Foreign Direct Investment (FDI) and Technology Transfer in Nigeria, 2013-2022

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Abstract
The Nigerian state for quite some time has been saddled with the challenges of technology transfer as the country has remained a producer of raw materials for industrial countries. One of various ways Nigeria has sought to overcome her technology advancement challenges is through foreign direct investment. This paper, therefore, assessed the impact of Foreign Direct Investment (FDI) on technological transfers in production/manufacturing, oil and gas, agriculture and telecommunication sectors in Nigeria. This study utilized ex post factousing secondary sources of dataas the main instrument of data collection. Findings of the study revealed that a sum of 130.1 billion dollars was received from foreign capital importation during 2012-2023, out of whichFDI inflow stood at 11.72 billion dollars. Thus, the Multinational Corporations (MNCs) operating in Nigeria has provided training programs to Nigerians working in the various sectors of the economy. Nigerians were not made to know the intricacies of producing goods and services effectively and efficiently. Consequently, Nigerian working in these companies innovation ability was not enhanced. The activities of MNCs have generated little multiplier effects for local firms in the country. Therefore, the general impact of FDI on technology transfer in Nigeria is low. The study therefore recommends that Nigerian government needs to increase funding for Research and Development (R&D) activities to support technological advancements.

Key words: Foreign Direct Investment (FDI), technology transfer, production/manufacturing, oil and gas, agricultural and telecommunication.

Introduction
Nigeria for decades has been confronted with the challenges of technological transfer. Since independence in 1960, this has made the search for solutions to the challenges of technological transfer the pre-occupation of the Nigerian government at different intervals. Among the various ways Nigeria has sought to overcome her economic development

challenges is through foreign aids and by allowing nations, international businessmen and multi-national companies to invest in her economy through Foreign Direct Investment (FDI), as FDI is seen as the vehicle for economic development (Atim, 2006; Igbadoo, Nnana & Igwe, 2023).

Generally, it is assumed that FDI has a causal link with technological transfer even though they are separate conceptual entities. FDI is believed to be the main conduit through which technology transfer takes place. FDI inflow is said to have significant impact on the technological development of the host country. When foreign companies invest in a country, they bring with them advanced technologies, management practices, and research and other development capabilities. This transfer of technology can contribute to the improvement of the host country's productivity, competitiveness, and innovation capacity. The actualization of these benefits can thus lead to the realization of the developing country's macroeconomic and microeconomic goals such as economic growth, improved productivity, better standard of living, reduction of poverty and unemployment and an increased investment in research and development amongst others (Igbadoo, Nnana, &Igwe, 2023).In other words, FDI brings in capital, technology, know-how, and new business practices, which can lead to increased economic activity and job creation.

Nigeria has been a recipient of FDI since independence. However, it is important to state that the first national development plan of 1962-1968 and the second development plan which saw the institutionalization of the Nigerian Enterprises Promotion Decree (NEPD) under the indigenization policy of 1972 both limited the inflow of FDI in the country. The plans imposed trade restrictions and capital controls as part of a policy of import-substitution industrialization aimed at protecting domestic industries and conserving foreign exchange reserves (Arawomo & Apanisile, 2018).

In 1995, the Nigerian government took proactive steps in pursuing FDI inflows into the country with the establishment of the Nigerian Investment Promotion Commission (NIPC) in 1995 as FDI was deemed as a solution to economic development challenges in the area of employment generation, poverty reduction and technology transfer (Arawomo & Apanisile, 2018). The essence of the NIPC was to market the Nigerian economy, remove possible deterrents to FDI, provide investment incentives to attract FDI and ease the process of FDI entry by Multinational Enterprises (MNEs) into the country. Statistics from CBN Statistical Bulletin (2016) and World Bank (2022) indicated that foreign direct investment flows into Nigeria increased significantly since 1995 after the restriction on FDI inflow in the country was removed, between 1995-2012, FDI inflows in the country stood at 64.25 billion US dollars

and 2013-2022, FDI inflow in the country stood at 11.2 billion naira (CBN, 2023). Thus, from 2013 to 2022, except for 2016, the statistic indicates that FDI inflow in the country is on decline. This decline could largely be attributed to political instability, insecurity, high taxation, lack of transparency, widespread corruption and poor quality of infrastructure (UNCTAD, 2018 & Ikpoto, 2022). Overall, from 1970 to 2022, the FDI flow in the country stood at 89.03 billion US dollars (World Bank, 2022; CBN, 2023).

Deriving from the above, it is evident that Nigeria has been a recipient of FDI over the years, it is expected that FDI inflows in Nigeria would impact on technological transfer in the country, but research on these effects in production/manufacturing, oil and gas, agriculture and telecommunication sectors in Nigeria has not been extensively studied during the period, 2013-2022. It is against this background that this paper seeks to assess foreign direct investment and technology transfer in Nigeria, 2013-2022.

Understanding Foreign Direct Investment and Technological Transfer

FDI is an investment by an individual, company, or country in another country's domestic economy, aiming to maximize capital or profit (Andza & Akuv, 2022). It can be through establishing businesses, joint ventures, or acquiring assets, with a 10% control or influence required (Obiekwe, 2018). It is a combination of technology, marketing, capital and management. It provides a firm with new markets, marketing channels, easy admittance to new technology, skills and product, financing and production facilities.

There is consensus of opinions among scholars such as Ikiara (2003); Blomstrom and Kokko (2003) and Dantas (2022) that MNCs establish subsidiaries in host nations where they introduce new technology, skills, marketing know-how, and innovative management approaches. Through a variety of routes, these knowledge resources may "leak" to local businesses. Generally, labour mobility as a result of FDI inflow between subsidiaries and indigenous firms could facilitate knowledge spillover, the integration of the local market with international operators, learning from foreign subsidiaries, demonstration of new technologies, and technical assistance for indigenous firms.

Ikiara (2003) argued that technology transfer can happen directly to local firms working in joint ventures with MNCs or it can happen indirectly as a benefit that trickles down to unaffiliated local firms. Ikiara identified four interconnected channels through which spillovers happen: labour turnover from affiliates to domestic firms, horizontal links

between affiliates and domestic firms in the same industry, internationalisation of R&D, and vertical links between affiliates and their suppliers and customers in the host country's R&D.

However, a rising body of empirical research with slightly contradictory conclusions has recently been discussed in the literature. For example, as (Ghali and Rezgui, 2008) explain, the results of the studies are significant in some cases and insignificant in others. For example, the earlier studies (Blomström and Persson, 1983) and (Blomström, 1986), which covered low-income and developing economies, used cross-sectional data to confirm the presence of positive spillover. Narula (1997) initiated a preliminary investigation of the functions of multinational enterprises in obtaining industrial technology in Nigeria. In addition to discovering that the tangible technology that developing country multinationals transmit is also obtained by domestic companies, he also discovered that these multinationals do not always obtain technology from their home country. Asiedu (2002) only studied the determinants of FDI in Nigeria among other African countries. Neither study is able to provide light on how foreign direct investment (FDI) affects business performance in Nigeria or even if FDI speeds up the transfer of technology to local companies there. Thus, those studies confirm that a relationship exists between FDI and technological transfer but recent studies on the topic have scarcely isolated those consequences in Nigeria, especially during the study period. That is why this research fills in the gap that exists in knowledge in this regard.

Research Method

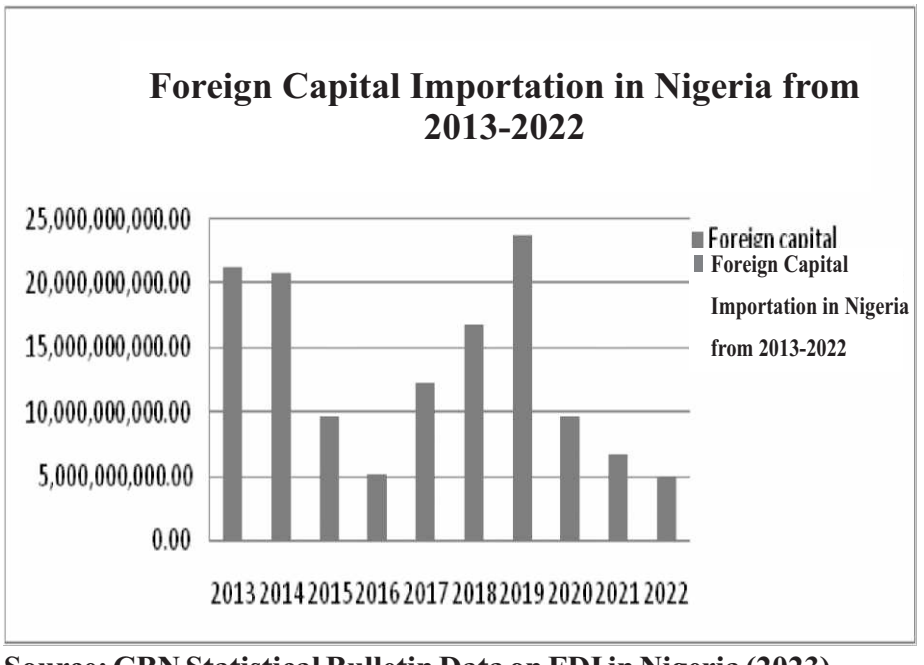
This study utilized ex post facto research design. Ex post facto research design was used in this study because the researchers made use of archival extraction of data on FDI from Central Bank of Nigeria(CBN). It is in this regard that ex post facto research design was deemed fit for this study. The population covered by this study is that of the entire Nigeria. Nigeria has a projected population of 218,541,212 (World Bank Report, 2023). This population is undoubtedly large and may pose difficulties for data generation and analysis. For this reason, a sample was drawn purposely from six states namely; Benue, Borno, Enugu Kano, Lagos, Rivers States and Abuja (FCT). Benue has a population of 6,141,300, Borno, 6,111,500, Enugu, 4,690, 100, Kano, 15,462,200, Lagos, 13,491, 800, Rivers, 7,476,880 and the FCT has a population of 3,067,500 (NBS Annual Abstract of Statistic, 2022). The combine figure for the six states and the FCT is 56,471,200. The decision to select these states was because all these states and the FCT received FDI during the period under study. Therefore, there is need to study these states to see the impact of FDI on technological transfer in these states. The instrument of data

collection that was used in this study was the documentary or archival extraction of data on FDI in the country. Accordingly, the researcher retrieved records from Central Bank of Nigeria, National Bureau for Statistics and World Bank as they relate to the foreign investment flow in Nigeria from 2013 to 2022. To sum the mass of data that was generated from through CBN, on FDI inflow in Nigeria and its impacts on technological in the country during the period covered by the study, the researchers made use of bar chart and tables. Data collected was therefore analyzed and inferences were done in line with the objectives of the study.

Data Presentation and Analysis on Foreign Direct Investment in Nigeria, 2013-2022

Data presented below is on FDI inflow from 2013-2022.Figure1 and 2 represent data on Foreign Capital Importation and FDI in Nigeria from 2013-2022. The figures presented below are in US dollars.

Figure1: Foreign capital importation in Nigeria from 2013 to 2022



Source: CBN Statistical Bulletin Data on FDI in Nigeria (2023)

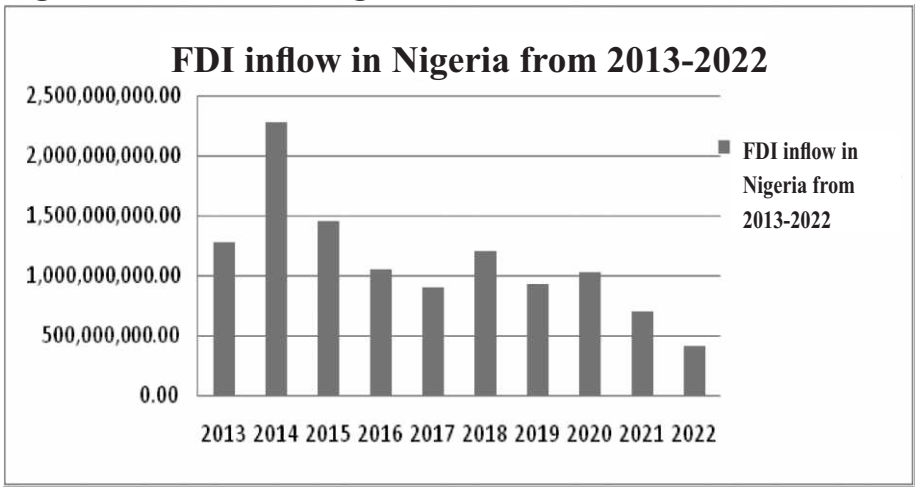
The figure above indicates that in 2013, the sum of 21.3 billion US dollars was received from foreign capital importations in Nigeria. In 2014, the sum of 20.7 billion US dollars was received from foreign capital importations in the country which shows that there was a little decline from the sum received in 2013 (CBN Statistical Bulletin Data on FDI in

Nigeria, 2023). In 2015, the sum of 9.6 billion US dollars was received from foreign capital importation, the figures indicate that there was a massive drop in foreign capital importation of that year (CBN Statistical Bulletin Data on FDI in Nigeria, 2023).

In 2016, the sum of 5.1 billion US dollars was received from foreign capital importations. The data indicates that the country recorded its second lowest foreign capital inflow in that year. In 2017, the sum of 12.2 billion US dollars was received from foreign capital importations (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). The data indicated that foreign capital importation in the country began to rise again during this period as compared with what was received in 2015 and 2016. Thus it was not as attractive as that of 2013 and 2014. In 2018, the sum of 16.8 billion US dollars was received from foreign capital importation. The data indicates that the rise in foreign capital importation continued in this year, which represented an improvement from what was received in 2015, 2016 and 2017. However, despite the improvement in the foreign capital inflow, the amount attracted was not up to what was received in 2013 and 2014.

In 2019, the sum of 23.7billion US dollars was received from foreign capital importations (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). This figure shows that Nigeria received it highest capital importation during this year, the re-election of former President Muhammadu Buhari gave businessmen hope of political stability, a development that was responsible this massive inflow in that year. In 2020, the sum of 9.6 billion US dollars was received from foreign capital importations. The figure indicates that foreign capital importation started dropping again. However, the figure shows that the figure was marginally better than what was received in 2015 and an increase from what was received in 2016 but a decline from what was received from 2013, 2014, 2017, 2018 and 2019. In 2021, the sum of 6.7 billion US dollars was received from foreign capital importations (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). The data indicated a further decline from what was received in the previous year. However, it was better than was received in 2016. In 2022, the sum of 4.8 billion US dollars was received from foreign capital importation, which was the lowest the country has received during this period (CBN Statistical Bulletin Data on FDI in Nigeria, 2023).

Figure 2:FDI inflow in Nigeria from 2013 to 2022



Source: CBN Statistical Bulletin Data on FDI in Nigeria (2023)

The figure above indicates that in 2013, the sum of 1.2 billion US dollars was received from FDI in Nigeria (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). In 2014, the sum of 2.2billion US dollars (11%) of the total foreign capital importation in that year was received from FDI in the country (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). This implies that there was an increase in FDI inflow in this year as compared to 2013. Nigeria received its highest FDI this year. In 2015, the sum of 1.4billion US dollars (15%) of the total foreign capital importation in that year was received from FDI in the country which presented a decline from what received in 2014 but an increase from what received in 2013 (CBN Statistical Bulletin Data on FDI in Nigeria, 2023).

In 2016, the sum of 1.04billion US dollars (20%) of the total foreign capital importation in that year was received from FDI in the country which presented a decline from FDI in 2013, 2014 and 2015 (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). In 2017, the sum of 8.9million US dollars (8 %) of the total foreign capital importation in that year was received from FDI in the country, which presented a decline in 2013, 2014, 2015 and 2016 (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). In 2018, the sum of 1.1billion US dollars (8%) of the total foreign capital importation in that year was received from FDI in the country (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). There was an increase in overall FDI inflow as compared to what was received in 2017 and 2016 but a decline from 2013, 2014 and 2015.

In 2019, the sum of 9.2 million US dollars (4%) of the total foreign capital importation in that year was received from FDI in the country (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). This was the

lowest FDI inflow as compared to what was obtained from 2013-2018 (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). In 2020, the sum of 1.02billion US dollars (11%) of the total foreign capital importation in that year was received from FDI in the country (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). There was an increase in overall FDI inflow as compared to 2019 and 2017 but a decline in what was invested from 2013, 2014, 2015, 2016 and 2018. In 2021, the sum of 6.9million US dollars (10%) of the total foreign capital importation in that year was received from FDI in the country which represented the lowest from what was invested from 2013-2020 (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). In 2022, the sum of 4.1million US dollars(8.5%) of the total foreign capital importation in that year was received from FDI in the country which represents the lowest of what was received during this period (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). Thus, from 2013 to 2022, except for 2014, the statistic indicates that FDI inflow in the country is on decline. This decline could largely be attributed to political instability, insecurity, high taxation, lack of transparency, widespread corruption and poor quality of infrastructure (UNCTAD, 2018 &Ikpoto, 2022).

Table, 1: FDI Inflow in Nigeria in Agriculture, Oil, Gas, Production/Manufacturing and Telecommunication sectors from 2013- 2022

FDI Inflow in Nigeria in Agriculture, Oil,Gas, Production/Manufacturing and Telecommunication sectors from 2013-2022						
S/No	**Year**	**Agriculture**	**Oil and Gas**	**Production/ Manufacturing**	**Telecommunication**	**Total**
1.	2013	82,370,181.00	129,620,615.53	391,332,828.18	9,059,275.65	612,382,900.36
2.	2014	24,321,957.25	208,172,142.72	943,978,115.11	994,325,249.94	2,170,797,465.02
3.	2015	98,325,502.51	29,764,926.38	423,690,429.20	938,126,117.80	1,489,906,975.89
4.	2016	22,466,314.03	720,152,394.07	302,645,963.69	931,200,333.41	1,976,465,005.20
5.	2017	159,053,306.79	323,066,251.56	864,515,430.71	522,147,701.23	1,868,782,690.29
6.	2018	289,482,492.25	115,553,663.90	671,109,423.25	63,233,727.84	1,139,379,307.24
7.	2019	453,427,031.00	106,547,878.14	1,291,217,066.41	942,863,833.96	2,794,055,809.51
8.	2020	300,775,949.75	53,510,866.84	913,883,844.82	417,481,615.30	1,685,652,276.73
9.	2021	159,915,439.72	70,057,997.39	777,781,416.00	753,044,446.35	1,760,799,299.46
10.	2022	94,293,841.12	5,044,229.76	673,236,481.91	399,905,531.38	1,172,480,084.17
G/Tota		**1,684,432,015.42**	**1,761,490,966.29**	**7,253,390,999.28**	**5,971,387,832.86**	**16,670,701,813.85**

Source: CBN Statistical Bulletin Data on FDI in Nigeria (2023)

Table 1 indicates that FDI inflow in the four sectors stood at 16,670,701,813.85 dollars from 2013-2023, of which agriculture sector received 1,684,432,015 dollars, oil and gas sector received 1,761,490,966.29 dollars, production/manufacturing sector attracted 7,253,390,999.28 billion dollars and telecommunication received 5,971,387,832.86 dollars (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). This implies that the attention of foreign investors is gradually shifting from the oil and gas sector to other sectors of the Nigerian economy, especially the production and manufacturing sector. It is important to state that the data on FDI inflow in the country is combined with other foreign capital inflows by the Central Bank of Nigeria when it comes to the distribution of FDI by nature of business.

Twenty one (21) businesses attracted FDI in the country during this period. They include; oil and gas, telecommunications, manufacturing, agriculture, banking, brewering, construction, consultancy, drilling, electrical, financing, fishing, information and technology services, marketing, servicing, shares, hotels, telecommunication, training, trading, transport and weaving. The major sectors that attracted FDI in Nigeria include: oil and gas, telecommunications, manufacturing, agriculture, and servicing (CBN Statistical Bulletin Data on FDI in Nigeria, 2023).

In the agricultural sector, the following companies are operating in the sector during this period. They include: Oram International, Cargill, Nestle, Wilmar International, PVH Corp: Golden Veroleum, Indorama Corporation, Alluvial Agriculture, Agco Corporation, Gulu Agricultural Development Company and Nitromobile International Nigerian Ltd (CBN Statistical Bulletin Data on FDI in Nigeria, 2023).

In the production and manufacturing sector, the following companies are operating in the sector during this period; Procter and Gamble, Unilever, Coca Cola, Nestle, Samsung, Lafarge Holcim, Mercedes-Benz, Siemens, General Electric, Heineken, Peugeot, Toyota, Honda, Kia, Ford, Michelin and Philips (CBN Statistical Bulletin Data on FDI in Nigeria, 2023).

In the oil and gas sector, the following companies are operating in the sector during this period. They include: Royal Dutch Shell, Total, ExxonMobil, Chevron, Eni, Addax Petroleum, Agip, Sahara Energy Resource Limited, and Petrobras. And in the telecommunication sector, the following companies are operating in the sector during this period. They include:Mobile Telephone Network (MTN) and Multi-Choice (CBN Statistical Bulletin Data on FDI in Nigeria, 2023).

Table 2. FDI Inflow in Nigeria in Six states and FCT, from 2013 to 2022

FDI Inflow in Nigeria in Six states and FCT, from 2013 to 2022									
S/No	Year	Abuja (FCT)	Benue	Borno	Enugu	Kano	Lagos	Rivers	Total
1.	2013	119,598,965.33	-	3,000,000.00	44,476,016.58	2,675,471.40	21,022,259,489.68	7,835,000.00	21,212,520,414.39
2.	2014	122,875,016.84	-	-	227,439,346.71	524,966.00	20,213,049,364.61	6,319,965.00	20,570,208,659.16
3.	2015	11,226,066.75	-	-		-	9,545,891,167.26	1,500,000.00	9,559,059,873.72
4.	2016	85,425,682.42	-	-	2,196,212.00	728,790.10	4,941,960,592.74	6,339,009.44	5,041,186,616.38
5.	2017	2,521,802,874.45	-	-	708,690.00	184,970,442, 639.71.00	7,560,203,715.71	934,817.28	10,988,024,314.14
6.	2018	7,138,922,013.50	2,340,446.00	2,258,101.00	1,765,778.81	2,018,211.00	5,365,272,014.40	544,903.68	12,510,781,022.39
7.	2019	6,206,207,676.77	25,027,660.00	500,000.00	50,000.00	1,809,830.00	17,119,149,937.84	41,453,275.70	23,369,370,720.31
8.	2020	852,117,764.09	-	-	-	829,710.00	6,265,979,761.00	-	7,118,927,235.09
9.	2021	659,404,331.36	-	-	-	2,399,915.00	2,358,366,309.77	-	3,020,399,571.13
10.	2022	1,493,021,690.33	-	-	-	-	2,921,977,956.53	-	4,414,999,646.86
Grand Total		**19,210,602,081.84**	**27,368,106.00**	**15,758,101.00**	**277,078,683.81**	**11,171,863.50**	**97,314,110,309.54**	**64,926,971.10**	**116,921,016,116.79**

Source: CBN Statistical Bulletin Data on FDI in Nigeria (2023)

Table 2 indicated that FDI inflow in the six states of Borno, Benue, Enugu, Kano Lagos, Rivers and the FCT stood at 116,921,016,116.79 dollars from 2013-2023, of which FCT received 19,210,602,081.84 dollars (16%) (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). Benue State attracted 27,368,106.00 dollars (0%), Borno State received 15,758,101 dollars (0%), Enugu State attracted 277,078,683.81 dollars (0%), Kano State received 11,171,863.50 dollars (0%), Lagos State attracted 97,314,110,309.54 dollars (84%) while River State attracted 64,926,971.10 dollars (0%) (CBN Statistical Bulletin Data on FDI in Nigeria, 2023).

The study discovered that Lagos State and Abuja (FCT) are the hubs of FDI inflow in the country. Also, the study discovered that twenty eight (28) states and the Federal Capital Territorial (FCT) Abuja received FDI inflows, they include; Abia, Adamawa, Akwa Ibom, Anambra, Benue, Borno, Bauchi, Cross River, Delta, Ebonyi, Edo, Enugu, Imo, Kaduna, Kano, Katsina, Kogi, Kwara, Lagos, Niger, Ogun, Ondo, Osun, Oyo, Rivers, Sokoto, Yobe and Nasarawa (CBN Statistical Bulletin Data on FDI in Nigeria, 2023). Eight (8) states namely; Bayelsa, Ekiti, Gombe, Jigawa, Kebbi, Plateau, Taraba and Zamfara were attracting zero FDI during this period (CBN Statistical Bulletin Data on FDI in Nigeria, 2023).

There are several reasons why Lagos State and Abuja have received more Foreign Direct Investment (FDI) inflows in Nigeria than any other state during this period, according to respondents. Ikpoto (2022) confirmed that Lagos and the Federal Capital Territorial Abuja are the hubs of FDI in Nigeria, noting that the majority of the states including Benue State do not have FDI and lack the capacity of attracting FDI. Ikpoto gave the reason behind the attraction of foreign investors to Lagos State as a result of the state being the commercial capital not just in Nigeria but Africa as a whole. Ikpoto opines that the capitalist prefers to invest in the city because of the nature and character of the forces of production in the state, noting that the state can boast of having a quality labour power as compared to other states in the country. Ikpoto further states that, Abuja in recent times has become an attraction area for FDI because it is the seat of power and it has both the amenities and security which are attracting factors to foreign investors.

Impact of FDI on Technology Transfer in Nigeria

Nigeria is a country with a population of 218,541,212 people (World Bank Report, 2022). The country is richly blessed by nature with numerous valuable materials, human, and mineral resources. Overall, Nigeria has mineral, natural and human resources that are capable of playing a crucial role in the country's economy and have the potential to drive sustainable development and improve the livelihoods of its population (Elaigwu & Abubakar, 2022). Despite having human, natural and mineral resources, the country has remained a raw materials exporter to advance countries and multi-national companies, who in turn refined these products and sell to Nigerians at a high rate because of lack of technology.

It is instructive to note that since 1995, the country has turned to FDI to overcome her challenges of economic development, especially as it regards to the area of technological transfer, as FDI is seen as an important source of capital that complements domestic investment, encourages production improvements and contributes to the advancement in technology in any society. Technology transfer refers to the process of transferring knowledge, skills, and expertise from organization or individual to another for the purpose of developing, and utilizing technologies. It involves the transfer of technical information, procedures, and resources from the research and development stage to the practical application and commercialization stage (Arawomo & Apanisile, 2018). The impact of FDI on technological transfer is discussed below in the four sectors covered by the study.

In the production and manufacturing sector, Nigerians have

acquired knowledge on operation of machines but technological transfer was limited in the country as Nigerians working in these companies were neither exposed to the development stage of a product or process as the majority of foreign companies operating in this sector does not produce their products here, but rather assemble products already produced from their parents companies in their country (Ohiorheman, 2022). Therefore, the Nigerians working in companies gain little knowledge on products and cannot apply it locally. Although, Innoson Vehicle Manufacturing Company (IVM) to some extent has benefited from technological transfer as the company is producing various types of cars but the company is involved more in assembling of such cars as such total success has not been achieved in this regard.

In the oil and gas sector, thousands of Nigerians working with multinational companies such as Shell, Total, Exxon Mobil, Chevron, Eni, Addax Petroleum, Agip, Sahara Energy Resource Limited, and Petrobras have acquired knowledge, skills and expertise in the course of exercising their duties and through manpower training. To be specific, FDI has facilitated the transfer of skills and knowledge through the training of indigenous personnel in various aspects of the oil and gas industry, including exploration, drilling, production, marketing, and distribution (Ohiorheman, 2022). However, FDI has not brought the desirable effect on technological transfer. Today, Nigeria still refines fuel from other countries as the refineries in the country are not functional despite being a major oil producing country and having many foreign oil companies operating within the country. Thus recently, Dangote Company owned by Aliko Dangote a Nigerian built a refinery and received its first crude oil from Shell in December 2023 to refine and has released its first refined fuel. However, technology has not been transferred because this company is not locally built, and the important machineries in the company were all imported.

In the agricultural sector, FDI has to some extent impacted on technological transfer in the sector. One notable technological advance is the increased use of mechanized farming techniques by large-scale farmers. With the introduction of tractors, combine harvesters, and other modern equipment, some farmers (mostly elites) are able to increase their output and reduce labor-intensive processes. This has helped to improve the overall efficiency and effectiveness of agricultural operations for large-scale farmers in Nigeria. However, it is worth noting that technological advances in the agricultural sector in Nigeria are not evenly distributed. While some farmers have embraced modern technologies, many small holders still rely on traditional farming tools. Access to affordable and quality agricultural inputs, as well as training on how to

use modern technologies, remains a challenge for many farmers in Nigeria (Elaigwu& Abubakar, 2022).

Overall, the level of technological transfer in the agricultural sector in Nigeria has not been too significant in recent times. The desirable impact of technological transfer has not been felt as 90% of farmers still use locally made farming tools for farming in the country as mechanized farming has continued to remain a challenge in the country, a development that has continued to impact negatively on food security in the country. Nigeria's agricultural fundamentals are robust and include an estimated 84 million hectares of arable land, out of which 40 % is cultivated and only 10 % of the 40 % is cultivated optimally. Thus, the chemicals produced by these companies have assisted in the area of farm weeding but Nigerians that are working with these companies are not exposed to the production process, and technological transfer has remained grossly low in the sector(Elaigwu& Abubakar, 2022).

In the area of telecommunication, foreign companies operating within the telecommunication sector have rolled out Fourth Generation Long-Term Evolution (4G LTE) networks across the country, providing faster internet connectivity. This has improved the overall quality of telecommunication services in Nigeria(Ajala& Adesanya, 2017). The telecommunication companies in Nigeria have expanded their mobile network coverage to reach even remote and rural areas. This has helped in bridging the digital divide and connecting more people to telecommunication services. Furthermore, many Nigerians working in the telecommunication sector have received manpower training on different gadgets operations and repair during this period. However, these developments have led to technology transfer as Nigerians are not exposed to the production processes of gadgets such as phones, sim cards, laptops, desktops, and televisions.

FDI has not led to the desirable level of technological transfer in the country, the country is still struggling with development of technology, as of today, majority of the finished goods used in the country are imported, petroleum products are refined elsewhere and shipped to the country, majority of farmers still rely on traditional farming tools, there is poor network connectivity in telecommunication industry, and the country remains a producer of raw materials for industrialized countries. Thus, the sum of 11,295,609,384.72 dollars was received from FDI during the period covered by the study.Nigerian economy is still weak characterized with limited technology as FDI have not been able to address the problem of inadequate technology in the country as the activities of MNCs have generated little multiplier effects on the domestic companies in Nigeria.

Conclusion

Nigeria has been faced with the problem of technological transfer. Nigerian technical condition, particularly in the production/manufacturing, oil and gas, agriculture and telecommunication have shown retardation with manifestations as majority of the finished goods used in the country are imported, petroleum products are refined elsewhere and imported to the country, majority of farmers still rely on traditional farming tools, there is poor network connectivity in telecommunication industry, and the country remains a producer of raw materials for industrialized countries. This situation made the Nigerian government to seek FDI as a vehicle for technological transfer as FDI is considered a prescriptive antidote for the improvement of technological development in any society. The paper found that Nigerians working in the various sectors of the economy have thus received training from the Multinational Corporations (MNCs) operating in Nigeria. However, Nigerians were not made to understand the complexities of producing goods and services effectively and efficiently, nor were they exposed to the product or process development stage. As a result, they were unable to innovate more. MNC operations have not been of much impact to domestic businesses in the nation. Consequently, there is little overall effect of FDI on technology transfer in Nigeria. The study therefore concludes that, the challenges of technological transfer in Nigeria are not insurmountable given an objective analysis of the causative factors, adoption of correct institutional mechanisms to address the multi- dimensional issues involved. A way forwarded is there suggested in the next section of the study.

Recommendations

In order to enhance technological transfer in Nigeria, certain recommendations have been derived from findings of this study. They include: Nigerian government needs to increase funding for R&D activities to support technological advancements. This can be done through partnerships between government, private sector, and academic institutions to create R&D centers or foster collaboration with international organizations.

Also, the government needs to improve the education system in which it will enhance the quality and relevance of science, technology, engineering, and mathematics (STEM) education in schools and universities. This will prepare a skilled workforce capable of contributing to technological development.

Finally, government needs to foster collaboration and partnerships between industry, academia, and government institutions to facilitate knowledge sharing and technology transfer. This can be done through joint research projects, industry-academia programs, and technology transfer agreements.

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