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## **Women's Participation in the Offshore and Inshore Fisheries Entrepreneurship: the Role of CSR in Nigeria's Oil Coastal Communities <sup>1</sup>**

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Research Department

**Women's Participation in the Offshore and Inshore Fisheries Entrepreneurship: the Role of CSR in Nigeria's Oil Coastal Communities**

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**Abstract**

**Purpose** – The purpose of this paper is to critically examine the multinational oil companies' (MOCs) corporate social responsibility (CSR) initiatives in Nigeria. Its special focus is to investigate the impact of the global memorandum of understanding (GMOU) on women involved in offshore and inshore fisheries entrepreneurship in the coastal communities of the Niger Delta region.

**Design/methodology/approach** – This paper adopts a survey research technique, aimed at gathering information from a representative sample of the population, as it is essentially cross-sectional, describing and interpreting the current situation. A total 800 respondents were sampled across the coastal communities of the Niger Delta region.

**Findings** – The results from the use of a combined propensity score matching (PSM) and logit model indicate that the GMOU model is gender insensitive as extensive inequality restrains fisherwomen's participation in the offshore and inshore fisheries entrepreneurship, often due to societal norms and customs that greatly frustrate women's development in fisheries.

**Practical implication** – This implies that if fisherwomen continue in this unfavourable position, their reliance on menfolk would remain while trying to access financial support and decision making regarding fisheries entrepreneurship development.

**Social implications** – The inshore and offshore fisheries entrepreneurship development can only succeed if cluster development boards (CDBs) of GMOUs are able to draw all the resources and talents and if fisherwomen are able to participate fully in the GMOUs intervention plans and programme.

**Originality/value** – This research contributes to the gender debate in fisheries entrepreneurship development from a CSR perspective in developing countries and rationale for demands for social projects by host communities. It concludes that business has an obligation to help in solving problems of public concern, and that CSR priorities in sub-Saharan Africa should be aimed toward addressing the peculiarity of the socio-economic development challenges of the countries and be informed by socio-cultural influences.

**Keywords** – Gender, fisheries entrepreneurship, corporate social responsibility, sub-Saharan Africa.

**Paper type** Research paper

## 1. Introduction

Gender equality is an important developmental objective which enables both sexes to participate correspondingly in societal and economic matters (UNDP, 2016). Universally, social groups are inspiring vital discussions about the injustice women have endured in every phase of their lives; and at times these discussions have resulted in invisible changes in the way women are treated on the job, in the family and elsewhere (UNDP, 2013; World Bank, 2014). Unfortunately, women in rural areas, and mostly poor female farmers and fisherwomen in sub-Saharan Africa, are yet to benefit from the current focus on gender equality, even as it is amongst the world's most gender-unequal regions (Uduji and Okolo-Obasi, 2018a; African Development Report, 2015). In sub-Saharan Africa, women play a vital role in marine environments and fisheries economics, precisely in the small-scale and artisanal fisheries sector, but they are unfortunately not considered in making fisheries management decisions, often due to ethnic customs (Uduji and Okolo-Obasi, 2018c; Cliffe and Akinrotimi, 2015). In the entire sea food industry including fisheries, aquaculture, sea food processing and all related services, women represent half of the total working population of the region (Mutimukuru-Maravanyika *et al*, 2017). But if the gap in the region is ever to be closed, the distinct challenge that sub-Saharan African women encounter should become a global matter of concern. Appreciating the role of women to fisheries and their contribution in providing food security is essential in making the case for equitable improvement in fisheries, multinational and economic solidity, and informed fisheries administration in sub-Saharan Africa (Lange and Jiddawi, 2009; Frocklin *et al*, 2012).

Nigeria, in the meantime, is one of the countries in sub-Saharan Africa where differences in income have remained high over the decades. As a result, the involvement of women in economic, political and social advancement is hindered by unequal access to resources and opportunities (Uduji and Okolo-Obasi, 2018a, 2018d; Uduji *et al*, 2019b). The economy of the country is seriously reliant on the oil sector. By the estimation of the International Monetary Fund, the oil and gas sector in Nigeria accounts for over 95% of the foreign export earnings and about 65% of the revenue of the Nigerian government (IMF, 2017). The IMF (2013) shows that Nigeria had an estimated 37.2 billion barrels of proven oil reserves by January 2011. The Niger Delta where multinational oil companies (MOCs) sustain a noteworthy presence has become a centre of endless conflicts. The Federal Government of Nigeria is in joint-venture agreement with MOCs functional in her oil and gas sector. The Federal Government is the owner and controller of the land, including the natural resources in

the soil; this is a key source of clash in the Niger Delta of Nigeria (NNDC, 2004). The government can obtain land for over-riding public purposes by virtue of the Land Use Act 1978 (FGN, 2017). By tradition, those indigenous to Niger Delta have been farmers and fishermen; but decades of pollution from oil spillage and gas flaring, in addition to a fast growing population has drastically affected these traditional sources of livelihood resulting in their not being viable or significantly declining (PND/UNDP, 2011, UNDP, 2006). As a result, the unemployment rates in the region are higher than the national average (FGN, 2017; Uduji *et al*, 2019c). The negative effects of the actions of MOCs in the region include gas flaring, oil spillage, environmental pollution, unwanted social impacts, conflict and violence amongst others (Boele *et al*, 2001; Asgil, 2012; Omeje, 2006). The destruction of the environment which is a concomitant to oil extraction, as well as the relationship between MOCs and the Nigerian government, and the deficiency in revenue sharing, has exacerbated the grievances of the host communities toward MOCs operations in the region (Watts, 2004; Marchant, 2014; MNDA, 2015; Slack, 2012).

In agreement with this rhetoric, the MOCs have executed many CSR programs since the late 1990s, for the most part centering on development projects in the region. Yet most researchers stress the obvious shortfall of these projects (Amao, 2008; Edoho, 2008; Ekhaton, 2014). It has been constantly revealed that communities in the Niger Delta still have a very negative understanding of MOCs operations with regard to their environmental costs in addition to the persistent lack of employment and projects aimed at community development (Frynas, 2005; Eweje, 2007; Idemudia, 2007). Clashes within the region has only worsened in recent decades with assaults on oil infrastructure and industry employees making the Niger Delta in actual fact volatile (PIND, 2011; World Bank, 2008). On the contrary, Ite (2006), Uduji and Okolo-Obasi (2017), Renouard and Lado (2012), Uduji *et al* (2018b), Lompo and Trani (2019), and Uduji *et al* (2019c) back CSR initiatives, arguing that the Global Memorandum of Understanding (GMoU) model is gaining grounds given the extent of failures of government. With high support for the new CSR model, it is essential to seek for a way to explain these observations. With this in mind and apparent gap in the literature, this research has four main aims which are in line with the multinational oil companies' new CSR model called GMoU as it concerns gender equality in sustainable fisheries development. They include:

- Determining the extent of multinational oil companies' CSR interventions in fisheries development in the Niger Delta region of Nigeria.

- Assessing the extent of multinational oil companies' GMoUs intervention in policy dialogue and advocacy for equitable fisheries development in the Niger Delta region of Nigeria.
- Examining the effect of multinational oil companies' GMoUs in enabling rural women in coastal communities to be equipped with essential fishing skills for the adoption and usage of basic equipment towards closing the existing gap of involvement in the offshore and inshore fisheries industry in the Niger Delta region of Nigeria.
- Analyzing the implications of bridging the gender gap of involvement in the offshore and inshore fisheries sector in Nigeria's oil coastal communities.

### 1.1 Study hypothesis

The challenges encountered by rural women in Nigeria's oil coastal communities are basically related to ethnic and societal norms and practices; which mostly limit rural women's advancement in the fisheries sector and places fisherwomen in a difficulty where they have to look up to their menfolk in their efforts to secure financial support and to speak for them in decision making as it concerns fisheries development and management. Thus, we project the hypothesis that GMoUs intervention of multinational oil companies in sustainable fisheries development has not made a significant impact in enabling the rural women to be equipped with essential fishing skills for adoption and in usage of basic equipments towards closing the existing gap of involvement in the offshore and inshore fisheries sector in Nigeria's oil coastal communities.

The outlook of this paper departs from existing gender, entrepreneurship, and CSR literature which has concentrated on, *inter alia*: African entrepreneurship challenges and opportunities for doing business (Tchamyou, 2017; Dana *et al*, 2018; Asongu and Odhiambo, 2019); economic miracles in the making in economies of the Eastern Mediterranean region (Dana, 2000); promoting SMEs in Africa with insights from an experiment in Ghana and Togo (Dana, 2007); economic sectors in Egypt and their managerial implications (Dana, 2000); socio-cultural environments and emerging economy entrepreneurship of women entrepreneurs in Indonesia (Anggadwita *et al*, 2017); decision-making challenges of women entrepreneurship in family business succession process (Ramadan *et al*, 2017); female entrepreneurs in transition economies: insights from Albania, Macedonia and Kosovo

(Ramadani *et al*, 2015); women entrepreneurs in the Republic of Macedonia (Ramadani *et al*, 2013); an exploratory study look at female entrepreneurship in Kosovo (Ramadan *et al*, 2015); the socioeconomic effects of small-scale women business in broom production and marketing industry (Nwosu *et al*, 2019); Christian entrepreneurial activities and micro women entrepreneurship development (Quagraine *et al*, 2018); the surprising lack of connection between social networks and the enterprise success of ultra-religious female micro-entrepreneurs (Monnickendam-Givon *et al*, 2018).

Other African-centric studies on female economic participation that this study departs from have focused on: gender discrimination in land ownership (Ajala, 2017); women and gender in English-speaking sub-Saharan Africa (Ampofo *et al*, 2004); researching African women and gender studies (Ampofo *et al*, 2008); rethinking the feminization of poverty (Chant, 2006); the feminization of poverty (Chant, 2008); African feminist studies (Lewis, 2002); women's studies in Africa (Mama, 1996); gender studies in Africa at crossroads (Nzomo, 1998); gender identity (Stoller, 1964); sex and gender on development (Stoller, 1968); oil transnational corporations, environmental sustainability and corporate social responsibility (Edoho, 2018); nexuses between governance, inequality, globalization, information technology and female economic participation (Efobi *et al*., 2018; Asongu and Odhiambo, 2018, 2020a, 2020b, 2020c, 2020d; Asongu *et al*., 2020a, 2020b); corporate social responsibility and Chinese oil and gas multinationals in the oil and gas industry of Nigeria (Ekhator, 2014); effect of CSR on advancement of women in small-scale fisheries of sub-Saharan Africa (Uduji and Okolo-Obasi, 2018c); the skepticisms of interested parties on multinational oil companies CSR initiatives in Nigeria (Eweje, 2007); the dishonest improvement promise of corporate social responsibility of multinational oil companies (Frynas, 2005); corporate social responsibility of multinational oil companies in the HIV/AIDS response (Uduji *et al*, 2019c); reinventing the wheels of corporate social responsibility practices in the oil industry of Nigeria (Idemudia, 2007); Shell's input towards sustainable community development in the Niger Delta of Nigeria (Ite, 2006); corporate social responsibility inventiveness in Nigeria and rural women livestock keepers in oil-host communities (Uduji and Okolo-Obasi, 2018d); corporate social responsibility input towards human development (Lompo and Trani, 2013); CSR and disparity in the Niger Delta of Nigeria (Renouard and Lado, 2012); corporate social responsibility and the role of women in sustainable improvement in agricultural in sub-Saharan Africa (Uduji *et al*, 2019b) and customers' experience with self-service technologies in Nigeria (Ugwuanyi *et al*, 2020).

The rest of the paper is organized as follows. Section 2 concentrates on the background, literature and theoretical underpinnings. Section 3 looks at the materials and methods. Section 4 presents the outcome together with the corresponding discussion. Section 5 closes the work with policy implications.

## **2. Background, literature and theoretical underpinnings**

### **2.1 Background**

The Niger Delta, in the Southern part of Nigeria, is a vast 70,000 km<sup>2</sup> oil basin consisting of nine administrative states (Figure 1). In a joint venture, multinational oil companies with the Nigerian National Petroleum Corporation (NNPC) have since 1958 been extracting high quality crude oil in the region (Boele *et al*, 2001). Very early in the process, the influence of MOCs' oil extraction resulted in protests by local communities in the Niger Delta. The main grievances concern destruction of the environment and the reliance of the industries on it, and the fact that a poor percentage of the oil profit reaches the communities (Marchant, 2014). It is based on this backdrop of ever-increasing and often intense domestic protest, accumulating international criticism of MOCs and the related reputational risk, that the MOCs prompt adoption of CSR should be viewed. MOCs, in 2006, presented a new way of engagement with communities called the Global Memorandum of Understanding (GMoU), which has been functional in the region (SPDC, 2013). A GMoU is a pact between MOCs and a cluster (or group) of several communities. Groups (or clusters) are based on local government or clan/historical affinity lines as directed by the relevant state government (Alfred, 2013). The GMoU gets communities together with representatives of State and Local Governments, MOCs and Non-profit Organizations, like development NGOs, in a committee that makes decisions called the Cluster Development Board (CDB) in the region (Chevron, 2014). Under the footings of the GMoUs, the communities agree on the development they want, while MOCs make available secured funding for five years, guaranteeing that the communities have steady and unswerving finances as they embark on the execution of their community development plans (Chevron, 2017). The main characteristic of GMoU approach includes single agreement with clusters of communities, and communities take the key decisions; while in the previous approach, multiple bilateral agreements with individuals' communities, and MOCs assume direct responsibility for development.



**Figure 1.** Constituent Administrative States of the Niger Delta, Nigeria

The GMoUs represent a significant shift in CSR approach, emphasizing on more transparent and responsible processes, steady communication with the grass root, sustainability and conflict avoidance (Uduji and Okolo-Obasi, 2018d; Uduji *et al.* 2019c; SPDC, 2004). MOCs, by the end of 2011, have signed and effected agreements with 27 clusters, covering 290 communities, which is about 30% of the nearby local communities to their business operations in the region (Chevron, 2014). The GMoUs effectively accomplished a total of 596 projects, in 2011 (including pre-projects); and over \$79million has been made available in funding; nine of the 27 CBDs have developed into registered foundations in receipt of third party funding (SPDC, 2013; Chevron, 2017). Even with a substantial increase in the MOCs development projects since the taking on the new CSR model in the region, intellectuals and civil society actors maintain that very little notable progress has been made (Idemudia, 2007; Eweje, 2007; Edoho, 2008; Omeje, 2006). With many disagreeing on the merits of CSR, it is necessary to seek an explanation for these observations from the women’s point of view in coastal communities of the Niger Delta.

## **2.2 Literature**

The foremost fisheries segments are offshore or oceanic, inshore, fresh water and aquaculture. However in this study, our evaluation concentrated on fisheries species, subsistence fishing, inshore and offshore fisheries, putting into consideration the involvement

of women and status of each sector. Women are skilled fishers in the coastal zones and most fisheries activities are carried out both for selling in the domestic markets and for personal consumption; and various types of fish have also been the aim of value added activities (Bennett, 2015; Ram-Bides, 2015). Subsistence fisheries mostly make food available for the household, with any surplus sold to local markets or distributed to relatives and friends through traditional system of barter (exchange). As generalists, women forage and collect a wide range of species in the inshore areas (de la Torre-Castro *et al*, 2017). They are aware of seasons of species; fishing patterns and trends are usually dictated by such seasons, or by that which is in demand in markets; and treasured species are taken to market if reachable (Harper *et al*, 2013). In Africa's sub-Saharan area, women control the subsistence of the fishing sector with their day-to-day fishing activities (Hauzer *et al*, 2013; Uduji and Okolo-Obasi, 2018b, 2019; Lange and Jiddawi, 2009). In addition, women are in control of the selling of crustaceans, mollusks and seaweed in the region; many of them fish for household needs but sell the surplus (Frocklin *et al*, 2012; Uduji *et al*, 2018a). Their fishing activities are carried out within the coastal reef areas, mud and sand flats, and mangrove areas. The mangrove fishery is of great value to women fishers as they are the chief users of the coastal mangrove areas (Santos, 2015; Uduji *et al*, 2019a).

Women largely take part in the inshore fisheries sector, which comprises of a diverse range of marine and freshwater finfish, and invertebrate but are mostly poorly understood (Rleiber *et al*, 2014; Uduji *et al*, 2019d, 2019e). Because of little information on species, catches and trend of fisheries in general, quantifying women's contribution to different fisheries is challenging (Bennett, 2015; Zhao *et al*, 2013). In Africa's sub-Saharan area, both subsistence and commercial fishers are interested in inshore fisheries; and small-scale fishers do not find it easy to access the offshore fishery resources. Besides, there are challenges concerning the marketing of products from remote areas, where they are in abundance, to urban areas, where market opportunities are greatest (Uduji and Okolo-Obasi, 2018c; Uduji *et al*, 2019f). The gender differences in employment and income in the region are quite huge. This is worsened by the fact that the input of women is lost in enumeration, by not including or underestimation of household work and unpaid family work (Cliffe and Akinrotimi, 2015). In Nigeria, the activities of women fishers mostly fall into the subsistence or semi-subsistence fisheries sector which is usually placed under household work (gathering of food for consumption at home). These disparities are evident in labour force engagement with men

dominating the commercial sector, while women dominate the subsistence sector. A great number of women are in the unemployed category (African Development Report, 2015).

Method of fishing and types of equipment in use in the inshore fisheries are largely simple; several make use of hands and simple tools. The methods and abilities however are diverse and need a close knowledge of the environment and species aimed at (de la Torre-Castro, 2017). In Nigeria's coastal communities, besides the collection of invertebrates, the rural women net fish, arrange barriers and traps, and use hand lines. In addition, the seasons of diverse species and the impact of the lunar cycle, winds and other natural occurrences on marine species are well known and benefitted from when fishing (Cliffe and Akinrotimi, 2015; Uduji *et al*, 2019g, 2019h). The Niger Delta Development Commission (NDDC) is committed to boosting the development of offshore fishery, generation of income and reduction of pressure on inshore resources (NDDC, 2014, PIND/UNDP, 2011). The concerns of offshore fisheries are often in line with access to investment capital, improvement of joint-ventures, enhancing products for competitive markets, technological advancements for cost reduction or increased production, and fishers in the coastal communities gaining capacity (FGN, 2017). The tactics rely on skilled labour and entrepreneurship, which are lacking in most of the women in the region; resulting in their being largely left out of offshore sustainable fisheries development (Uduji and Okolo-Obasi, 2018c; UNDP, 2006). Cliffe and Akinrotimi (2015) have emphasized on how most initiatives on the offshore fisheries are centered on assisting men's activities in the improvement and management of fisheries in the region. This is the reason this research seeks for a business case for interested parties in the oil coastal communities in Nigeria.

## **2.3 Theoretical underpinnings**

### **2.3.1 African CSR Conceptualization**

The problem of corporate social responsibility in developing countries is shaped by a vision distilled in 2000 into the Millennium Development Goals – a world with reduced poverty, hunger and disease, higher prospects of survival for mothers and their babies, better academically exposed children, equal opportunities for women, and an improved environment (UN, 2006). The wide-ranging question this study attempts to address, therefore, is: what is the part business plays in resolving the critical issue of gender differences in improvement of fisheries in sub-Saharan Africa? While the precise question is: Do CSR intervention positively affect women's involvement in the offshore and inshore fisheries

development of coastal communities in the Niger Delta region of Nigeria? Carroll's CSR Pyramid is maybe the most well-known model of CSR, with its four levels showing how vital economic, ethical, legal and philanthropic responsibilities are respectively (Carroll, 1991). Though, Visser's exploration of CSR in Africa was used to question the accuracy and importance of Carroll's Pyramid; signifying that if Carroll's basic four-part model would be acknowledged, the relative priorities of CSR in Africa are expected to be dissimilar to the classic Western version (Visser, 2006). Uduji *et al*, (2018b), also projected that Carroll's CSR Pyramid is probably not the best model for comprehending CSR in a rural African context. Muthuri (2012), depending on the extant literature on CSR in Africa, postulated that the CSR issue rampant in Africa includes reduction of poverty, community development, economic and enterprise development, education and training, health and HIV/AIDS, environment, human rights, sports, corruption, governance and accountability. Amaeshi *et al*, (2006), argued that CSR in Nigeria should be targeted at addressing the distinctiveness of the socio-economic advancement changes of the country, and be directed by socio-cultural influences; and essentially may not reflect the popular Western version. Hence, this study adopts a quantitative methodology, but looks at the results from the African CSR perspective.

### **2.3.2 African gender conceptualization**

The idea of gender, as contrary to either the male or female division, was not advanced until in the 1970s. In the early part of the 1960s, Robert Stoller, a psychologist who had worked with distinct persons born with obscure genitalia, was the first to recognize a difference between sex and gender as he assumed four ideology of sex, gender, gender identity and gender role (Stoller, 1964, 1968). In spite of the fact that the concept of 'gender role' soon lose brightness of illumination, from view in feminist circles, Stoller's other three doctrines were quickly appropriated by feminists. Hence, from the 1970s onwards, there is an increasing debate about sex and gender, and whether men and women's bodies have natural dissimilarities that pre-determine a specific gender, which in turn guide in direction to a corresponding sexuality. Consequently, from the 1980s, there has been a rapid and often excessive increase of women's bodies and gender research in Africa (Ampofo *et al*, 2004). This spread can be attributed to several elements such as the global north women's movement, the influence of the women and development industry, the national political and economic conditions, the crisis in African education and the emergence of state feminism (Mama, 1996, Uduji and Okolo-Obasi, 2018a, 2018c, 2018d). Far back in time, in the 1950s and 1960s, African women were linked to nationalist struggles for independence. Moreover,

gender, race and class relations were already constituted in the struggles that engaged the women when compared to their counterparts in the global north, who only began to express recognition of the centrality of these issues in the 1980s (Lewis, 2002).

Meanwhile, the prevalent approaches to the study of women and gender in Africa have been founded in the African feminist as opposed to global north feminist ethnographies and theories (Uduji *et al*, 2019b, 2020a, 2020b). African gender scholars are familiar with postmodernist conversations on difference in perspectives, stressing the need to generate systematic evidences around issues that unify and create space for dialogue rather than confrontation and differences (Ampofo *et al*, 2008; Nzomo, 1998). Therefore, this paper seeks to use African gender conceptualization as a framework for descriptive analysis of women's participation in the offshore and inshore fisheries entrepreneurship in Nigeria's oil coastal communities. This is anchored from the perspective that Africa's growth and development agenda can only thrive if the continent is capable of drawing from all its resources and talents, and if women are able to participate fully in social, economic and political life; which will require increased efforts to remove discrimination and encourage equal rights.

### **3. Methods and materials**

The study embraces a quantitative methodology, as a contribution given the shortage of quantitative works in the region (Uduji and Okolo-Obasi, 2017; Uduji *et al*, 2018b; Uduji *et al*, 2019c); which is consistent with Dana *et al* (2005) and, Dana and Dumez (2015) on expanding the scope of methodologies used in entrepreneurship research. The survey research technique was utilized with the purpose of collecting cross-sectional information from an illustrative sample of the population. The survey is basically cross-sectional in that it defines and interprets what is happening at present in the region.

#### **3.1 Sampling procedure**

Here, we used a multi-staged sampling method which put together both purposive and simple random sampling to choose the final respondents for the study. We began by deliberately picking two most coastal local government areas (LGAs) from each of the nine states of the Niger Delta region. The two LGAs are those that are hosting or are very close to one hosting multinational oil company facilities. We also made use of purposive sampling to choose three coastal communities from each of the selected LGAs. Each of the communities selected is

either hosting or very close to a community hosting at least one multinational oil company facility. Then, from the fifty-four coastal communities selected, with the aid of community gate keepers, we combined both quota and simple random sampling to select 800 women. The quotas considered are, women who are involved in and have received direct intervention from a cluster development board CDB, which is the organ that implements the GMoU, and women who have not received any intervention. We sampled 300 women who have received CSR interventions from the CDBs, 500 women who have not. The assortment was done in the designated communities in line with the population of the state in which the community is situated (Table 1).

**Table 1.** Sample Size Determination Table

States	Total Population	Population of Female	Minimum Sample Per Community	Minimum Sample Per State	% of Total Pop.	Treatment	Control
<u>Abia</u>	2,881,380	1,451,082	13	80	9%	30	50
<u>Akwalbom</u>	3,902,051	1,918,849	16	96	12%	36	60
Cross River	2,892,988	1,421,021	12	72	9%	27	45
<u>Delta</u>	4,112,445	2,043,136	18	104	13%	39	65
Imo	3,927,563	1,951,092	17	104	13%	39	65
<u>Ondo</u>	3,460,877	1,715,820	15	88	11%	33	55
Edo	3,233,366	1,599,420	13	80	10%	30	50
<u>Bayelsa</u>	1,704,515	830,432	8	48	5%	18	30
Rivers	5,198,716	2,525,690	22	128	16%	48	80
<b>Total</b>	<b>31,313,901</b>	<b>15,456,542</b>		<b>800</b>	<b>100</b>	<b>300</b>	<b>500</b>

**Source:** FGN, 2017/Authors' computation

### 3.2 Data collection

We used the name treatment group to make a distinction between the fisher women who through the GMOUs of the MOCs gained capacity building support (CG), while the name control group refers to those who have never received such. Both groups were selected from the same communities that host the facilities of the MOCs. The women provided answers to the questions that wanted to know if they had received support directly from the MOCs in the area of CSR to better their lives in the area of fishery business. There was an administering of a structured questionnaire on the selected women in a form that denotes an appropriate tool to assess qualitative issues via quantitative information. Scores were assigned according to the objectives based on this questionnaire. The researchers directly administered the questionnaire with the help of research assistants. The local research assistants came into use for three major reasons. First, the study area has over 50 ethnic groups that speak different

local languages and dialects. Second, the territory is very rough, with a high level of violence in some areas, which makes a local guide necessary. Third, some items in the instrument would need clarification which could be best done in local dialects.

### **3.3 Analytical framework**

The study examined the impact of Global memorandum of Understanding (GMoU) of multinational oil companies on involvement of women in the offshore and inshore fisheries development in the coastal communities of the Niger Delta region in Nigeria (see Appendix for definitions of variables). To attain the study specific objectives 1, 2 and 4, descriptive statistics was put to use, and the outcomes are presented in tables, charts and graphs. Achieving objective 3 required a combined use of propensity score matching (PSM) and logit model to evaluate the effect of GMoU on equipping the women in coastal communities with vital fishing skills for getting involved in the offshore and inshore fisheries. These techniques were chosen on the basis that, the study needs control for the problems of endogeneity and selectivity. In Propensity Score Matching (PMS), we first put into consideration the direct recipient of Corporate Social Responsibility via General Memorandum of Understandings (CG) as a “treatment”, so as to assess an average treatment result of CG using propensity score matching approach. Propensity score matching (Odoziet *al*, 2010) requires predicting the probability of treatment based on observed characteristics for the treatment and the control group too. It sums up the pre-treatment characteristics of each subject into a single index variable and is then put to work in matching similar individuals. In propensity score matching (Ravallion, 2001), an ideal comparison group is chosen from a survey that is larger and matched to the treatment group on the basis of a set of observed characteristics on the anticipated probability of treatment given observed characteristics (propensity score). These so called observed characteristics are those used in choosing individuals but not impacted by the treatment, thus, our choice in embracing this methodology. We made an assumption that the decision to be treated (that is, receiving CG intervention), although not random, in the end rests on the variables observed. Rosenbaum and Rubin (1983) have claimed that the ability to match on variable X means that probability of X can be matched too. Therefore, in valuing the impact of CG on engaging women in the offshore and inshore fisheries activities; two groups are identified. In these two groups, those with CG (treatment group) is denoted as  $R_i = 1$  for women<sub>1</sub> and  $R_i = 0$  otherwise (control group). The groups are selected from the same communities for the same set of socio-economic characteristics to apply to both. The

treatment is matched to the control group based on the propensity score: (Probability of receiving CG given observed characteristics)

Hence:

$$P(X_1) = \text{Prob}(R_2 = 1/X_2) \quad (0 < P(X_2) < 1) \quad \text{Equation 1}$$

Where  $X_1$  is a vector of pre CG control variables, if  $R_1$ 's are independent over all 1 and the results are independent of CG given  $X_1$ , then results are also independent of CG given  $P(X_1)$ , as they will likewise do if CG is received d randomly. To draw precise conclusions about the effect of CG activities on making the women in the offshore and inshore fisheries to be involved, we saw the need to sidestep the selection bias on observables by matching on the probability of the treatment (covariates  $X$ ) to this; we defined the PS of Vector  $X$  thus:

$$P(X) = \text{Pr}(Z = 1/X), \quad \text{Equation 2}$$

The  $Z$  represents the treatment indicator in equating 1, if the chosen individual woman has received CG, and zero otherwise. Because the PS is a balancing score, the observables  $X$  will be shared same for both treated and non-treated and the differences are seen as to the attribute of treatment. To get this unbiased impact estimates, we adapted the four steps in line with Rosenbaum and Rubin (1983); Liebenehm, Affognon and Waibel (2011). In the first place, we acknowledged that the probability of receiving CG is predicted by a binary response model, with suitable observable characteristics. Hence, we pooled two individual groups, (treatment and control). After these, we assessed the logit model of CG receiving or not receiving as a function of some socio-economic characteristics variables. These variables include both individual, household and community variables represented in this equation as thus:

$$P(x) = \text{Pr}(Z= 1/X) = F(\alpha_1 x_1 + \dots + \alpha_n x_n) = F(x\alpha) = e^{x\alpha} \quad \text{Equation 3}$$

We created value of the probability of receiving CG from the logit regression allocating each woman a propensity score. The non-CG receiving women with very low PS outside the range found for receiver were left out at this point. For each woman receiving CG, a non-receiving that has the closest PS as measured by absolute difference in score referred to as nearest neighbour was acquired. We used the nearest five neighbours in making the estimate more rigorous. The mean values of the outcome of indicators for the nearest five neighbours were

calculated and the variance between the mean and actual value for treatment is the estimation of the gain due to GMoU. This variance between treatment and control groups is valued by the average treatment effect on the treated (ATT). The true ATT, based on PSM is written thus:

$$ATT_{PSM} = E_{p(x)} \{E(y_1/Z = 1, P(x)) - E(y_0/Z = 0, P(X))\}, \quad \text{Equation 4}$$

$E_{p(x)}$  stands for expectation with respect to the sharing of PS in the population. The true ATT shows the mean difference in engagement of the women. In this, we achieve a suitable match of a participant with her counterfactual in as much as their observable characteristics are identical. Three different matching techniques could be used in obtaining this matched pair; these methods which vary in terms of bias and efficiency are: nearest neighbor matching (NNM) radius matching (RM) and kernel-based matching (KM), a non-parametric matching estimator. The third thing done was checking the matching estimators' quality by standardized differences in observables' means between receivers of CG and non-receivers. Representing difference in percent after matching with  $X$  for the covariate  $X$ , the variance in sample means for receivers as  $(\bar{X}_1)$  and matched non-receivers as  $(\bar{X}_0)$ . In line with Rosenbaum and Rubin (1985), the sub-samples as a percentage of the square root of the average sample variance is put thus:  $(\int_1^2 \text{ and } \int_0^2)$ .

Hence:

$$|SD = 100 * \frac{(\bar{X}_1 - \bar{X}_0)}{(.05 \int_1^2 \text{ and } \int_0^2)^{1/2}} \quad \text{Equation 5}$$

We accepted a remaining bias below 5% after matching, even when there is no obvious threshold of a matching that succeeded or failed. This we took as a clue that the balance among the different observable characteristics between the matched groups is sufficient. In general, while considering the quasi-experimental design of the MOC's GMoU activity, there might be a possibility that unobservable factors like women's intrinsic motivation and specific abilities or preferences, had impacted the decision to receive or not. This problem of hidden bias was avoided by the bounding approach. In equation 3, we complemented the logit model to estimate propensity score by a vector  $U$  containing all unobservable variables and their effects on the probability of receiving CG and captured by  $\gamma$ :

$$P(x) = \Pr(Z= 1/X) = F(X\alpha + U\gamma) = e^{X\alpha U\gamma} \quad \text{Equation 6}$$

With sensitivity analysis, we looked at the strength of the influence of  $\gamma$  on receiving CG in order to attenuate the effect of receiving CG on potential outcomes. Simply put, the assumption is that the unobservable variable is a binary variable taking values 1 or 0. The receiving probability of both women is applied to this, in line with the bounds on the odds ratio as stated thus:

$$\frac{1}{e\gamma} \leq \frac{P(Xm)(1-P(Xn))}{P(Xn)(1-P(Xm))} \leq e\gamma \quad \text{Equation 7}$$

Rosenbaum (2002) agreed in that both individual youth have the same probability of receiving CG, as long as they are identical in X, only if  $e\gamma = 1$

## 4. Results and discussion

### 4.1 Descriptive analysis

In giving a proper analysis of the fisherwomen in the study, the starting point should be a description of some of their social (education), demographic (age, marital status, household size) and economic (occupation, household income) characteristics (Table 2). These characteristics are essential in understanding the differences in the socio-economic status of the fisherwomen who take part in the activities of the CDBs that implement the GMoUs compared with their counterparts who do not participate in the coastal communities of Niger Delta region. Analysis (Table 2) shows that about 55% of the respondent in the treatment group are fully involved in the fishery business either as fishers, processors, sellers and or distributors, while 51% in the control group are involved full-time. Others are either involved in trading, handicraft (mat-making, calabash painting, hair braiding etc.) or are employed by either government or private sectors in non-farm activities; some are into other commitments. In all, about 79% of the respondents are involved in fishery business either as full-time or part-time businesses. Also, among the treatment group, about 5% are less than 20 years while 9% are over 50 years. On the other hand, 7% of the control groups are less than 20 years while 22% are above 50 years. This shows that the population in the treatment group is relatively more productive than the population in the control group. About 3% of the treatment group has no experience in fishing business yet have received CSR support targeted at improving fishing. On the side of the control, only about 4% have no experience in fishery business. On both sides, 13% of the respondents have over 30 years of experience.

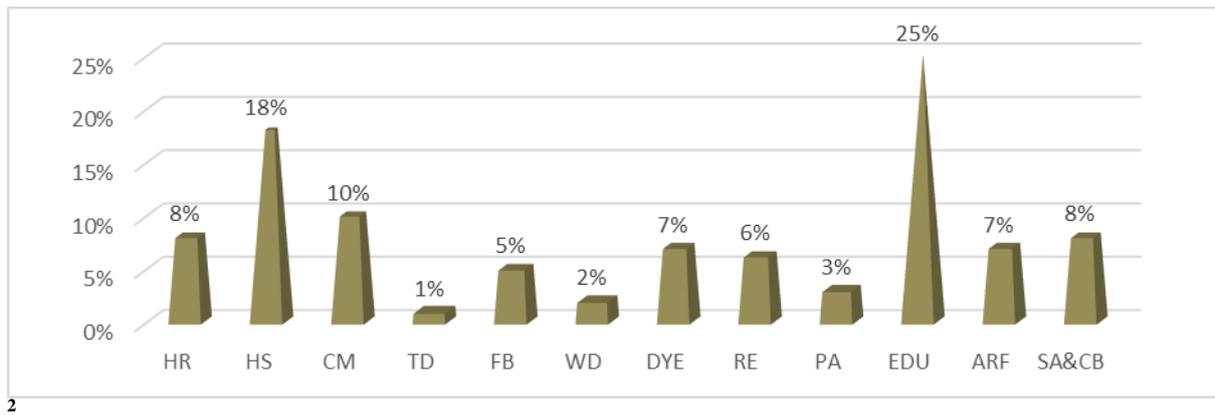
In continuation, the analysis (Table 2) also indicates that only about 2% of women in the treatment group is wholly uneducated, and could not read or writes while 13% of the respondent in the control group falls into the same cadre. Hence, this simply implies that over 87% of the respondents both in the treatment and control, are literate with at least basic education level. About 88% are either married or were married before, while the remaining 22% have not married; 6% are widowed both among the treatment and control group while 7% of the treatment group falls into divorced or separated and 8% of the control are in the same category. This discovery suggests alongside with Uduji and Okolo-Obasi (2018c) that having a grasp of the socio-economic characteristics of women in fisheries is necessary for evenhanded improvement of fisheries, economic and nutritional solidity, and informed fisheries management; on the other hand, overlooking the fisherwomen's socio-economic backgrounds may have a harmful effect on maritime security.

In spite of the ample potentials of fishing in the host communities, the women's average annual income in fishing is less than NGN100, 000 (equivalent to 285 USD) per annum. Among the treatment, while about 43% earn below NGN100, 000, 65% earn below NGN150,000, 81% within NGN200,000 and only 19% earns above NGN200,000. Among the control group, 48% earn below NGN100,000, 68% earn below NGN150,000, 84% within NGN200,000 and only 16% earns above NGN200,000 per annum

**Table 2.** Socio-economic characteristics of the respondents

Variables	Receivers		Non-Receiver		Variables	Receivers		Non-Receiver	
	Freq	%	Freq	%		Freq	%	Freq	%
<b>Primary Occupation</b>					<b>Household Size</b>				
Fishing Business	165	55	254	50.8	1-4 Person	201	67	338	67.6
Trading	26	9	57	11.4	5-9 Person	58	19	368	73.6
Full Farming	64	21	98	19.6	10-14 Person	23	8	72	14.4
Paid Employment	18	6	24	4.8	15 Person and above	18	6	22	4.4
Handicraft	13	4	32	6.4		<b>300</b>	100	<b>800</b>	160
Others	14	5	35	7	<b>Annual Income from Fishing Business</b>				
	<b>300</b>	100	<b>500</b>	100	1000 - 50,000	52	17	92	18.4
<b>Years of Experience in Fishing Business</b>					51,000 - 100,000	78	26	146	29.2
None	8	3	21	4.2	101,000 - 150,000	65	22	106	21.2
1 - 10 Years	87	29	135	27	151,000 - 200,000	47	16	76	15.2
11 - 20 Years	112	37	186	37.2	201,000 - 250,000	33	11	41	8.2
21 - 30 Years	55	18	93	18.6	251,000 - 300,000	18	6	34	6.8
Above 30 Years	38	13	65	13	Above 300,000	7	2	5	1
	<b>300</b>	100	<b>500</b>	100		<b>300</b>	100	<b>500</b>	100
<b>Age of Respondents</b>					<b>Annual Income off Fishing</b>				
Less than 20 years	15	5	35	7	None	124	41	221	44
21-25 years	56	19	57	11.4	1000 - 50,000	44	15	75	15
26-30 years	102	34	120	24	51,000 - 100,000	51	17	82	16
31 - 35 years	49	16	69	13.8	101,000 - 150,000	42	14	60	12
35 - 40 years	33	11	51	10.2	151,000 - 200,000	21	7	33	7
41 - 45 years	20	7	35	7	Above 200,000	18	6	29	6
45 - 50 years	16	5	21	4.2		<b>300</b>	100	<b>500</b>	100
Above 50 years	9	3	112	22.4	<b>Value of receipts through CG</b>				
	<b>300</b>	100	<b>500</b>	100	1000 - 50,000	32	11		
<b>Level of Education</b>					51,000 - 100,000	56	19		
None	6	2	64	12.8	101,000 - 150,000	65	22		
FSLC	86	29	187	37.4	151,000 - 200,000	49	16		
WAEC/WASSCE	182	61	231	46.2	201,000 - 250,000	38	13		
Degree and above	26	9	18	3.6	251,000 - 300,000	36	12		
	<b>300</b>	100	<b>500</b>	100	Above 300,000	24	8		
<b>Marital Status</b>						<b>300</b>	100		
Single	34	11	49	9.8					
Married	226	75	377	75.4					
Widow	19	6	32	6.4					
Divorced/Separated	21	7	42	8.4					
	<b>300</b>	100	<b>500</b>	100					

**Source:** Computed from the field data by authors

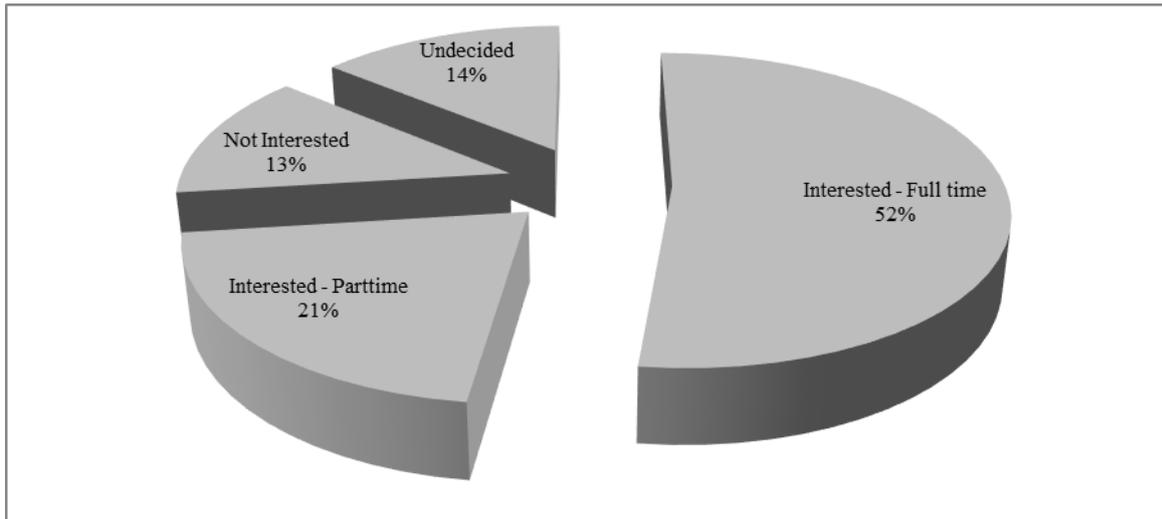


**Figure 2.** Percentage distribution of CSR intervention of MOCs by sectors in the Niger Delta.

**Source:** Computed from the field data by authors

Analysis (Figure 2) shows the level of investment and interventions the MOCs have made in the communities. It shows that education (teacher’s training, provision of infrastructure, library and laboratory equipment and scholarship) accounts for 25% of the CSRs of the MOCs; health services accounted for 18%; chieftaincy matters 10%, agriculture and rural farming accounts 7%; while policy advocacy accounts for 3%. Skill acquisitions and capacity building accounts for 8%, while the subject matter of our study accounts for 5% which is not too big but significant. This observation agrees with Zhao *et al* (2013) in that it is essential to support women’s economic success in fishing to build prosperous fishing communities. Ram-Bidesi (2015) is also of the same mind that women’s incomes from fisheries add to household food security more directly than men’s incomes because women usually contribute a greater portion of their incomes towards feeding their families. Hence increasing the women’s access to fishing capital and other productive assets will enhance family food security in the host communities.

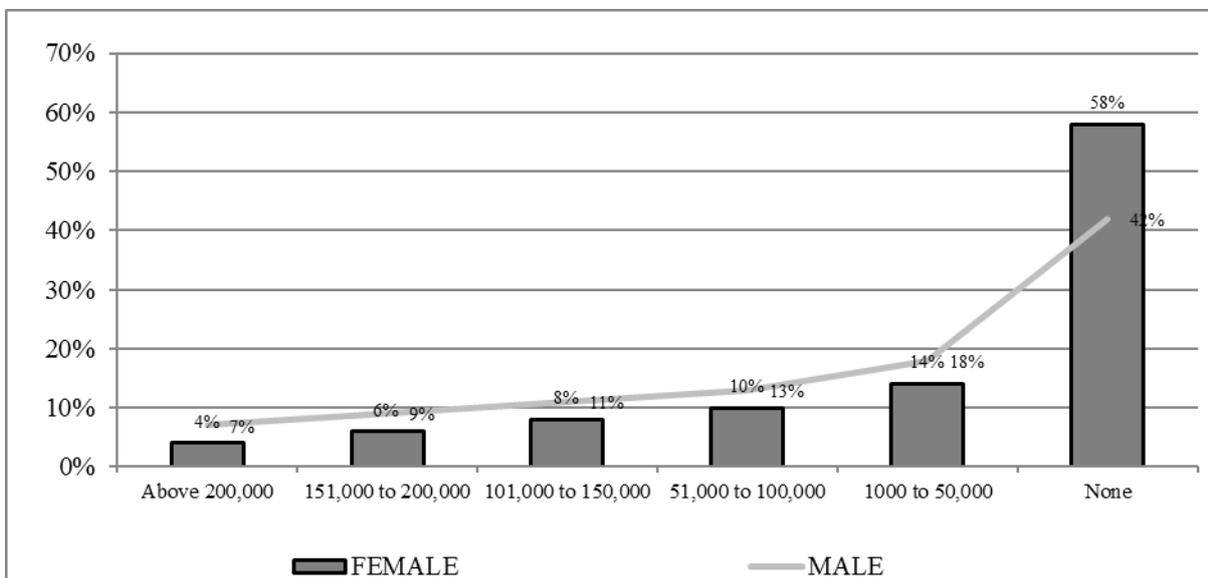
<sup>2</sup>HR = Housing and Roads, HS = Health Services, CM = Chieftaincy Matters, TD =Tourism Development, FB = Fishing Business, WD = Women Development, DYE =Direct Youth Employment, RE = Rural Electrification, PA = Policy Advocacy, EDU = Education, ARF = Agriculture and Rural Farming, SA&CB = Skill Acquisition& Capacity Building



**Figure 3.** Willingness of the rural women to participate in offshore and inshore fisheries

**Source:** Computed from the field data by authors

Analysis (Figure 4) indicates that 52% of the women are willing to be fully engaged; while 21% opt for part-time engagement; 13% are uninterested, while 14% are undecided. This vividly paints the picture that any conscious effort made to expose the women in offshore and inshore fisheries to the basic fishing equipment will boost their participation and empower them in playing decisive roles in marine environment and fisheries economies.



**Figure 5.** Percentage distribution of the respondent in line with rate of CG receipt

**Source:** Computed from the field data by authors

Analysis (Figure 5) points out those women in comparison to their male counterparts have not equally benefited from the GMoUs of the MOCs intervention in fishery development. Further analysis (Figure 5) reveals that 58% of the women did not gain from the intervention

from the MOCs; while 42% of their male folks did. From the 42% of the women that have received intervention, 4% received NGN 200,000 (equivalent of 553 USD) and above, while for their male counterparts it is 7%. This finding agreed with Santos (2015) in that training of coastal women is very essential, particularly with the adoption of modern fishing practices that are tailored to offshore and inshore fisheries advancement which use natural resources in a sustainable manner; with the view of attaining economic development without degrading the environment. Analysis (Table 3) shows how the women have faced various challenges in their involvement in offshore and inshore fisheries; it shows that, for the treated groups, only 1 -30% of the women are confronted with access to modern fishing equipment. For the control group, between 61 to 90%, strive to get the modern equipment and on time. In access to farm credit; while about 70% of the treated enjoyed the privilege; about 30% faced difficulties in accessing credit. Among the treated fisherwomen, none is poor in the use and application of modern equipment, while over 60% of the control faces such difficulties.

**Table 3** Distribution of the fisherwomen according to their major challenge in the coastal communities of Niger Delta

Possible Challenges	Receivers of CG					Non-Receiver of CG				
	None	1 - 30	31- 60	61-90	All	None	1- 30	31-60	61- 90	All
Access to modern equipment		X							X	
Access to fishing credit		X								X
Access to Storage facilities			X						X	
Poor Rural Transportation					X					X
Poor Knowledge modern equipment use and Application	X								X	
Pollution of the insure water space					X					X
Usage of crude equipment	X									X

**Source:** Computed from the field data by authors

Further analysis (Table 3) reveals that access to storage facilities for the two groups (treated and control) is a major challenge. Over 30% face the difficulty among the treatment group, while it is over 70% for the control. This observation gives consent to Harper *et al* (2013) in which giving support to coastal women in fisheries is seen as a way of breaking the vicious cycle that leads to poverty in coastal communities and expansion of slums in the urban areas where the poor get poorer. Uduji & Okolo-Obasi (2018) have similar view in that fisherwomen instead of being treated as mere benefactors are seen as experts who possess fishing knowledge that can balance experts' formal knowledge. Hence, involvement in the GMoUs can contribute to offshore and inshore fisheries improvement, and surge production

and productivity in the region. It is vital to recognize the role that fisherwomen play and their influence by giving them greater GMoU support and engaging them in training and conducting of advancement programmes that improves their role in the offshore and inshore fisheries development in sub-Saharan Africa.

#### **4.2 Econometric analysis**

Analysis (Table 4) summed up the average variances in the four basic scores and independent observable characteristics between non-participants and participants. Generally, the difference in means indicates that the level of knowledge, access to modern fishing equipment in the sample is realistically low. The average test scores we derived ranked from 18% to 34% of maximum score. Yet, the women fishers receiving CG reached significantly higher scores in all classifications than the control group (those who had not received). The variances are from 3.5%, in the category of access to fishing credit, to 8.6% in the category of knowledge of modern equipment use and application. When the selected observable characteristics were looked into, the results showed noteworthy positive differences in means of fishing capacity (9.29%); fishing type (4.03%); annual income (6.43%); sources of fishing input (4.72%), and primary occupation (4.03%). Further analysis (Table 4) reveals that, treatment women recorded unwanted significant mean in fishing experience too (-2.19%), size of household, marital status, and income of other household members. This proposes that following the fishing characteristics, the treatment group visibly has more access to modern equipment, better knowledge of usage, more access to fishing credit and better enterprises management skills than the control group. Thus, observable participation motivations can be identified, which underlines the probability that selective placement exists and consequently the need to apply propensity score matching.

In accordance with the selected characteristics which capture relevant observable differences of both the treated and control, the probability of receiving CG is predicted. The Logit model as built in equation 3 has been reported (Table 5), which revealed that the estimated coefficients, the odd ratio are expressed in terms of odds of  $Z=1$ , the marginal effect and standard error. Looking at single observables, it is proven that primary business, educational level of the women, farm size and perception of the GMoU are factors that positively affect the women's involvement in the GMoU programmes. On the other side, farming experience unexpectedly affects it significantly and negatively.

**Table 4.** Comparison of mean knowledge score and observable characteristics across participants and non-participants (N = 800)

Access and Knowledge Score in Percentage of maximum score	Receivers	Non Receivers	Difference
Score on Access to Input	27.24	21.52	5.72**
Score on Knowledge of input use	34.15	25.56	8.59**
Score on Farm enterprise Management	23.73	17.82	5.91**
Score on Access to Fishing Finance	21.32	17.83	3.49**
<b>Socio-Economic Characteristics</b>			
Age	24.21	20.45	3.76
Education	43.38	30.21	13.17
Marital Status	28.1	25.38	2.72**
Household Size	11.65	16.37	-4.72
Primary Occupation	18.82	15.78	3.04*
Annual Income	41.29	34.86	6.43
Income of Other Household Members	6.46	7.15	-0.69
<b>Fishery Characteristics</b>			
Fishing Type (full time or otherwise)	16.31	12.28	4.03**
Fishing capacity	23.81	14.52	9.29**
Source of Input	9.28	4.56	4.72*
Fishing Experience	4.67	6.86	-2.19***
Number of Transportation means	6.92	6.28	0.64
<b>Observation</b>	<b>198</b>	<b>602</b>	

Source: Computed from the field data by authors

**Table 5.** Logit model to predict the probability of receiving CG conditional on selected observables

Variables	Coefficient	Odd Ratio	Marginal Effect	Std. Error
Age	-.044	.813	.019	.021
PriOcc	.521	.621	.240*	.124
Edu	.017	.827	.061**	.021
AY	-.062	1.108	.00212	.024
Fishing Capacity	.021	.514	.0621**	.035
Exp	-.032	.713	-.072**	.143
MS	-.043	1.703	.0003	.103
HHcom	-.421	.632	.0012	.204
Inpsou	.513	1.421	.0412	.031
Perception of GMoU	1.421	8.423	.072*	.025
Constant	1.116	3.321	.00346	.676
Observation	800			
Likelihood Ratio - LR test ( $\rho = 0$ )	$\chi^2(1) = 1254.31^*$			
Pseudo R <sup>2</sup>	0.28			

\* = significant at 1% level; \*\* = significant at 5% level; and \*\*\* = significant at 10% level

Source: Computed from the field data by authors

Ensuing possibility of receiving CG predicted in the model, the effect of the CG on equipping the rural women in coastal communities with necessary fishing skills for adoption and use of basic fishing equipment scores is assessed by the ATT, in line with equation 4. After cautiously certifying that the observations are ordered randomly and that there are no huge differences in the distribution of propensity scores, the result shows that NNM (nearest neighbor matching) produces the highest and most significant treatment impact estimate in all the four outcome groupings of access to modern fishing equipment: Knowledge of Equipment use, Fishing enterprise Management, Access to Fishing Funding and Total Capability of the Women (Table 6).

The closest neighbor estimate of the access to modern fishing equipment as a result of receiving CG is approximately 5%; but, due to NNM method yielding relatively poor matches as a result of information not being enough, we shifted attention to the other two matching method (KM and RM.). The estimated effect using radius matching algorithm is about 3%; while Kernel-based matching algorithm yields a substantial average treatment effect on the treated of 8.1%, which is the women's highest impact estimate. Accordingly, it can be confirmed that CG generate significant gains in women's involvement in the offshore and inshore fisheries, and if encouraged and made better will bridge the gender gaps and lift many out of penury. Now, following the model, in equation 5, we attempt checking the unevenness of single observable characteristics as the third step and it reveals that the quality of KM and RM in matching is by far higher than that of the simple method of picking the only closest neighbor in line with the propensity score. The summary statistics (Table 7) for the overall balance of all discrepancies between treatment group and control confirm the higher quality of kernel-based matching and radius matching; both the mean and the median of the absolute standardized difference after matching are under the threshold of 5%.

**Table 6.** Estimated impacts of CSR activities using the MOCs' GMoU (CG) on women via different matching algorithms

	<b>Access and Knowledge Score in Percentage of Maximum Score</b>		<b>Average Treatment effect on the treated</b>
	Receivers	Non- Receivers	
<b>Nearest neighbor matching</b>	Using single nearest or closest neighbor		
Score on Access modern fishing equipment	29.21	24.57	4.64**
Score on Knowledge of equipment use	36.81	30.21	6.6**
Score on Fishing enterprise Management	29.13	24.28	4.85**
Score on Access to Fishing Finance	29.08	25.18	3.9**
Score on total capability of rural young women	25.11	19.34	5.77*
<b>Observations</b>	<b>186</b>	<b>186</b>	
<b>Radius matching</b>	Using all neighbors within a caliper of 0.01		
Score on Access modern fishing equipment	24.17	21.12	3.05**
Score on Knowledge of equipment use	20.18	18.34	1.84**
Score on Fishing enterprise Management	18.52	14.32	4.2**
Score on Access to Fishing Finance	21.31	18.23	3.08**
Score on total capability of rural young women	20.12	14.52	5.6**
<b>Observations</b>	<b>171</b>	<b>271</b>	
<b>Kernel-based matching</b>	Using a bi-weight kernel function and a smoothing parameter of 0.06		
Score on Access modern fishing equipment	21.14	17.02	4.12**
Score on Knowledge of equipment use	29.62	22.38	7.24**
Score on Fishing enterprise Management	17.13	13.24	3.89**
Score on Access to Fishing Finance	21.34	20.12	1.22**
Score on total capability of rural young women	23.71	15.61	8.1*
Score on Access modern fishing equipment	<b>186</b>	<b>614</b>	

\*= significant at 1% level; \*\* = significant at 5% level; and \* \* \* = significant at 10% level

**Source:** Computed from the field data by authors

**Table 7.** Imbalance test results of observable covariates for three different matching algorithms via standardized difference in percent

Covariates <i>X</i>	Standardized differences in % after		
	Nearest neighbor matching	Radius matching	Kernel-based matching
<i>Age</i>	16.8	2.7	3.6
<i>PriOcc</i>	13.8	6.2	3.4
<i>Edu</i>	35.6	5.9	6.5
<i>AY</i>	10.9	3.8	2.1
<i>Farm size</i>	14.8	2.3	0.5
<i>Exp</i>	34.6	2.4	4.3
<i>MS</i>	21.9	4.6	2.6
<i>HHcom</i>	18.8	5.4	2.1
<i>Inpsou</i>	24.8	3.8	1.9
<i>Perception of GMOU</i>	75.4	4.8	6.3
Constant	54.3	3.2	3.87
Mean absolute standardized difference	29.3	4.1	3.4
Median absolute standardized difference	21.9	3.8	3.4

**Source:** Computed from the field data by authors

In the final stage and with respect to equation 7, we looked at the sensitivity of significance levels being aware that it is the responsibility of an appropriate control strategy for hidden bias. The analysis (Table 7) likens the sensitivity of treatment effects on scores on access modern fishing equipment, knowledge of equipment use, access to modern fishing equipment, access to fishing credit, total capability of the women and their fishing enterprise management among the three introduced matching algorithms; in all, robustness results produced by Rosenbaum's bounds are quite related. This finding has the same views with Uduji and Okolo-Obasi (2018c), in that in spite of the women's interest in the offshore and inshore fisheries activities ethnic beliefs and customs continue to impact their involvement in the GMoU clusters. And because amateurish fisherwomen are generally multi-tasking: their household needs, customary role and wage jobs as well as their priorities tend to be with the family rather than with improving on their need to be involved in the GMoU clusters. This is an area that Cluster Development Boards (CDBs) ought to pay special attention to being multi-tasking members of the oil-host communities: mothers, wives, fishmongers, matriarchs and homemakers.

**Table 8.** Sensitivity analysis with Rosenbaum's bounds on probability values

	<b>Upper bounds on the significance level for different values of <math>e^y</math></b>				
	$e^y= 1$	$e^y= 1.25$	$e^y= 1.5$	$e^y= 1.75$	$e^y= 2$
<b>Nearest neighbor matching</b>	Using single nearest or closest neighbor				
Score on Access modern fishing equipment	0.0001	0.0041	0.0634	0.315	0.721
Score on Knowledge of equipment use	0.0001	0.001	0.0321	0.231	0.412
Score on Fishing enterprise Management	0.0001	0.0015	0.0021	0.311	0.214
Score on Access to Fishing Finance	0.0001	0.0021	0.0031	0.0512	0.134
Score on total capability of rural young women	0.0001	0.0123	0.0231	0.0241	0.0421
<b>Radius matching</b>	Using all neighbors within a caliper of 0.01				
Score on Access modern fishing equipment	0.0003	0.0214	0.1346	0.682	0.091
Score on Knowledge of equipment use	0.0001	0.0013	0.0021	0.134	0.056
Score on Fishing enterprise Management	0.0002	0.0012	0.0023	0.021	0.0713
Score on Access to Fishing Finance	0.0001	0.0002	0.0009	0.0081	0.0463
Score on total capability of rural young women	0.0001	0.0015	0.0012	0.0312	0.0723
<b>Kernel-based matching</b>	Using a bi-weight kernel function and a smoothing parameter of 0.06				
Score on Access modern fishing equipment	0.0001	0.0148	0.146	0.548	0.042
Score on Knowledge of equipment use	0.0001	0.00731	0.0231	0.213	0.026
Score on Fishing enterprise Management	0.0001	0.00121	0.0001	0.005	0.0218
Score on Access to Fishing Finance	0.0001	0.0015	0.0013	0.0021	0.0134
Score on total capability of rural young women	0.0001	0.0351	0.012	0.0421	0.0425

**Source:** Computed from the field data by authors

Analysis (Table 8) reveals that there is a more generated robust treatment effect in Kernel-based Matching than in Nearest Neighbor Matching and Radius Matching in line with estimates to hidden bias, especially for access to modern fishing equipment, knowledge of equipment usage and also for total capability of fisherwomen. Therefore, there is a possibility

that matched pairs may vary by up to 100% in unobservable characteristics, while the effect of CG on access to modern equipment, knowledge of equipment use as well as for total capability of rural women, would still be significant at a level of 5% ( $p$ -value = 0.042 and  $p$ -value = 0.026, and  $p$ -value = 0.0425 respectively). Same groupings of knowledge score are robust to hidden bias up to an influence of  $e^{\gamma} = 2$  at a significance level of 10% following the radius matching approach.

In general, our findings come to one opinion with Dana *et al* (2008) in that oil and gas have a role to play in the entrepreneur development of the local people. Also, it gives consent to Dana *et al* (2009) in that oil and gas can potentially impact on the livelihood of the host communities. However, our specific discoveries show that women have rarely engaged in the offshore and long distance capture fisheries in the Niger Delta region of Nigeria due to the demanding work involved, domestic responsibilities and social norms. Women in the region are more commonly engaged in subsistence and inshore fishing from small boats and canoes in coastal and inland waters. They also contribute as entrepreneurship and are available for labour before and after the catch in both offshore and inshore activities. They would handle more tasks if they own capital and directly participate in production to sale of fish. In agreement with Uduji & Okolo-Obasi (2018c), the women face discouraging restrictions that significantly limit their potential and enmesh into a gender productivity trap. Closing this gap may not be that easy, but progress is possible via simple intervention of MOCs through GMoUs which can be very powerful and achieve the desired result. This proposes that the relative priorities of MOCs corporate social responsibilities in the Niger Delta should vary from the classic Western version as argued by Carroll (1991). Instead, the CSR of MOCs in the region ought to be guided by Visser (2006) on the significance of a cultural context in deciding the appropriate CSR priorities and programmes for the host communities. Moreover, it is necessary to be flexible as suggested by Amaeshi *et al.* (2006) in addressing the uniqueness of the socio-economic problems in the region; this requires closing the gender gap in involvement in fisheries which is the traditional source of livelihood of the people.

Nevertheless, in extension and input, we reason that if MOCs are to work towards an ideal CSR in the Niger Delta region, closing the gender gap in GMoU clusters involvement would be good for women and sustainable progress in fisheries. It is therefore our argument in this paper that MOCs are better positioned to enhance gender equality through GMoUs fisheries development project intervention. Investing in women fishers and instituting GMoU action plans that gear towards closing this gender gap in involvement in fisheries could yield huge

benefits for women and their families, host communities and the country at large. Closing the gap may also be gainful to sub-Saharan Africa's next generation, in that when a woman improves in her income, she becomes hegemonic in vital decisions that affect her family, especially her children. Besides, families in which women influence economic decisions could assign more income to food, health, education and the nutrition of children. Enhancing gender equality through GMoUs participation in the offshore and inshore clusters could result in a generation of sub-Saharan Africans who are better fed, educated and fortified to make useful contributions to their economies, within fisheries and beyond. Being aware of these opportunities, Multinational Corporation, African policy makers, donor governments and development associates should turn their attention to the gender gap in sustainable improvement in fisheries activities.

## **5. Conclusion and policy implications**

Approaches to offshore and inshore fisheries are mostly dependent on skilled labour and entrepreneurship which most women in Nigeria's oil coastal communities' are deficient in, and are largely left out of. As a result, we set out to examine the effect of a new CSR model of multinational oil companies (MOCs) on gender equality in fisheries development in the Niger Delta region of Nigeria. 800 women, in total, were tested across the coastal communities of the region. Results from the use of combined propensity scores matching and logit model revealed the various drawbacks that fisherwomen experience in accessing the same General Memorandum of Understanding (GMoU) cluster resources, training, markets and opportunities unlike men; women also face deep-rooted norms and institutional barriers that further widen the gap; moreover, they face discouraging restrictions that significantly limit their potential and enmesh them into a gender productivity trap. This implies that if the fisherwomen remain at this disadvantaged position, they would continue to look up to their menfolk when attempting to access financial support and to be heard in decision making relating to fisheries development and management. Dealing with the barriers that hold back the involvement of women in the offshore and inshore fisheries could both boost gender equality and usher in wider economic growth. The results suggested the need for tactical inclusion of fisherwomen in the GMoU cluster targets, making available basic fishing equipment and building capacity for gender mainstreaming proficiencies (skills and abilities needed to execute a mainstreaming plan) that will enable more women to be involved in the offshore and inshore fisheries sector, and ensure food security in sub-Saharan Africa.

This study adds to the literature on gender in sustainable fisheries development in five notable ways. First, we identified the key gender gaps in the advancement of Niger Delta fisheries. Second, the research made available insights into the usefulness of GMoUs in enhancing opportunities for women fishers in sub-Saharan Africa. Third, unlike former studies, this study utilizes a quantitative methodology, considering that quantitative works on the effect of CSR in the region are scarce. Fourth, the investigation seeks to explore how Africa conceptualizes CSR models within the context of fisherwomen. Fifth, we put forward suggestions, in line with action plan, that would aid MOCs to effectively confront the problems of CSR execution in Africa. As much as we know, this is the first study that surveys the significance of GMoUs in offshore and inshore improvement in fisheries activities in sub-Saharan African within the framework of gender equality. However, reproducing this analysis in other regions of the world is advisable in order to find out whether the established nexus withstand empirical scrutiny in varied coastal contexts of developing countries.

#### **Disclosure statement**

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## Appendix

<b>Variables</b>	<b>Definition</b>
Age	Age of the respondent rural young woman measure in number of years with a range.
PriOcc	Primary occupation the respondent rural young woman determining the women who are full time or part time fisher and those who live in the coastal communities but are not involved in any form of fishing.
Edu	Highest level of education obtained by the respondent rural young woman measured in number of years spent in school
AY	Annual income of the respondent rural young woman measured as total income less off fishery income. (income earned purely from fishery and fishery value chain)
Fishing Capacity	Level of participation in the fishery value chain by the respondent rural young woman, measured by size of fishing equipment, insure or offsure.
Exp	Fishing experience of the respondent rural young woman measured in number of year spent in the fishing industry.
MS	Dummy for Marital status of the respondent rural young woman. ( married =1 not married =0)
HHcom	Income of other members of the household of the respondent rural young woman measured as total income of the household less income from fishing
Inpsou	Sources of input used in fishery by the respondent rural young woman. This includes sources and availability of modern equipment.
Perception of GMoU	This is a dummy for how the people see the GMOU and the CSR of the MOCs. (those who perceive it as ours or for us = 1 and those who perceive it as theirs and for them =0)
CG	Corporate social responsibility interventions of the multinational oil companies using the global memorandum of understanding as received or participated in by the rural women.