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Strengthening women's participation in the traditional enterprises of sub-Saharan Africa: The role of corporate social responsibility initiatives in Niger Delta, Nigeria

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A G D I Working Paper

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Strengthening Women's Participation in the Traditional Enterprises of sub-Saharan Africa: The Role of Corporate Social Responsibility Initiatives in Niger Delta, Nigeria

Forthcoming: African Development Review

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Strengthening Women's Participation in the Traditional Enterprises of sub-Saharan Africa: The Role of Corporate Social Responsibility Initiatives in Niger Delta, Nigeria

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Abstract

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 development of rural women's traditional enterprises in the Niger Delta region. A total of 2400 women were sampled across the region. Results from the use of a combined propensity score matching and logit model indicate that the GMoU model of the CSR has recorded significant success in supporting farming and fishing transformation generally; but has also undermined those initiatives that focused on empowering rural women in traditional enterprises, due to the cultural and traditional context in the region. This causes both direct harm to women and their children, and wider costs to African economies. It implies that if the GMoU interventions are not targeted to raise women's economic status and to deter aggression, invariably they may contribute towards reducing the participation of women in economic, political and social development and, by extension, dampen efforts in deterring poverty and achieving the sustainable development goals (SDGs) in sub-Saharan Africa.

Keywords: Traditional enterprises, corporate social responsibility, rural women transformation, multinational oil companies, propensity score matching, sub-Saharan Africa

1. Introduction

Across sub-Saharan Africa, women play important and varied role in traditional enterprise, but they have unequal access, relative to men, to productive resources and opportunities (Anyanwu & Augustine, 2013; Anyanwu *et al*, 2016). In Nigeria, women are particularly active in the informal sector, but their entrepreneurial activities are mainly small in scale, with a low-income base and low technological content (Uduji *et al*, 2019a, 2020a). Closing these gender gaps would enhance economic, political and social development in the region. Empowering women and ensuring gender equality may not be an easy task, but progress can be made and simple interventions such as a targeted corporate social responsibility (CSR) can sometimes be necessary (Burton *et al*, 2000; Asongu *et al*, 2019). Yet, the emergence of CSR has largely been seen as a strategy employed by companies to deflect public criticism of their behavior, and means for avoiding government regulation (Crane & Matten, 2007; Doane, 2005; Jenkins, 2005). As a concept, CSR has been strongly criticized and an intense discussion has burst forth over its utility and practical implication (Watts, 2004; Frynas, 2009). While proponents view CSR as a vehicle for potentially reinvigorating an old dynamic in business-society relationships, critics see it as a platform for new functions to be demanded of old institutions (Idemudia, 2014; Uduji *et al*, 2019b). This difference in perception invariably sets the context for the CSR debate, pitting those in favour of preserving an already well-established business-society relationship against those who insist that business-society relationships must adapt to changing societal value.

Meanwhile, in Nigeria, oil is mainly extracted in the Niger Delta region. Traditionally, the people of the Niger Delta have been farmers and fishermen, which were mostly engaged by enterprising women in the region; but decades of oil spillage and gas flaring as well as a rapidly growing population, has meant these traditional sources of livelihood are either no longer viable or have experienced significant decline (NDDC, 2004; Idemudia, 2014; Uduji & Okolo-Obasi, 2017). Consequently, the region's unemployment rates are higher than the national average (UNDP, 2006; Uduji & Okolo-Obasi, 2018a, 2018b, 2018c). Nevertheless, multinational oil companies (MOCs) operating in the region has been involved in a plethora of CSR activities in Nigerian and Niger Delta in particular. Over the years, MOCs have tried to improve on how they engage with local communities to deliver these projects. In 2006, MOCs introduced a new way of working with communities called the Global Memorandum of Understanding (GMoU). A GMoU is a written statement between MOCs and a group (or cluster) of several communities. The GMoUs represent an important shift in approach,

placing emphasis on more transparent and accountable processes, regular communication with the grassroots, sustainability and conflict prevention (Chevron, 2014). Under the terms of the GMoU, the communities decide the development they want while MOCs provide secure funding for five years, ensuring that the communities have stable and reliable financing as they undertake the implementation of their community development plans (Uduji *et al*, 2019a, 2019b). For instance, in 2009, a pro-women GMoU cluster in Rivers State embarked on the upgrading of Rumuibekwe market in Port-Harcourt with the provision of 90 open market stalls, skill acquisition and training programmes; by December 2012, an independent evaluation study of the project showed significant improvements in the livelihood of the community and its environs as the market and relevant skills acquired created direct employment opportunity for about 300 women (SPDC, 2013).

However, scholars such as Idemudia (2014), Frynas (2009), Ekhaton (2014), Eweje (2006) and others have argued that the new CSR model is not far reaching or deeply entrenched. Thus, it has been contended that some of these CSR initiatives are not carried out on a coherent basis and not always sustained (Amaeshi *et al*, 2006, Uduji & Okolo-Obasi, 2019c, 2020). On the contrary, Ite (2007), Lompo & Trani (2013) and others support the CSR initiatives, arguing that the GMoU model is becoming popular with communities given the extent of failures of government. Against this background and obvious gap in the literature, the positioning of this research has six main objectives which are consistent with the MOCs' new CSR model (GMoU) relative to gender equality in traditional enterprises (farming and fishing) development:

- To determine the issues related to women enterprise development in Niger Delta.
- To determine the spread of women involvement in enterprise development among the population along marital status, age, and location (urban/rural) in the Niger Delta.
- To ascertain the level of MOCs' CSR investment in Niger Delta.
- To determine the impact of the MOCs' CSR on women's enterprise development.
- To analyse how individual, household and community level factor affect the propensity of women in benefiting from the MOCs' CSR in Niger Delta.
- To identify alternative means of financing young rural women entrepreneurs in both formal and informal sector using MOCs' CSR so as to affect a positive shift in status.

Thus, the further contents of the paper can be adumbrated as follows. Section 2 describes the methodology. Section 3 presents the main findings and their implications. Finally, Section 4 concludes with policy recommendations.

2. Methodology

We adopted a quantitative method, given the scarcity of quantitative data on the intricacies of CSR impact in the region (Uduji *et al*, 2019c, 2019d,2019e). The study employed the use of survey research technique targeted at obtaining information from a representative sample of female entrepreneurs involved in traditional enterprises. Hence, we collected cross-sectional primary data using structured questionnaire to profile the individual, households and communities in the study area.

2.1 Sampling procedure

Using multi-staged sampling method, we combined both simple random sampling, purposive and quota sampling to select the respondents based on the population of the states (NPC, 2007) as follows: Firstly, we purposely selected the two most rural local government areas (LGAs), each from the nine States of Niger Delta region. We also applied purposive sampling to select three rural communities from each of the selected LGAs, on the same basis that the communities are more rural than others. From the fifty four rural communities selected, we used simple random sampling with the help of community gate keepers to select 2400 rural women traditional entrepreneurs.

2.2 Data collection

Questions to distinguish between CSR receivers and non-receivers were probed to the women to determine if they have received directly from the MOCs in the area of CSR to improve their livelihood in traditional enterprise. Based on this questionnaire, scores were allocated according to the objectives of the study. The questionnaire was directly administered by the researchers with the help of research assistants.

2.3 Analytical framework

Added to the descriptive method used in data analysis, a combination of propensity score matching (PSM) and logit model was adopted to estimate the impact of MOCs' CSR on traditional enterprise development among women in the rural communities of Niger Delta.

This binary choice model provides the opportunity to identify the probability of participation on the subject of the study. The dependent variable (probability of being developed entrepreneur) regresses up against the observable individuals, household and community level characteristics which will include receipt or non-receipt of the MOCs' CSR. Hence, multivariate linear regression model of the odds ratios is stated thus:

$$P_x = \log \frac{P_i}{1-P} = \log O_i = \alpha + \beta I_i + \dots + \gamma H_i + \dots + \pi C_i + \dots + \mu \quad \text{Equation 1}$$

Where:

α - Vector of Coefficient of independent variation,

β = Vector Coefficient of variables, which indicate individual characteristics,

γ = Vector Coefficient of variables, which indicate household characteristics,

π = Vector Coefficient of variables, which indicate community level characteristics,

Y = whether the individual is self-employed or not i.e. 1 = self-employed 0 = not self-employed,

P_i = probability of Y=1

I - Vector variables, which indicate individual characteristics,

H - Vector variables, which indicates household characteristics,

C - Vector variables, which indicates community characteristics and

μ - Error term

2.4 Model specification

In propensity score matching, picking an ideal comparison group, from a larger survey we match them to the treatment group based on set of observed characteristics on the predicted probability of treatment. Hence, estimating the impact of CSR on enterprise development of women, two groups were selected. They are those who have received CSR (Treatment) and otherwise (Control). Therefore, probability of receiving CSR given observed characteristics is stated thus:

$$\text{Hence: } P(X_1) = \text{Prob}(R_2 = 1/X_2) \quad (0 < P(X_2) < 1) \quad \text{Equation 2}$$

Where X_1 is a vector of pre-CSR control variables. To draw precise conclusions about the impact of CSR activities on development of women entrepreneurs in traditional enterprises, the necessity to side-step the selection bias on observables by matching on the probability of the treatment (covariates X) became obvious. To this; we defined the PS of Vector X thus:

$$P(X) = \Pr (Z = 1/X), \tag{Equation 3}$$

The Z represents the treatment indicator equating 1 if the selected individual woman has received CSR, and zero otherwise. As the PS is a balancing score, the observables X was spread same for both treatment and control and the differences are the attribute of treatment. To get this unbiased impact estimates, we took steps which include: Acknowledging that the probability of receiving CSR is predicted by a binary response model, with suitable observable characteristics. Hence we estimated a logit model of CSR receiving or not receiving as a function of the variables of interest as follows:

$$P(x)=\Pr(Z=1/X)=F(\alpha_1X_1+\dots+\alpha_nX_n)=F(x\alpha)=e^x\alpha \tag{Equation 4}$$

Formed value of the probability of receiving CSR from the logit regression assigning each woman a propensity score where the control with very low PS outside the range found for the treatment were dropped. For each treatment, a control that has the closest PS as measured by absolute difference in score referred to as “nearest neighbor” were obtained. The variance between treatment and control groups were assessed by the average treatment effect on the treated (ATT). The true ATT, based on PSM is written thus:

$$ATT_{PSM} = E_{p(x)} \{E(y_1/Z = 1, P(x)) - E(y_0/Z = 0, P(X))\}, \tag{Equation 5}$$

$E_{P(X)}$ stands for expectation with respect to the distribution of PS in the population. The true ATT indicates the mean difference in capability of the women in enterprise. In this we achieve an adequate match of a participant with her counterfactual in as much as their observable characteristics are identical. Checked the matching estimators’ quality by standardized differences in observables’ means between treatment and control. Representing difference in percent after matching with X for the covariate X, the difference in sample means for treatment as (\bar{X}_1) and matched control 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 variances are put thus: $(\int_1^2 \text{ and } \int_0^2)$.

Hence:

$$|SD = 100 * \frac{(\bar{X}_1 - \bar{X}_0)}{(.05 \int_1^2 \text{ and } \int_0^2)^{1/2}} \tag{Equation 6}$$

We also accepted a remaining bias below 5% after matching taking it as an indication that the balance among the different observable characteristics between the matched groups is

sufficient. The problem of hidden bias was avoided by the bounding approach. In equation 4 above, 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 CSR and captured by γ :

$$P(x)=\Pr(Z=1/X)= F(X\alpha +U\gamma) = e^{X\alpha U\gamma} \quad \text{Equation 7}$$

With sensitivity analysis, we examined the strength of the influence of γ on receiving CSR in order to attenuate the impact of receiving CSR on potential outcomes. Simply put, the assumption is that the unobservable variable is a binary variable taking values 1 or 0. To this, the receiving probability of both women is applied in line with the bounds on the odds ratio as stated thus:

$$\frac{1}{e\gamma} \leq \frac{P(X_m)(1-P(X_n))}{P(X_n)(1-P(X_m))} \leq e\gamma \quad \text{Equation 8}$$

Therefore, in line with Rosenbaum (2002), we could argue that both individual woman have the same probability of receiving CSR, provided that they are identical in X , only if $e\gamma=1$

3. Main Findings and their Implications

3.1 Socio-economic characteristics analysis

The analysis of women in the study begins with a description of some of their social, demographic, and economic characteristics. These characteristics are important in understanding the differences in the status of the treatment group compared with control. The analysis indicates that about 60% of the respondents are full-time farmers, while 13% are engaged in fishing and only about 6% are employed by either government or private sectors in non-farm activities. The average age of the respondent is 33 years, while average experience is 12 years; with about 9% having more than 15 years of experience in their enterprise. It was also noted that only about 8% of the women population in the Niger Delta region is completely uneducated, while the rest are literate at least to basic education level. This finding contrasts with Uduji *et al* (2020c), in that basic education is not the key challenge of women in sub-Saharan Africa. About 25% of the respondents are single, while 46% are married, 13% are widowed, likely as a result of incessant violence in the region, and 16% are separated. Despite the abundant potentials of traditional enterprise (farming and fishing) in the host communities, the average annual income of the women is less than NGN100, 000 (equivalent of 328 USD) per annum. While 25% of the women have

participated in any form of capacity building programme of the MOCs, 75% have not even heard much about it; hence, about 43% says they have never received any CSR.

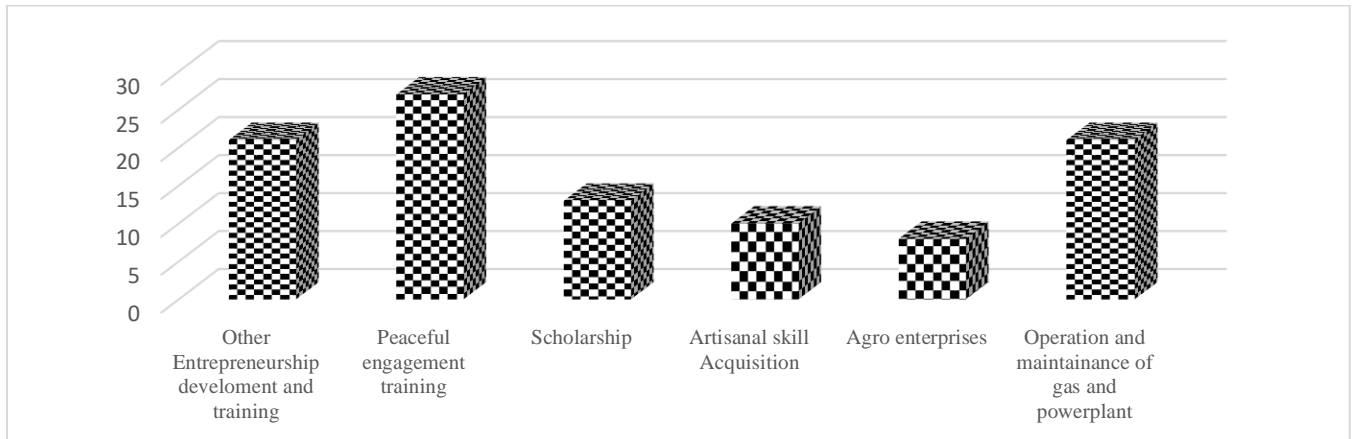


Figure 1.Percentage distribution of CSRs intervention of MOCs by sectors in the Niger Delta.

Source: Authors’ compilation based on household survey.

Analysis (Figure 1) reveals the catchment areas of MOCs capacity building using GMoU; 27% is in the area of peaceful engagement training, while 21% is in the area of operation and maintenance of gas and power plants; agro entrepreneurship development receives only 8%, while other entrepreneurship development and training received 21%. This suggests that the CSR is mostly targeted to areas that guarantee the exploration of the MOCs in a peaceful atmosphere, and the beneficiaries of such interventions are mainly urban based, while paying little attention to the majorities living in rural areas and working mainly in farm enterprises. This observation assent to Anyanwu (2013, 2016), in that income inequality in sub-Saharan Africa is mirrored in unequal access to resources and opportunities between rural and urban resident, and between women and men. This suggests that an inclusive structure of growth, anchored on employment and resulting in more equal distribution of opportunities and income, would not only reduce poverty but would also set the stage for accelerating future growth in the Niger Delta.

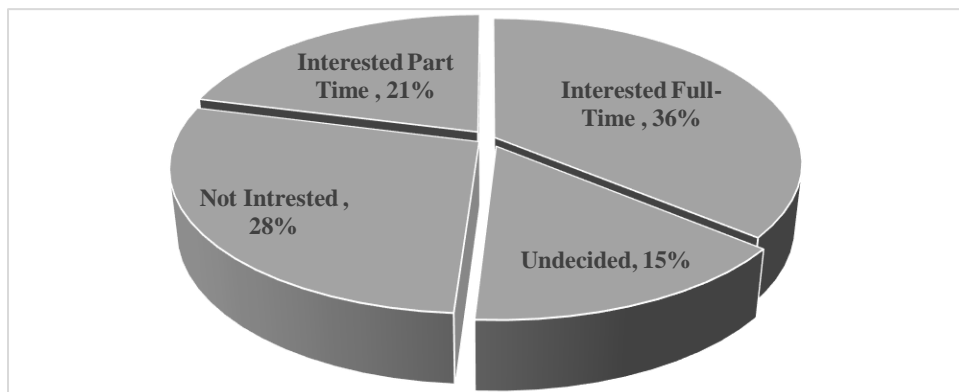


Figure 2. Willingness to participate in traditional enterprises

Source: Authors' compilation based on household survey.

Analysis (Figure 2) shows that 36% of the women are interested in full-time participation in high growth traditional enterprise, while 21% are interested part-time; 28% are not interested and 15% are yet undecided. This finding suggests that any targeted GMoU intervention towards this direction will prove vital to increasing women's involvement in the agricultural and fishery value chain, and ultimately addressing the significant untapped potential of this sizable and growing demographic. This finding harmonize in opinion with Uduji *et al* (2020d, 2020e), in that priorities to target include: job creation, preferably in the formal sector, to absorb rural migrants productivity; infrastructure development in rural areas to increase farmers' access to markets.

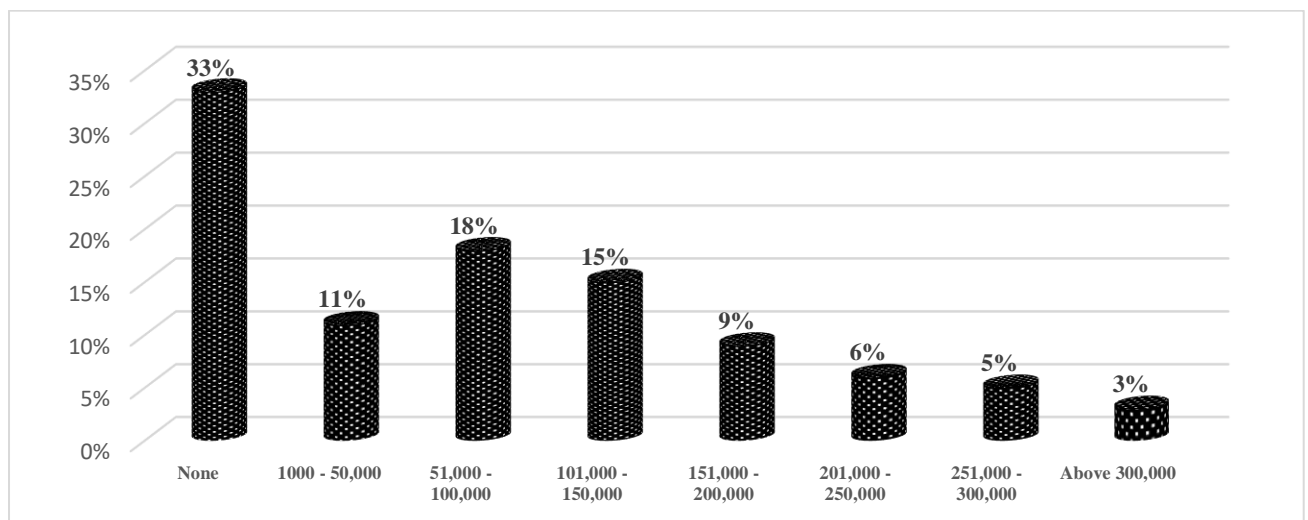


Figure 3.Rate of rural women receipt of GMoU intervention on entrepreneurship development.

Source: Authors' compilation based on household survey.

Analysis (Figure 3) indicates that 33% of the women have not receive any intervention fund from GMoU on enterprise development, while 14% have receive N200,000 (equivalent of 548 USD) or more. This finding arrives at a settlement with Anyanwu (2014a, 2014b) in that inadequate access to financial services is a principal challenge to women entrepreneurs in Nigeria; most financial service providers are reluctant to provide their services – including credit, savings and insurance – to rural women due to their lack of collateral and financial literacy, among other reasons. It implies that promoting GMoUs financial interventions targeted to rural women's, mentoring and training programmes; interventions that improve agricultural productivity for the poor can contribute to reducing inequality in the region.

Table 1. Distribution of the women according to their major challenge in traditional enterprises in the Niger Delta

Description	Receivers of CG					Non-Receiver of CG				
	%	%	%	%	%	%	%	%	%	%
	0	1 - 30	31-60	61-90	100	0	1 - 30	31-60	61-90	100
Access to input		X							X	
Access to lands				X					X	
Access to credit		X								X
Poor rural transportation					X					X
Access to storage facilities				X			X			
Poor knowledge of input use and application	X								X	
Short supply of labour			X			X				
Usage of manual labour		X								X

Source: Authors' compilation based on household survey.

Analysis (Table 1) shows how the women entrepreneurs have faced numerous challenges in traditional enterprises development. For the treated groups, only 1 -30% of the women are challenged with access to inputs like fertilizer, improved seeds and stems, crop protection products, fishing tools as well as farm machineries. For the control group between 61 - 90%, struggle with getting inputs and on time. Access to land is a major challenge to both treated and control group, while about 60% and above have access to finance in the treated group and almost all the control group has not. Among the treated group, none has poor knowledge of input use and application, while over 60% of the treated have such challenges. This suggests that the little MOCs have done with the CG shows a sign of improvement in the women, especially rural women's capability to function and improve their welfare. This observation comply with Uduji *et al* (2020e, 2020f, 2020g), in that gender inequalities in agriculture are characterized by unequal access to agricultural inputs such as land, fertilizers, and finance; women who depend on agriculture and do not own land for this purpose are more vulnerable to domestic violence, and therefore dominate in vulnerable employment, with most of them working in seasonal, petty trading of agricultural products. Anyanwu & Kponnou (2017) also conceded in that understanding the link between economic growth and poverty reduction would require identification of these major obstacles that constrain women participation and limit the flow of economic propensity to the poor. This is also in harmony with Anyanwu & Erhijakpor (2010), in that gender inequality remains a major barrier to efforts to reduce poverty in Africa. This calls for prioritization of gender issues in development and the need to recognize equality as an important prerequisite for success in other development objectives.

3.2 Econometric analysis

In analysis (Table 2), we summarized the average differences in the four basic scores and independent observable characteristics between participants and non-participants. Generally, the difference in means shows that the level of market access to women entrepreneurs in the sample is reasonably low with average test scores ranking from 15% to 20% of maximum score. Nevertheless, the women receiving CSR reach significantly higher scores in all categories than those, who had not received. The difference is from 3% in the category of access to input to 11.5% in the category of Knowledge and training. When the selected observable characteristics were examined, it shows that there are significant positive differences in means of enterprise size (8.15%), enterprise type (7.03%), experience (1.88%), annual income (7.66%), sources of input (1.31%) and primary occupation (1.62%).

Furthermore, treatment group recorded also negative significant mean in household size, marital status, and income of other household members which are 4.76, -4.28, and -1.89 respectively. Hence, observable participation incentives can be identified, which underlines the possibility that selective placement exists and therefore the need to apply propensity score matching.

Table 2. Comparison of mean knowledge score and observable characteristics across participants and non-participants (N = 2400)

Access and Knowledge Score in Percentage of maximum score	Receivers	Non Receivers	Difference
Score on access to input	22.42	19.35	3.07**
Score on knowledge and trainings	31.08	19.56	11.52**
Score on market access	19.73	14.68	5.05**
Score on access to finance	21.32	16.78	4.54**
Socio-economic characteristics			
Age	22.23	20.45	1.78
Education	31.83	20.21	11.62*
Marital status	21.10	25.38	-4.28**
Household size	11.32	16.08	-4.76
Primary occupation	17.28	15.66	1.62*
Annual income	42.52	34.86	7.66
Income of other household members	6.36	8.25	-1.89
Enterprise characteristics			
Enterprise type	16.31	9.28	7.03**
Enterprise size	27.80	19.65	8.15**
Source of input	3.72	2.41	1.31*
Experience	4.67	2.79	1.88***
Community characteristics			
Cooperative membership	16.31	12.28	3.03**
Enterprise type	22.30	17.15	5.15**
Restrictive social norms	4.61	3.60	1.01*
Business license	5.27	1.16	4.21***
Number of transportation means	7.89	7.28	0.61

Observation	594	1806
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Source: Authors' compilation based on household survey.

In line with the selected characteristics which capture the treated and control's relevant observable differences, the probability of receiving CSR is predicted. The Logit model as built in equation 4 has the reported analysis (Table 3), the estimated coefficients; the odd ratio are expressed in terms of odds of $Z=1$, *the marginal effect and standard error*. Examining single observables, it is shown that primary occupation, educational level of the women, enterprise size and perception of the GMoU are factors that positively influence the women participation in the capacity building programmes. On the other side, experience surprisingly affects it significantly in negative way.

Table 3. Logit model to predict the probability of receiving CSR conditional on selected observables

Variables	Coefficient	Odds Ratio	Marginal Effect	Std. Error
Age	-.037	.983	.009	.019
PriOcc	.319	.962	.120*	.142
Edu	-.007	1.017	.051**	.012
AY	-.016	.908	.00114	.042
Bizsize	.017	.954	.0511**	.053
Exp	-.021	1.810	-.054**	.132
MS	-.013	1.930	.00135	.130
HHcom	-.319	.562	.0012	.205
Inpsou	.451	1.31	.0521	.013
Perception of GMoU	1.241	11.143	.061*	.052
Constant	1.816	5.131	.00261	.667
Observation		2400		
Likelihood Ratio - LR test ($\rho=0$)		$\chi^2(1)$ 1135.23*		
Pseudo R ²		0.21		

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

Source: Authors' compilation based on household survey.

Following probability of receiving CSR predicted in the model, the impact of the CSR on woman's access to input scores is estimated by the ATT in line with equation 5. After carefully certifying that observations are ordered randomly and that there are no large disparities in the distribution of propensity scores, the result (Table 4) shows that NNM (nearest neighbor matching) yields the highest and most significant treatment effect estimate in all five outcome categories of access to input, knowledge and trainings, market access, access to finance and total capability of women.

Table 4. Estimated impacts of CSR activities using the MOCs' GMoU (CSR) on women's capacity building using different matching algorithms

Description	Access and Knowledge Score in Percentage of Maximum Score		Average Treatment effect on the treated
	Receivers	Non- Receivers	
Nearest neighbor matching	Using single nearest or closest neighbor		
Score on access to input	34.21	30.52	3.69**
Score on knowledge and trainings	41.28	31.44	9.84**
Score on market access	29.13	24.28	4.85**
Score on access to finance	31.13	27.28	3.85**
Score on total capability of women	27.21	21.34	5.87
Observations	594	594	
Radius matching	Using all neighbors within a caliper of 0.01		
Score on access to input	34.14	31.12	3.02**
Score on knowledge and trainings	40.16	32.34	7.82**
Score on market access	28.41	25.13	3.28**
Score on access to finance	30.43	26.22	4.21**
Score on total capability of women	24.52	19.42	5.1
Observations	585	1625	
Kernel-based matching	Using a bi-weight kernel function and a smoothing parameter of 0.06		
Score on access to input	34.14	32.02	2.12**
Score on knowledge and trainings	39.26	32.38	6.88**
Score on market access	27.31	25.13	2.18**
Score on access to finance	28.33	26.22	2.11**
Score on total capability of women	21.67	12.36	9.31*
Observations	521	1795	

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

Source: Authors' compilation based on household survey.

The nearest neighbor estimate of the total capability of women due to receiving CSR is approximately 6%. But, in as much as NNM method yields relatively poor matches as a result of the limitation of information, we shifted attention on the other two matching method (KM and RM). The estimated impact using radius matching algorithm is about 5.1%, while Kernel-based matching algorithm produces a significant average treatment effect on the treated of 9.31%, which is the highest impact estimate for total capability of women. Consequently, it can be confirmed that CSR generate significant gains in women's capacity building, and if encouraged and improved upon will lift many out of poverty line. For instance, this isacknowledged in SPDC (2013) and Chevron (2014) in that funding was received for a capacity building programme – “Add Their Voice to the Budget” (ATVB) for all GMoU clusters in Bayelsa State; and the programme was designed to equip the GMoU clusters with relevant skills required for peaceful engagement and complement government effort in the planning and implementation of the development agenda for the respective

communities; a total of 61 representative from the GMoU clusters including youths, women leaders and traditional rulers successfully completed the ATVB training on budget tracking and advocacy skills.

Following the model in equation 5, we attempt checking the imbalance of single observable characteristics as the third step and it show that the quality of KM and RM in matching is much higher than that of the simple method of choosing the only closest neighbor with respect to the propensity score. The summary (Table 5) statistics for the overall balance of all covariates between treatment group and control confirms the higher quality of kernel-based matching and radius matching. Both the mean and the median of the absolute standardized difference after matching are below the threshold of 5%.

Table 5. Imbalance test results of observable covariates for three different matching algorithms using standardized difference in percent

Covariates X	Standardized differences in % after		
	Nearest neighbor matching	Radius matching	Kernel-based matching
Age	15.7	3.3	2.1
PriOcc	11.6	5.3	3.4
Edu	31.4	6.4	8.8
AY	9.5	3.8	2.1
Biz size	12.6	2.7	0.5
Exp	31.4	2.4	4.3
MS	21.5	4.9	2.6
HHcom	19.4	5.4	2.1
Crescourse	22.5	4.1	1.9
Perception of GMOU	86.4	5.5	6.3
Constant	41.6	2.8	4.7
Mean absolute standardized difference	27.60	4.24	3.53
Median absolute standardized difference	19.4	4.1	3.4

Source: Authors' compilation based on household survey.

Table 6. Sensitivity analysis with Rosenbaum's bounds on probability values.

	Upper bounds on the significance level for different values of e ,				
	Using single nearest or closest neighbor				
	$e_y=1$	$e_y=1.25$	$e_y=1.5$	$e_y=1.75$	$e_y=2$
Nearest neighbor matching	Using single nearest or closest neighbor				
Score on Access to input	0.0001	0.0041	0.0634	0.418	0.871
Score on Knowledge and trainings	0.0001	0.0012	0.0321	0.231	0.621
Score on Market access	0.0001	0.0016	0.0021	0.321	0.211
Score on Access to Finance	0.0001	0.0021	0.0031	0.0521	0.143
Score on total capability of women	0.0001	0.0223	0.0231	0.0241	0.0411
Radius matching	Using all neighbors within a caliper of 0.01				
Score on Access to input	0.0004	0.0214	0.1634	0.628	0.091
Score on Knowledge and trainings	0.0001	0.0013	0.0021	0.134	0.066
Score on Market access	0.0002	0.0012	0.0032	0.021	0.0731
Score on Access to Finance	0.0001	0.0002	0.0009	0.0081	0.0436
Score on total capability of women	0.0001	0.0015	0.002	0.0312	0.0732
Kernel-based matching	Using a bi-weight kernel function and a smoothing parameter of 0.06				
Score on Access to input	0.0001	0.0184	0.164	0.485	0.034
Score on Knowledge and trainings	0.0001	0.0071	0.0231	0.213	0.012
Score on Market access	0.0001	0.0011	0.0001	0.005	0.0218
Score on Access to Finance	0.0001	0.0015	0.0013	0.0021	0.0134
Score on total capability of women	0.0001	0.0315	0.012	0.0421	0.0432

Source: Authors' compilation based on household survey.

In the final stage, and in line with equation 7 in the model, we examined (Table 6) the sensitivity of significance levels knowing that it is the responsibility of an appropriate control strategy for hidden bias, and compares the sensitivity of treatment effects on scores on access to input, knowledge of input use, farm enterprise management access to farm finance, and score on total capability of women among the three introduced matching algorithms. In all, robustness results produced by Rosenbaum's bounds are quite similar.

Analysis (Table 6) shows that KM generated more robust treatment effect than NNM and RM in respect to estimates to hidden bias, especially for access to input, knowledge and training, as well as for total capability of women. There is a probability that matched pairs may differ by up to 100% in unobservable characteristics; while the impact of CSR on access to input, knowledge and training as well as for total capability of women, would still be significant at a level of 5% (p-value = 0.034 and p-value = 0.012, and p-value = 0.0432 respectively). The same categories of knowledge score are robust to hidden bias up to an influence of $e=2$ at a significance level of 10% following the radius matching approach.

On the whole, the findings of this study confirm that GMoUs of MOCs have become very popular with communities, with greater ownership leading to better projects, sustainability and improved trust; which provides a better organized community interface and grievance/dispute resolution mechanism. This suggests that a carefully designed CSR policies, strategies and projects can work within existing traditional and cultural norms, in ways that benefit both women and men in the development of traditional enterprises in Niger Delta region of Nigeria. The findings share the same views with Amaeshi *et al* (2006), on the importance of cultural context in the determination of appropriate CSR priorities and programmes in Africa. The findings also give consent to Uduji *et al* (2020b, 2020c) on the need for flexibility in approach to CSR policy and practice by multinationals operating in Africa and globally. However, in extension and contribution, if we are to contribute on how CSR interventions can advance gender equality in traditional enterprises and rural employment in Africa, we would argue that MOCs' CSR can play an important role in empowering women and ensuring equality when investment in farming and fishing is designed to raise women's economic status and to deter aggression. Acknowledging the web of challenges within sub-Saharan African women, families, communities and at the policy level that shape a woman's experience is critical to implementing effective CSR programmes.

These power dynamics can be complex and challenging to navigate, but by improving gender equity we improve outcomes for all.

4. Conclusion and Policy Recommendation

Women's participation in economic, political and social development is being held back by unequal access to resources and opportunities and unacceptable levels of interpersonal violence. This causes both direct harm to women and their children, and wider costs to African economies. Thus, we set out to assess the impact of multinational oil companies (MOCs) corporate social responsibility on development of women's traditional enterprises in the Niger Delta region of Nigeria. A total of 2400 women were sampled across the region. Results from the use of a combined propensity score matching and logit model indicate that the GMoU model of the CSR has recorded significant success in supporting farming and fishing transformation generally; but has also undermined those initiatives that focused on empowering rural women in traditional enterprises, due to the cultural and traditional context in the region. This causes both direct harm to women and their children, and wider costs to African economies. It implies that if the GMoU interventions are not targeted to raise women's economic status and to deter aggression, invariably they may contribute towards reducing the participation of women in economic, political and social development and, by extension, dampen efforts in deterring poverty and achieving the sustainable development goals (SDGs) in sub-Saharan Africa.

The study adds to the literature on gender parity in access to inputs that affect women's and men's productivity in agriculture in five notable ways. Firstly, we identified the key gender gaps in accessing farming and fishing opportunities provided by MOCs in the Niger Delta region of Nigeria. Secondly, the research provides insights into how CSR interventions can advance gender equity in rural areas of the Niger Delta. Thirdly, departing from previous studies, this research adopts a quantitative methodology to tackle the scanty quantitative gender in agriculture on the relevance of CSR in the region. Fourthly, the study seeks to explore the nature of an African CSR model in women's traditional enterprises transformation. Fifthly, we put forward policy suggestions that would guide multinationals to successfully tackle the challenges of mainstreaming gender equality in African agricultural development. However, there is a dearth of international research which surveys the nature and extent of CSR and gender in Africa as compared with other regions of the world. Hence,

there is an urgent need for further research on how CSR can advance gender equity in sub-Saharan Africa at the international, regional, national and sectoral levels, as well as on theoretical constructs.

Disclosure statement

No potential conflict of interest was reported by the authors.

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