11 oil-producing states in Nigeria, including Akwa Ibom, Delta, Rivers, Edo, Abia, Ondo, Imo, Bayelsa, Lagos, Anambra, and Kogi. Nigeria provides a lot of opportunities for each state. Significant effort is put into oil-producing states in Nigeria as crude oil is the pillar of the country's economy. These states receive 13% of the revenue generated yearly by crude oil from the federal.

Oil production in Nigeria is broadly divided into 3 main parts: offshore, downstream and natural gas. Figure 1 shows the overall production of crude oil in Nigeria across 120 years since 1900. Although it was discovered in the early 1900s, commercial production only begun from 1958.

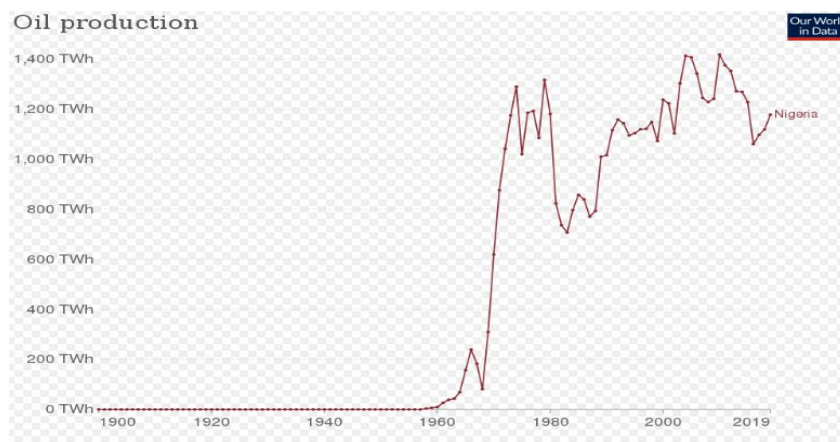


Figure 1 - Development of oil production in Nigeria

Table 1 below shows the different types of production, their production capacity in terms of barrels per day

Table 1. Refineries and their value of production

Kind of production	Production value	
Offshore	The amount of oil extracted from Nigeria was expected to expand from 15,000 barrels per day (2,400 m ³ /d) to 1.27 million barrels per day (202,000 m ³ /d) in 2010	
Natural gas	Natural gas reserves are well over 5,300 km ³ (187×10 ¹² cu ft), the gas reserves are three times as substantial as the crude oil reserves.	
Downstream	Refinery	Production
	Warri Refinery	125,000 barrels
	New Port Harcourt Refinery	150,000 barrels
	Kaduna Refinery	Defunct
	Old Port Harcourt Refinery	Defunct
	Dangote Refinery	New refinery (650,000 barrels)

Operating agreements

As of 1999, details and nature of the relationship between the government and the operating companies were governed by three types of agreements, joint ventures, production sharing contracts and service contracts.

Table 2. Operating agreement between NNPC and multinational companies

Multinationals	Percentage agreement	Production capacity (barrels per day) by 2000
Shell Petroleum Development Company of Nigeria Limited (SPDC)	NNPC (55 %), Shell (30%), Elf (10 %) and Agip (5 %)	899 000
Chevron (American)	NNPC (60%) and Chevron (40%)	400 000
Mobil Producing Nigeria Unlimited	NNPC (60%) and ExxonMobil (40%)	632 000
Nigerian Agip Oil Company Limited	NNPC (60%), Agip (20%) and ConocoPhillips (20%)	150 000
Elf Petroleum Nigeria Limited	NNPC (60%) and Elf (40%)	90 000
Texaco Overseas Petroleum Company of Nigeria	NNPC (60%), Chevron (20%) and Texaco (20%)	60 000

Some Independent and indigenous oil and gas companies include: Addax Petroleum Nigeria Limited; Aiteo Group; AMNI International Petroleum Development Company Ltd; Consolidated Oil Limited; Dubri Oil Company Ltd; Emerald Energy Resources Ltd; Yinka Folawiyo Petroleum Company Ltd.

Challenges facing oil management and production in Nigeria

Nigeria is blessed with oil. However, activities associated with petroleum exploration, development and production operations have caused civil wars, poverty, pollution in Nigeria, especially the Niger Delta. Discharges of petroleum hydrocarbon and petroleum-derived waste streams have caused environmental pollution, adverse human health effects, socio-economic problems and degradation of host communities in the 9 oil-producing states in the Niger Delta region. Pipeline vandalism, crude oil theft, pollution, natural gas flaring, oil spillage causes serious environmental degradation which resulted into serious conflicts. A lot of experts have regarded this as a curse than a blessing.

Bad refineries

Nigeria refines less than 3% of the oil it produces. As a result despite the large production of oil it ends up importing majority of petroleum products from abroad. The local refineries are not functional. Also, when they are functional they operate at less than 30%.

Figure 2 shows the daily demand of refined by Nigerians and the production capacity of our local refineries. This leads to mass importation of from abroad.

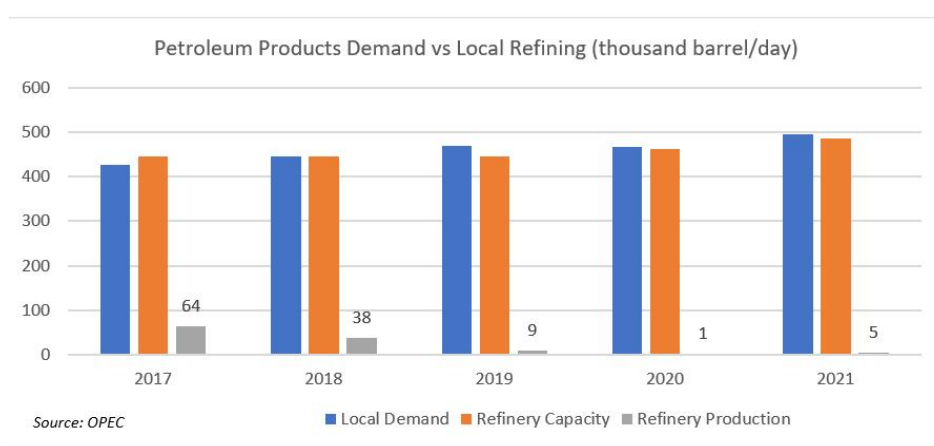


Figure 2 - Petroleum products demand vs local refinery production vs local refinery capacity

Recommendations

In other to drastically improve the management of oil in Nigeria, the government should enforce laws regarding safe oil production practices and companies who do not comply with these rules should be heavily fined and banned if they refuse to pay fines. Profits from oil production should be used to improve the standard of living of citizens of the Niger delta area. This will greatly reduce the frequency of oil theft and pipeline vandalism. Existing refineries should be rehabilitated and brought back into operation to least at 80–90% capacity utilization. Government should create an enabling environment with fiscal incentives to attract investments into refining in Nigeria such as Dangote’s refinery. Improved relationship with Russia will certainly be beneficial to both countries.

Conclusion

This article covers the structure of oil and gas industry, upstream and downstream sector, obstacles in the oil and gas industry, pipeline vandalism, crude oil theft, pollution, inadequate pipeline infrastructure, effects of poor management among others stating the negative effects of excessive degradation due to oil exploration and conflicts in Nigeria. With a complete discussion of the history, production and issues associated with the petroleum industry in Nigeria, our future discussions will be a comprehensive work on its old refineries, cost of repairs of old refineries, introduction of foreign investors to its downstream sector especially the refineries, cost production of new refineries, benefits and economic advantages both to Nigeria and its foreign investors - specially Russia

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CHALLENGES OF OIL AND GAS TRANSPORTATION STRATEGY DEVELOPMENT IN SONATRACH COMPANY, ALGERIA

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Sonatrach is an integrated oil and gas company based in Algeria. It operates in various sectors, including upstream exploration and production, downstream refining and marketing, pipeline transportation, and more. As the national oil company of Algeria, Sonatrach plays a crucial role in the country's oil and gas industry [1].

Including all the processes that this company covers in the sector of energy, pipeline transportation is one of the aims that is really important for the company to transport the crude oil and gas to different destinations, and to ensure the safety of the transportation, the company uses classical methods for the safety of the pipelines, this research will be based on implementing the new technology of auto drones and their advantage for the company, that is highly required to install such new generation of technology to this sector as many other large energy companies around the world.