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PROMOTING GENDER – EQUITABLE AGRICULTURAL VALUE CHAINS: THE ROLE OF CORPORATE SOCIAL RESPONSIBILITY IN NIGERIA'S NIGER DELTA

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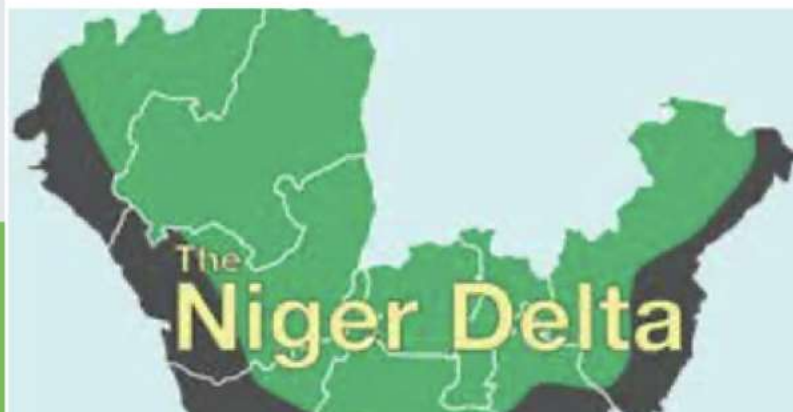
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Abstract

Purpose – The purpose of this paper is to critically examine the multinational oil companies' corporate social responsibility (CSR) initiatives in Nigeria. Its special focus is to investigate the impact of the global memorandum of understanding (GMoU) on promoting gender-equitable agricultural value chains in the Niger Delta region.

Design/ methodology/approach – This paper adopts a quasi-experimental design that used 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 of 760 rural women (380 from the treatment group and another 380 from the control group) were sampled across the Niger Delta region.

Findings – The results from the use of a combination of a logit model and propensity score matching indicate a significant relationship between GMoU model and gender-equitable agricultural value chains in the Niger Delta, Nigeria.

Practical implications – This implies that CSR of a multinational oil companies is a critical factor in the need to integrating gender into agricultural value chains, and achieving the goal of increasing agricultural growth and expanding the stable food supply.

Social implications - It suggests that creating and sustaining competitive and equitably-oriented value chains that help small-scale farmers, especially women will require examining gender issues and proactively integrating gender components into GMoU policies and action plans of MOCs for value chain analysis and development strategies in the Niger Delta.

Originality/value – This research contributes to gender debate in agricultural value chains 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.

Keywords Gender, Agriculture, Value chains, Corporate social responsibility, Multinational oil companies, sub-Saharan Africa

Paper type Research paper

1. Introduction

Gender-equitable agricultural value chain enterprises being promoted has been a conspicuous topic in recent times and has raised the development plan; as there is rising support globally that for agriculture to make progress in emerging countries, gender explicit procedures and services aimed at women in value chains should be established (African Competitiveness Report, 2017). Promoting gender-equitable agricultural value chain enterprises is a basic quality of new inventiveness, and is a primary conduit for accomplishing the goal of aggregating agricultural advancement and increasing the steady food supply (African Economic Outlook, 2017). The enhanced market-based coordination which is the distinguishing characteristic of value chains lessens transaction cost and creates room for increased yield in agriculture as well as economic progress (African Development Report, 2015). Forming and nourishing viable and equitably-oriented value chains that aid small-scale farmers, particularly women, will have need of overtly scrutinising gender issues and proactively incorporating gender components into value chain examination and development schemes (FAO, 2011). Value chain programmes when fashioned with gender equitable principles, can nurture both effectiveness and gender equity objectives to boost poverty-lessening impacts (Abdul-Rahman and Abdulai, 2020). In Nigeria, women are responsible for 75% of the farming population, operating as farm managers, and providers of labour (FAO/IFAD/ILO, 2010). Though women make up a large portion of the farming population, women's prospects in agriculture are held up by formal and traditional roles (Moss and Schmitz, 2019). By and large, the extent of gender contribution in agricultural production shows a discrepancy across ethnic groups in Nigeria. In general, women are hardly ever associated with agricultural export crops such as rubber, cotton, cocoa; instead, they are involved with the cultivation of food crops such as maize, cassava, cowpea, pepper, melon, and vegetables (Asongu *et al*, 2019a). In some cases, women take part in small-scale animal production including small ruminants, aquaculture and poultry. Aggregators and those who distribute are the first point of contact after crop produces (food products) are harvested; bulk purchase of crop produces is highly capital intensive, and women are constrained from this process due to low access to finance. The transportation of products of agriculture in Nigeria is entirely male controlled (Uduji *et al*, 2020). Women are more concerned in the sale of packing materials used for most crops and treated foods such as garri, maize, and yam flakes. The treating (processing) landscape in agricultural value chains is mainly at the informal and small-scale level. At this stage, women execute much of the processing; while in contrast, at the formal treating level, established processing companies belong to men (Okolo-Obasi *et al*, 2021). Nigeria indeed owes its women as well as girls a better deal, and would need directed interventions to increase women's economic status and discourage aggression.

In the meantime, the economy of Nigeria, as a nation, relies greatly on the oil and gas sector, which makes available 95% of export revenues, 80 to 85% of government proceeds, and about 32% of gross domestic products (GDP). Nigeria happens to be the largest oil producer in Africa and among the top ten worldwide. As a nation, her recoverable reserves were estimated at 36.2 billion barrels in January 2007. It is unfortunate that with the country's relative oil wealth, GDP per capita is 2,400 USD, and indigence is widespread – about half the nation's population live on less than \$1.25 per day (FGN, 2017). In Nigeria, oil is mostly mined in the Southern part of the country. The Niger Delta, a part of the nation multinational oil companies (MOCs) maintain a notable presence, has become a region of ceaseless violence and conflicts. The federal government is already in joint-venture agreements with the MOCs functioning in the oil and gas sector of the nation. The federal government not only controls and but also owns the land together with its natural resources in the subsoil. This is a key source of conflict in the Niger Delta. Lands can be obtained by the government for public purposes they deem necessary by virtue of the Land Use Act 1978. The unwanted effects of the activities of the MOCs in the region include oil spills, gas flaring, pollution of the environment, negative social impacts, violence and conflicts amid others (Eweje, 2006). Nonetheless, MOCs partake in a plethora of corporate social responsibility (CSR) activities in the Niger Delta as well as other parts of Nigeria (Asongu *et al*, 2019b). As a yearly action, MOCs invest in social projects and programmes in communities predominantly in the Niger Delta. Their investments of the early days were in agricultural development programmes in the early sixties but have progressed over the years to include water projects, healthcare, roads and civil infrastructure, education, and small businesses which benefit the host communities (Chevron, 2017). As the years passed by, MOCs made better how they had dealings with local communities to execute the projects. In 2006, MOCs brought into existence a novel way of working with communities called the Global Memorandum of Understanding (GMoU). The GMoUs stands for a vital shift in approach, with great emphasis on more transparent and responsible processes, sustainability and conflict prevention, and regular communication with the masses (SPDC, 2013). Under the conditions of the GMoUs, the Cluster Development Boards (CDBs) of the communities agree on the development they want, while MOCs make available secure finance for five years making sure that the communities have stable and dependable financing as they take on the execution of their community development plans (Chevron, 2014). By the end of 2012, MOCs had succeeded in signing agreements with 33 GMoU clusters; this covers 349 communities; which is about 35% of the local communities around the MOCs' business set-ups in the Niger Delta (SPDC, 2018).

However, the upsurge of GMoU model has largely been seen as a scheme engaged by MOCs to swerve public criticism of their misbehavings, and a means for dodging government regulation (Frynas, 2009). As an idea, GMoU has been crippling criticized, and there is now

passionate debate over its efficacy and practical implications. While those for GMoU see it as a vehicle for potentially bolstering an old dynamic in MOCs-community relationships, those against it see it as a basis for new functions to be required of old institutions (Slack, 2012). This variance in awareness unvaryingly sets the context for the CSR model deliberation, pitting those for its preservation as an already deep-rooted MOCs-community relationship against those who hold that MOCs-community relationships must acclimatise to shifting community values (Idemudia, 2014; Ite, 2007; Renouard and Lado, 2012; Ekhatior, 2014; Marchant, 2014; Lompo and Trani, 2013; Okolo-Obasi and Uduji, 2021). Succeeding the preceding opposing points of view of the CSR initiatives in the Niger Delta, this paper is a plus to gender discourse in the agricultural value chains development and comprehensive growth literature from the CSR standpoint, by looking at the empirical facts in four areas that have been given much responsiveness in the literature. The paper seeks to make certain the level of CSR investment that MOCs have made in line with agricultural value chains as well as ascertain the level of gain from such investment that amass to the rural women entrepreneurs and the effect of such on their trade. These four areas aimed at similarly represent four main questions which include the following:

- i. What is the degree of MOCs' CSR involvement in agricultural value chains advancement in the Niger Delta region of Nigeria?
- ii. What is the measure of gender involvement in the GMoU activities of the MOCs in the host communities of Niger Delta region?
- iii. Do MOCs' GMoU activities positively impact on rural women participation in agriculture products processing, transportation, circulation and wholesaling in the Niger Delta region of Nigeria?
- iv. Do MOCs' GMoU activities assist in achieving gender equitable opportunities across agricultural value chain enterprises in the Niger Delta region of Nigeria?

1.1 Study hypothesis

In the Niger Delta region of Nigeria, men are mostly the ones that play the part of the middle men, and few women exist across the value chain. Women are not really involved in wholesale; rather, they are more active on the retail side and much visible in the open air markets (Uduji *et al*, 2019). They find it harder to be part of the value chain enterprises due to inadequate exposure (education), lack of money, low social status and intolerable levels of interpersonal violence. This results in direct harm to women as well as their children, in addition to wider cost to the country's economies. Thus, we hypothesize as shown below:

- i. CSR of MOCs using GMoU has not made an appreciable contribution to the involvement of rural women in the processing, transportation, market access and trading of agriculture products in the Niger Delta region of Nigeria.
- ii. CSR of MOCs using GMoUs has not significantly contribute to removing the key constraints affecting women's involvement across value chains development in the Niger Delta region of Nigeria.

In accordance with above, the central aim of this paper is to determine the level of CSR interventions that MOCs have made in line with agricultural value chains as well as ascertain the level of gain from such investment that amass to the rural women entrepreneurs and the effect of such on their trade in Niger Delta. This research contributes to gender discourse in the agricultural value chains development and comprehensive growth literature from the CSR perspective in developing countries and the rationale for demands for social projects by host communities. The study utilizes quantitative approach and applied survey. The positioning of this paper departs from contemporary smallholder value chains literature, which has focused on, *inter alia*: a conceptual framework for smallholder value chains as complex adaptive systems (Orr *et al*, 2018); the value chain for sorghum beer in Kenya (Orr, 2018); responding to uncertainty in high quality cassava flour value chains in Nigeria (Lamboll *et al*, 2018); a review of agricultural innovation and inclusive value-chain development (Devaux *et al*, 2018); multi-stakeholder partnerships in value chain development (Mutebi Kalibwani *et al*, 2018); and revisiting the profitability and technical efficiency of cocoa production amidst economic diversification program of the Nigerian (Fawole and Ozkan, 2018).

The other parts of the paper are structured as follows: section 2 (examining the theoretical underpinning; section 3 (describing the method and materials); section 4 (presenting the results and corresponding discussion), and section 5 (conclusion with implications and future research directions).

2. Theoretical underpinnings

This study embraces quantitative methodology, but we viewed the result from the African CSR standpoints. Carroll's (1991) CSR pyramid is most likely the most renowned model of CSR, with its four levels showing the relative importance of economic, legal, ethical and philanthropy duties in that order. However, the exploration of CSR in Africa was used to question the correctness and significance of Carroll's CSR pyramid (Visser, 2006). If Carroll's basic four-part model is acknowledged, it is advocated that the relative priorities of CSR in

Africa are expected to vary from the classic, American ordering. Nevertheless, it is also projected that Carroll's CSR pyramid may not be the most reliable model for having a grasp of CSR in general, and particularly CSR in Africa. Muthuri (2012), depending on the extant literature on CSR in Africa, postulated that the CSR issues predominant in Africa include education and training, economic and enterprise, health and HIV/AIDS, environment, corruption and governance, sports, community development, human rights, poverty reduction, and accountability. Philanthropic initiatives as CSR by companies are predominant in Nigeria (Ekhatior, 2014). Thus, in emerging economies, the absence of government action in making available amenities for its citizens heightens the roles of multinationals in CSR and philanthropy, which is not considered as CSR in Western countries (Frynas, 2009). Amaeshi *et al* (2006) have reasoned that the Nigerian idea of CSR is remarkably dissimilar from the Western version, and should be directed towards addressing the distinctiveness of socio-economic development problems of the country, and should be made to flow from socio-cultural influences. In other words, they might not automatically reflect the popular Western standard/prospects of CSR.

3. Method and materials

We adopted a quasi-experimental design in this study. The quantitative method is embraced due to the dearth of quantitative work in the region (Uduji and Okolo-Obasi, 2022a). The research work made use of a survey research technique aimed at gathering information from an illustrative sample of rural women in the region. It is fundamentally cross-sectional and defines as well as interprets the condition at the time of the survey.

3.1 Sample size

The study took on the Topman *et al* (2011) formula, which has been decided to be very suitable in large population circumstances in ascertaining the sample size to utilize. Mathematically, the formula is conveyed thus:

$$n = \frac{(z^2)(pq)}{e^2}$$

In this equation, n represent the sample size while z stands for the standard normal deviation for a certain level of confidence, (95% confidence =1.96). Also, p is the section of the population to be evaluated, and e is margin of error at 0.05 for CI at 95%. In this work p is evaluated in the literature to be 0.45. Thus, taking a 95% confidence level and $\pm 5\%$ precision, we put together the sample size as follows: $n = \frac{(1.96)^2(0.45)(0.55)}{0.05^2}$ where p = 0.45 and hence q = 1-0.45 = 0.55; e = 0.05; z =1.96.

Hence, $n = \frac{(3.8416)(0.2475)}{0.0025} = n = \frac{0.950796}{0.0025} = 380.3184$ Approximately 380.

Nevertheless, because we are standing for two streams of respondents (the treatment and control), we multiplied the size by 2 to lessen the error selection bias.

3.2 Sampling

In the work, multi-stage sampling procedure was utilized in selecting respondents as determined in the sample size. Purposive, quota and simple random samplings were all put to use. Firstly, we used quota system in the region in line with the nine states as shown in the sample size table which made it clear that each state has a quota based on her population. Secondly, we purposively (on the grounds that the LGA is hosting at least one MOC facilities) picked two local government Areas (LGAs) out of each of the selected States. Hence, eighteen (18) LGAs were chosen for the study. Thirdly, we purposefully picked 2 communities from each of the chosen LGAs on the basis of such community hosting MOC facilities. At this point, we were mindful to pick one community that is a part of cluster development board and one that is not. Lastly, we involved the community gatekeepers to ensure there is proper representation in the collections made. Thus, the gatekeepers assisted us to arbitrarily select 380 respondents each from both the CDB and non-CDB communities to sum up to a total of 760 respondents necessary for the survey.

3.3 Data collection

The data for the research work were collected and organised using participatory research technique. We used this technique because it enables us to directly involve the people we are studying. Their outlook and opinion is very essential if we must realise the objective of the study and be able to correctly present answers to the research questions (Uduji and Okolo-Obasi, 2022b). The main tool put to use in the participatory appraisal was semi-structured interview (SSI) questionnaire which enabled us to produce cross sectional data used. We put to work this data collection instrument directly to the respondents with the assistance of local research aides that we employed for two key reasons which include: to help handle the language barrier (the several languages and dialects of the local people in the host communities) and to help out with movement (the terrain is rough and hostile, requiring the assistance of such indigenous research assistants).

3.4 Analysis Technique

We evaluated the roles of corporate social responsibilities of the MOCs in encouraging gender equity in the agricultural value chain among the rural host communities in the Niger Delta region. The descriptive and inferential statistics were both put to use in answering the

research question in order to achieve the set objectives. We used descriptive statistics to realise objectives 1 and 2 while objective 3 and 4 were accomplished using inferential statistics (both logit model and propensity score matching -PSM) so as to side-step problems of selectivity and endogeneity. In the propensity score matching, we parted two sets of respondents from communities which are the “treatment group”, and “control group”. We used the respondents picked from the communities that are a part of a Cluster Development Boards (CDBs) as the treatment group, while the respondents from otherwise form the control group. This is because, propensity score matching requires simply calculating the possibility of a treatment based on observed covariates involving both treatment and control. It summarizes the pre-treatment features of each subject into a single index variable and is then utilized in matching similar individuals (Uduji and Okolo-Obasi, 2022b). This simply implies selecting from a larger survey an ideal comparison group and making it to match the treatment group on the basis of a set of observed features. This matching is to make it possible to calculate the effect of a certain treatment given to an observed characteristic (propensity score) not received by the control. Here, we assumed that treatment decision, that is taking part in or belonging to a cluster development board, although not arbitrary, in the long run hinges on the variables observed. According to Rosenbaum and Rubin (1983), the aptitude to match on variable X actually means that one can as well match on probability of X , thus, the treatment group is denoted as $R_i = 1$ for rural woman₁, and $R_i = 0$ otherwise. The study hence matched the treatment group to the control group on the basis of propensity score. Accordingly, the equation is mathematically presented thus:

$$P(X_1) = Prob(R_2 = \frac{1}{x_2}) (0 < P(X_2) < 1) \quad \text{Equation (1)}$$

where, X_1 is a vector of before CSR involvement (intervention) control variables, if R_1 s are independent over all 1's and the results are independent of CSR involvement given X_1 , then results are also independent of CSR involvement given $P(X_1)$, just as they will do if involvement (intervention) is received arbitrarily. In drawing specific decisions concerning the effect of the CSR intervention activities on encouraging positive gender participation in agricultural value chain, the biasness in choosing observables by matching on the probability of the treatment (covariates X) was side-stepped. Thus, the propensity score of Vector X was defined as shown below:

$$P(x) = P_r \left(Z = \frac{1}{x} \right) \quad \text{Equation (2)}$$

In equation 2, Z represents the treatment indicator being =1 if the designated rural woman is from the treatment group (CDB community) and 0 if not. But because PS is a balancing score, the observables X was circulated same for the women from CDB communities as well

as the women from non-CDB communities and the variances are seen as the attribute of treatment.

In this study, to get a balanced impact evaluation of this treatment we kept an eye on the following steps embraced with modification from Uduji and Okolo-Obasi (2022a). The first step was to be aware that the treatment is predicted by a binary response model, with suitable observable features. Hence, we projected the logit model of receiving CSR or not as a task of some socio-economic features including individual, family (household) and community variables represented thus:

$$P_x = \log \frac{P_i}{1-P_i} = \log 0_i = \alpha_i + \beta_i x_i \dots \dots \dots + \dots \beta_n x_n + \mu \quad (3)$$

Secondly, we created value for the likelihood of receiving CSR from the logit regression giving each respondent a propensity score. The respondents from the control groups that have very low propensity score (outside the range found for treatment) were, at this point, dropped. For each woman in the treatment, another woman in the control that has the closest low propensity score was acquired. We then put out the figures for the mean values of the result of indicators for the nearest neighbours. The variance between the mean and actual value for treatment is the evaluation of the benefits due to CSR involvement of the MOCs and it is valued by the average treatment effect on the treated (ATT). This variance is mathematically expressed in the following way:

$$ATT_{PSM} = \sum_{P(X)} \{ \sum (\frac{y_i}{z} = 1, P(x) - \sum (\frac{y_0}{z} = 0, P(x)) \} \quad \text{Equation (4)}$$

EP(X) here represents expectation with respect to the circulation of propensity score in the population. The ATT shows the mean variance in encouraging gender equity in agricultural value chain involvement.

Thirdly, we checked the matching estimators' quality by standardized variances in observables' means between treatment group and the control group. Here, we made use of the modification of Uduji and Okolo-obasi (2022b) and represented the variance in percent after matching as \bar{X}_1 for the variance in sample means for CDB women (the treatment) and \bar{X}_0 for the matched non-CDB women (the control). We followed Uduji and Okolo-Obasi (2022a) and indicated the sub-samples as a percentage of the square root of the average sample variance: $(f_1^2 \text{ and } f_0^2)$

Hence:

$$|SD = 100 * \frac{(\bar{X}_1 - \bar{X}_0)}{(.05 f_1^2 \text{ and } f_0^2)^{1/2}} \quad \text{Equation (5)}$$

Although, there is no obvious threshold of successful or failed matching, we acknowledged that the remaining bias after matching is 5% and presumed that the balance among the

dissimilar observable features between the matched groups is adequate. We abutted the issue of hidden bias by the vaulting tactic, therefore, we made up for the logit model to evaluate propensity scores by a vector U incorporating all unobservable variables and their effects on the possibility of treatment captured by γ :

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

Finally, the strength of the effect of γ on treatment was x-rayed by utilizing sensitivity analysis. We did this to cut the impact of treatment on potential results as we assumed the unobservable variable to be a binary variable with values 1 or 0. To this, the treatment possibility is applied in line with the bounds on the odds ratio as shown below:

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

Same likelihood of getting CSR exist for each respondent only if they are identical in X , and only if $e\gamma=1$ (Rosenbaum and Rubin, 1983).

3.5 Shell Community Transformation and Development Index (SCOTDI)

The MOCs working in the Niger Delta carry on facing the difficulty of how to ascertain the success or failure of their CSR activities either as it relates to its effect on community advancement or its influence on corporate-community relations. To handle this issue, MOCs in 2013 put into function the Shell Community Transformation and Development Index (SCOTDI). It is an innovative structure that puts together and adapts a number of international principles into a fused index such that it is responsive to local context (SPDC, 2013). The structure (framework) is used in this work to access and rank the result of the dissimilar GMOUs clusters within the host communities of MOCs.

4. Results and discussion

4.1 Descriptive characteristics

Analysis of this study began with the elucidation of some of the respondent's economic (estimated annual earnings, estimated per capita revenue of other household members, primary employment); social (academic, gender, ability to access health care etc), and demographic (age, family size, experience) features. These features (characteristics) are essential in comprehending the dissimilarities in the socio-economic and demographic status of the respondents who enjoyed CSR support in comparison to those who did not.

4.2 The extent of MOCs' CSR investment in agricultural value chains in the Niger Delta Nigeria

In answering the first research question, we x-rayed the strength of MOCs' general CSR interventions in the different sectors. However, to ensure that the CSR interventions of the MOCs are pertinent to encouraging the involvement of rural women in the agricultural value chain, we first plotted their main challenges.

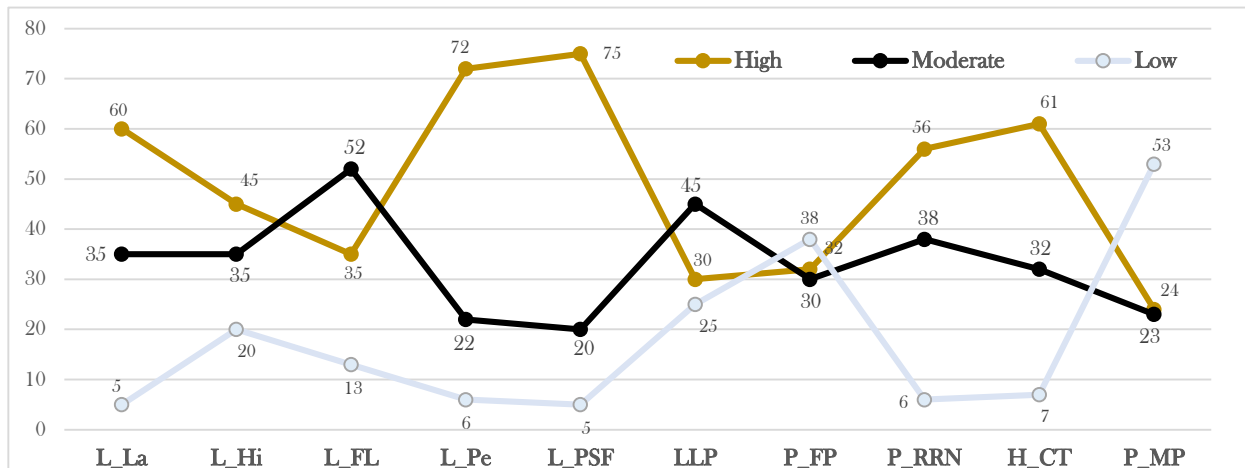
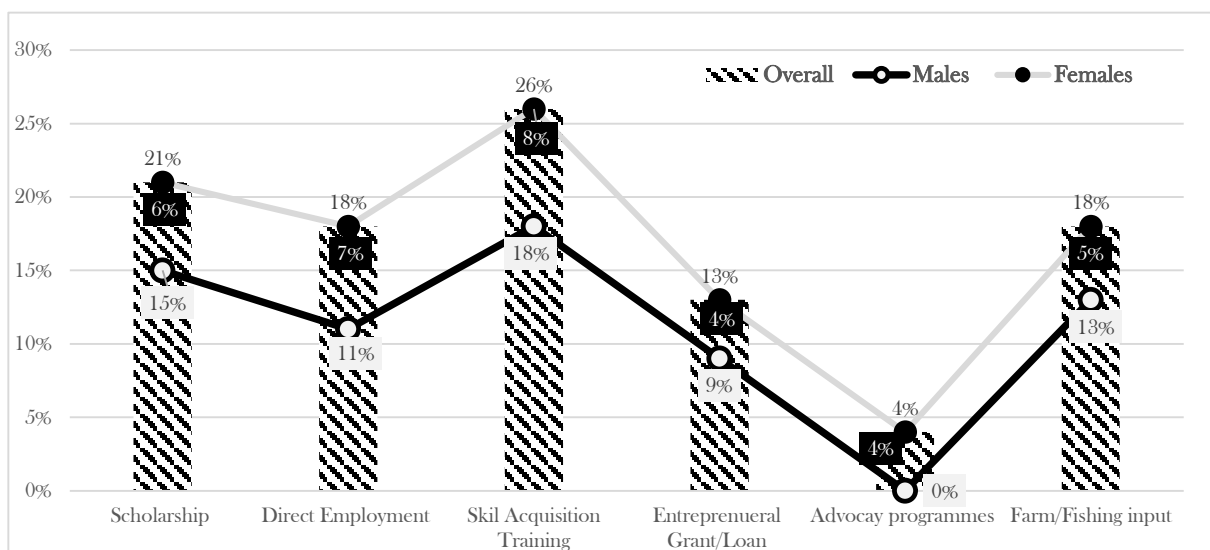


Figure 1. Percentage distribution of respondents by major challenges in agricultural value chain participation¹

Source: Authors' computation based on field survey.

Analysis (Figure 1) reveals that in summary, inability to access land for the women to support them in agricultural production is rated high.



¹ L_La = Lack of access to land, L_Hi = Lack of access to high yielding inputs, L_FL = Lack of adequate farm labour, L_Pe = Lack of processing equipment, L_PSF = Lack of preservation and storage facilities, LLP = Low level of production, P_FP = Preference for foreign products, P_RRN = Poor rural road network, H_CT = High cost of transportation, P_MP = Perishability of major products

Figure 2. Percentage distribution of CSR intervention by nature of women empowerment in the Niger Delta

Source: Authors' computation based on field survey.

Analysis (Figure 2) settles the natures of enablement the rural women in the treatment have got in the past in comparison to their male counterpart.

Table 1. Percentage rating of MOCs' CSR in promoting gender participation in agricultural value chain in the Niger Delta.

Activities	Total E&P	Exxon Mobil	Chevron	Shell	Agip	Others	Average: Field Survey	Average: Data from MOCs	Diff.
Skill acquisition and business training	8%	21%	17%	18%	17%	19%	15.80%	16.70%	0.90%
Construction and maintenance of rural roads	7%	5%	9%	6%	9%	10%	7.70%	8.90%	1.20%
Advocacy visits to relevant stakeholder	5%	4%	3%	8%	6%	5%	5.20%	7.60%	2.40%
Provision of subsidised Agric inputs for women	20%	18%	20%	16%	17%	18%	18.20%	21.80%	3.60%
Provision of short loans targeting only women	7%	4%	5%	7%	6%	9%	6.30%	7.90%	1.60%
Provision processing equipment	12%	15%	10%	8%	9%	6%	10.00%	13.40%	3.40%
Provision of seed grant for women entrepreneurs	13%	11%	12%	14%	14%	14%	13.00%	16.30%	3.30%
Procurement of land for lease to women	18%	15%	13%	19%	16%	14%	15.80%	19.20%	3.40%
Provision of preservation and storage facilities	10%	7%	11%	4%	6%	5%	7.20%	8.50%	1.30%

Source: Authors' compilation based on field survey.

Analysis (Table 1) indicates the efforts of the main line MOCS in utilizing in CSR intervention to encourage the involvement of rural women of the host communities in the agricultural value chain of the Niger Delta Region. The areas we considered are: 1) Acquisition of skill and business training; 2) Construction and upkeep of rural roads; 3) Advocacy visits to pertinent stakeholder; 4) Making available subsidised Agricultural inputs for women; 5) Setting up of

short loans aiming only women; 6) Provision of equipment for processing; 7) Making available seed grant for women entrepreneurs; 8) Obtaining of land for lease to women and; 9) Making available preservation and storage facilities.

4.3 Level of gender participation in the CSR intervention of the MOCs

This research work tries to establish the level of rural women's participation in CSR activities in the Niger Delta region. We considered the feelings as well as the opinions of the rural women making use of the Shell community transformation and development index (SCOTDI), a structure of innovation that can help pull respondents' views on the matters they are being assessed on.

In this examination, the viewpoints of the respondents (rural women) were sought on how cluster development boards are governed, on gender mainstreaming in CDBs input, transparency in the management, continuity of the CDBs after MOCs' CSR activities, as well as result of the GMoUs in the Niger Delta region, and collective inclusiveness in making decision. We present the ratings in line with the respondent women's participation in the receipts and usage of CSR interventions of the MOCs making use of GMoUs. The summary of the rating shows that the rural women rated their participation and input as low as follows: governance 14.8%, inclusiveness 15.8%, transparency, 11%, participation, 7.6%, continuity, 8.6%, and outcome 10.4%.

4.4 Econometric estimations for participating in GMoU and access to CSR intervention

Table 2. Comparison of mean score and observable characteristics across treatment and control for promoting gender participation in agricultural value chain (N = 760)

Access and Knowledge Score in Percentage of maximum score	Treatment	Control	Difference
Scores on enhanced agricultural products production	23.42	14.65	10.77**
Scores on enhanced agricultural products processing	34.62	14.34	20.28 **
Scores on enhanced agricultural products distribution	12.73	8.68	4.050**
Scores on enhanced agricultural products transportation	20.08	8.56	11.52**
Scores on enhanced agricultural products wholesaling	21.32	11.78	9.54**
Socio-Economic Characteristics			
Education	16.83	15.21	1.62*
Age	15.23	13.45	-0.22
Sex	8.51	9.47	-0.96
Marital Status	13.1	16.31	-3.21**
Primary Occupation	14.28	9.66	4.62*
Household Size	8.72	11.38	-2.66
Income of Other Household Members	12.25	8.28	3.97**
Estimated Annual Income	29.26	20.18	8.82**
Farm Characteristics			
Land ownership type	21.82	12.65	9.17**

Farm Type	11.35	6.21	5.14**
Farming Experience	4.71	3.96	0.75***
Source of Input	18.75	16.41	2.34*
Transportation means	12.41	10.28	2.13
Observation	365	365	

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

Source: Authors' compilation based on household survey

Analysis (Table 2) reveals the average variances in the basic scores and independent observable characteristics between the women from CDB communities (treatment group) and those from non-CDB communities (the control group). From the mean variance, scores on improved production of agricultural products (10.77%), scores on enhanced agricultural products processing (20.28%), scores on improved agricultural products circulation (4.050%), scores on enhanced movement of agricultural products (transportation) (11.52%), and scores on improved agricultural products wholesaling (9.54%) are considerably high for the women in the CDB communities in comparison to the women in the non-CDB communities. The variances are, 10.77%, 20.28%, 4.050%, 11.52%, and 9.54% in that order. These variances presented by the propensity score indicates that the MOCs' corporate social responsibilities using the GMOUs has made slight but noteworthy positive impact on stimulating rural women's involvement in the agricultural value chain of the Niger Delta region.

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

Variables²	Coefficient	Odd Ratio	Marginal Effect	Std. Error
Constant	7.214	2.324	.00321	.512
Edu	.378	.442	.041**	.016
Age	.103	.313	.0021	.013
M_Sta	.034	1.321	.0203	.123
Pri_Occ	.251	.352	.0120*	.124
Anu_Inc	.024	.521	.028	.032
Inc_OHhM	-.234	.321	.042	.032
Part_Ben	.739	1.451	.0012***	.021
CDB_Mgt	.012	.328	.110	.034
GMOU Perception	1.123	6.831	.123*	.031
Observation	760			
Likelihood Ratio - LR test (p=0)		$\chi^2 (1) = 1243.231^*$		
Pseudo R ²	0.27			

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

² Age = Age of respondent, Sex = Sex of respondent (Male = 1 female = 0), Pri_Occ = Primary occupation of respondent, Edu = Highest level of education of respondent, Anu_Inc = Income of the respondent, CDB_Mgt = Management system of the CDB leaders, M_Sta = Marital status of respondent, Part_Ben = Evidence of benefit of participants and Inc_OHhM = Income of other household members

Source: Authors' compilation based on household survey.

Utilizing equation 2 and applying the characteristics that capture relevant observable variances between the CDB respondent (women) and the non-CDB respondent (women) we projected the possibility of treatment (receiving the MOCs' CSR interventions) for the rural women. Analysis (Table 3) reveals the marginal effect, standard error in addition to the projected coefficients and the odd ratio conveyed in terms of odds of $Z=1$. From the single observation, we noted that, highest educational qualification of the respond is one of the factors that positively affect the rural women's seeking direct CSR intervention in the GMoU programmes. Other factor that has positive influence are, CDBs management system, primary employment, perception of GMoUs by the rural women, and gains of participations. Then, on the other hand, annual revenue, age of the women, and average per capita income of other family (household) members of the respondents has a negative influence on wanting to access CSR of the multinational oil companies. This, thus, implies that if more effort is made to upsurge the factors that increases access to CSR, more women will be profiting from the interventions directly.

In line with the possibility of treatment as projected in the model, we measured the effect of CSR on encouraging the involvement of rural women in the agricultural value chain in line with the variables of concern. We worked out the average treatment test (ATT) after attesting fully that the observations were ordered haphazardly and that there were no large discrepancies in the distribution of propensity scores. In putting to use the three-matching algorithm, the nearest neighbour matching (NNM) came out with the most significant average treatment test (ATT). We evaluated the effects in line with improved production of agricultural products, enhanced agricultural products handling, boosted agricultural products circulation, enhanced movement of agricultural products (transportation) and improved whole selling of agricultural product. Analysis indicates that the NNM estimate of women's improved processing of agricultural products is about 20%. This we also subjected to check using other methods (Kernel-based and Radius matching) as we assumed that the NNM method brought forth poor matches maybe because of scantiness of information. In reverse, we noted that making use of RM algorithm, the projected effect of women's improved processing of agricultural products was approximately 18% while Kernel-based matching algorithm generated an average treatment effect of 16%. With this, it is much obvious that the CSR of MOCs have been significantly beneficial in stimulating rural women's involvement in the agricultural value chain of Nigeria's Niger Delta region.

In the sensitivity analysis, kernel-based matching (KM) produced more robust treatment effect when compared to radius and nearest neighbour in terms of the assessments of hidden bias in women's scores on improved production of agricultural products, scores on

improved processing of agricultural products, scores on enhanced agricultural products circulation, scores on enhanced movement of agricultural products (transportation), and scores on enhanced agricultural products wholesaling. For this reason, there is a likelihood that matched pairs may be different by up to 100% in unobservable characteristics, while the effect of CSR of the MOCs using the GMoU as monitored by the CDBs on the variables assessed would still be significant at a level of 5% (p -value = 0.022) for scores on improved production of agricultural products; p -value = 0.0016, for scores on improved processing of agricultural products; p -value = 0.0270, for scores on enhanced agricultural products circulation; p -value 0.0322 for scores on enhanced movement of agricultural products (transportation), and p -value = 0.0121 for scores on enhanced agricultural products wholesaling. Same classifications of knowledge score are robust to hidden bias up to an influence of $e^{\gamma} = 2$ at a significance level of 10% in line with the radius matching approach. This result puts forward that, the CSR of the MOCs via GMoU interventions are noticeably putting in strength towards promoting gender involvement of rural women in the agricultural value chain of the Niger Delta region.

In all, these discoveries have confirmed that generating and sustaining competitive and equitably-oriented value chains that assist small-scale farmers, especially women, will need explicitly scrutinising gender issues and proactively incorporating gender components into GMoU value chain examination and development plans in the Niger Delta. The results also show that GMoU- value chain programmes, when planned with gender equitable principles, can nurture both competitiveness and gender equality goal to improve on poverty-lessening effect. This proposes that the relative priorities of MOCs' CSR interventions in the Niger Delta ought to be different from the classic, American ordering, as offered by Carroll (1991). Placing prominence on a cultural context in the determination of suitable CSR priorities and programmes, as put forward by Visser (2006), is essential in the context of the rural Niger Delta. It is also important to have flexibility, as suggested by Amaeshi *et al* (2006), in handling the distinctiveness of the socio-economic problems in the region, which includes closing the gender gap in agricultural value chains. But in addition and contribution, if we are to have a say on how CSR interventions can better gender equality across agricultural value chain in the Niger Delta, we would maintain that MOCs' CSR can play a vital role in improving on gender equality when investment in agricultural production is planned for the promotion of gender equitable openings in agricultural value chains. Therefore, striving towards achieving gender equality in agricultural value chains development ought to be prioritized in CSR practices in the Niger Delta, which as well will generate the supportive environment for more extensive accountable business.

5. Conclusion and policy

We examined the impact of MOCs' CSR on promoting gender-equitable agricultural value chains in the Niger Delta region. As much as 760 rural women were sampled across the Niger Delta region for the research work. Results from the use of a propensity score matching and logit model show that the skimpy CSR interventions of the MOCs breed positive results and wide-ranging value chain outcomes which indicate a significant relationship between GMoU model and gender-equitable agricultural value chains in the Niger Delta, Nigeria. This implies that CSR of a multinational oil companies is a critical factor in the need to integrating gender into agricultural value chains and achieving the goal of increasing agricultural growth and expanding the stable food supply. It suggests that creating and sustaining competitive and equitably oriented value chains that help small-scale farmers, especially women will require examining gender issues and proactively integrating gender components into GMoU policies and action plans of MOCs for value chain analysis and development strategies in the Niger Delta. The implication is that any increase in the CSR intervention of the MOCs using GMoU that is targeted at generating and supporting competitive and equitable-oriented value chain (a value chain that assists small-scale farmers, particularly women) will significantly enhance women contribution across agricultural value chains in the region. Therefore, GMoU - value chains programmes, when packaged with gender equitable principles, can nurture both competitiveness and gender balanced goals to turn around negative financial condition in the Niger Delta. The undertaking of this agricultural productivity is based on the GMoUs of MOCs' CSR to better the ability of women and the rural impoverished who work mainly in farms to embrace growth, by linking these groups to new openings throughout agriculture and market value chains in Nigeria.

The finding of this study helps us to consider a wide range of alternative for women's engagement with the global food system. It helps us both to look not only at increasing women's participation, but also to consider the quality and prospects of that participation across value chains. The finding will also help us look beyond the farm to both acknowledge and build on the potential of off-farm agricultural employment to contribute to total household income for the benefit of all household members. CSR of MOCs utilizing GMoUs via promoting gender – equitable agricultural value chain offers a way to compile a diverse set of strategies that encourage women to benefit from expanding economic opportunities in the Niger Delta region of Nigeria. This research contributes to gender debate in agricultural value chains 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. The main caveat of the study is its restriction to the scope of rural areas in Nigeria's Niger Delta region. Thus, the results cannot be generalized to other African countries with the same policy problems. Based on this shortcoming, repeating the analysis in other nations is worthwhile to ascertain whether the established nexuses withstand pragmatic examination in various rural contexts of Africa.

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