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Improving Gender Responsiveness of Cassava Value Chain in sub-Saharan Africa: the Role of CSR in Nigeria's Oil Producing Region

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Improving Gender Responsiveness of Cassava Value Chain in sub-Saharan Africa: the Role of CSR in Nigeria's Oil Producing Region[1]

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[1] The views expressed in this working paper are those of the authors and do not necessarily represent those of the ASPROWORDA, its Executive Board, or its management.

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 improving gender responsiveness of cassava value chain in Niger Delta regions of Nigeria.

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 of 780 rural women respondents were sampled across the Niger Delta region.

Findings – The results from the use of a combined logit model and propensity score matching indicate that CSR of the MOCs using GMoU model has recorded little but significant success in enhancing rural women participation in the cassava value chain in the Niger Delta.

Practical implications - This implies that if CSR interventions are not tailored to enhance opportunities for women, they may contribute towards reducing the participation of women in economic, political and social development and, by extension, damping efforts of reducing poverty and achieving the sustainable development goals (SDGs) in the Niger Delta.

Social implications – This suggests that MOCs' CSR interventions in the cassava value chain should consider gender relations to benefit men and women and alleviate household poverty.

Originality/value – This research contributes to the inequality debate in the agrifood value chain and inclusive growth literature from the CSR perspective in developing countries and the rationale for demand for social projects by host communities. It concludes that business has an obligation to help in solving problems of public concern.

Keywords Gender, cassava value chain, corporate social responsibility, multinational oil companies, sub-Saharan Africa

Paper type Research paper

1. Introduction

The starchy root crop, cassava, is a key source of food security in Africa due to its ability to grow in low-quality soils. Moreover, it is resistant to drought as well as diseases, in addition to having a flexible cultivation cycle (Mcnulty and Oparinde, 2015). The harvestable portion of cassava, the tubers, can be preserved underground until needed, which makes it an ideal food security crop

(Opata et al, 2021). No food staple in Nigeria is consumed as much as cassava is (Ehinmowo et al, 2015). As it were, Nigeria is the leading cassava producer in the world, with about 21 percent share in the global market (USAID, 2012). Just a small fraction of cassava yield in the country is produced for profitmaking in the livestock feed, ethanol, textile, confectionary, and food industries, while most of it is produced by smallholder farmers for subsistence or small-scale processing (Coulibaly et al, 2014). Agrifood chains, such as cassava value chain (CVC) has drawn the attention of governments, agencies that are non-governmental and even private investors with its various economic openings that play a positive role in the economic growth and development of Nigeria (Ikuemonisan et al, 2020). As postulated by Donkor et al (2017), it is essential to make sure that the primary actors in the CVC rightly gain from the openings in the sector; and if just a few actors in the value chain make the utmost profit, it is likely to result in high-income disparity. Therefore, there is the need to know how proceeds are disseminated among the actors in the chain, by putting into consideration gender dynamics – how gender roles in the chain are defined by social norms.

Nevertheless, Nigeria's economy greatly relies on the oil and gas sector which raises up to 95% of export returns, 80-85% of government proceeds, and in the region of 32% gross domestic product (FGN, 2017). Nigeria is the highest producer of oil in Africa and one of the top ten worldwide. The recoverable reserves of Nigeria's oil were estimated at 36.2 billion barrels in January, 2007 (Chevron, 2014). With all the country's relative oil wealth, GDP per capita is 2400 USD, and impoverishment is prevalent – about half of the populace live on less than $1.25 per day (Francis et al, 2011). Oil and gas reserves are mostly located in the Southern part of the country referred to as the Niger Delta. The expanse is marked by lack and underdevelopment. Oil extraction being a capital rather than labour-intensive industry makes available little employment (NDDC, 2004). To worsen matters, the expanse has difficult geographical terrain making infrastructure more expensive; in addition to the problem of environmental degradation, caused in part by what follows oil extraction – gas flaring, oil spillage etc. – that works against the traditional industries like fishing and agriculture (Okolo-Obasi et al, 2021; Uduji et al, 2021).

Nevertheless, multinational oil companies (MOCs) partake in a plethora of corporate social responsibility (CSR) in the Niger Delta as well as other parts of Nigeria. Year by year MOCs spend in social projects and programmes in communities primarily in the Niger Delta. The initial investments they made were in agricultural development programmes during early sixties but it grew over the years to include health care, roads and civil infrastructure, water projects, small

businesses and academics, which the people gain from (Egbon et al, 2018). With the passage of more time, MOCs made better how they engage with local communities in delivering these CSR projects. In 2006, MOC introduced a fresh way of relating with communities called the global memorandum of understanding (GMoU). The GMoU is a vital shift in methodology, placing emphasis on a more open and accountable process, steady communication with grassroots, sustainability and avoidance of clash (SPDC, 2013). Under the terms of the GMoUs, the communities make up their minds on what they want while MOCs release funding for five years which will ensure stable and dependable financing as the communities undertake the execution of their community development plans. This system takes over from the method of MOC agreeing to hundreds of separate development projects with different communities and managed them directly and distinctly (Chevron, 2014).

All said and done, the emergence of CSR - GMoU model has essentially been regarded as a strategy employed by MOCs to refract public criticism of their conduct, and a way of evading government regulation (Tamuno, 2020; Mamudu et al, 2021). As an ideology, GMoU has been seriously attacked, and there is now a huge debate over its effectiveness and practical implications. While those for it see it as a vehicle for potentially bolstering an old dynamic in business – community relationships, those against it see it as a platform for new functions being demanded of old institutions (Uduji and Okolo-Obasi, 2021; Asongu et al, 2018). This variance in perceptions unvaryingly sets the context for the CSR – GMoU debate, pitting those saying "yes" to protecting an already well-established business-community relationship against those saying "no" by insisting that business-community relationships must acclimatize to changing community values (Renouard and Lado, 2012; Lompo and Trani, 2013; Uduji and Okolo-Obasi, 2022). Ensuing the presiding varying points of view of the CSR initiative in the Niger Delta, this paper is an addition to gender discourse in sustainable agrifood value chains development (which include a set of value-adding undertakings necessary in moving a food product from the initial input supply stage via various stages of production, processing, movement, storage, selling to its final destination as well as post-disposal management) and comprehensive growth literature from the CSR standpoint, by looking at empirical facts in four areas that have gained massive attention in the literature. The paper is interested in establishing the level of CSR investment that the MOCs have given themselves to in the area of cassava value chain as well as finding out the level of gain from such investment that accrue to the rural women cum how it influences their trade. These four areas of focus also represent four main questions notably:

i. To what extent do the existing genders get involved in the GMoU intervention of the MOCs in the host communities?
ii. How far reaching is MOCs' CSR investment using GMoU in creating food security in Nigeria's Niger Delta expanse?
iii. Do MOCs' activities bring about changes that positively impact on rural women in cassava production, processing, transportation, storage as well as marketing in Nigeria's Niger Delta expanse?
iv. Do MOCs' GMoU intervention have effect on agrifood value chain sustainability among women in Nigeria's Niger Delta expanse?

1.1 Study hypothesis

Women in Nigeria may gladly manage their own work and earnings when capital obstructions to entry are brought down and physical product transformation is made simple with relative low-cost tools (Olusegun and Oyelade, 2021; Okongwu, 2020; Ekhator, 2019; Coulibaly et al, 2014; Ajala, 2017). In Nigeria's Niger Delta expanse, the obstacles to entry in the value chain processes result in a sharp contrast between the revenue-generation as well as livelihood prospects of women and men across the cassava value chains. This is because of gender variances ranging from access, regulation and ownership of land to selling of raw material as well as processed cassava produce (PIND, 2011). Despite constitutional declarations of gender fairness and laws that promote openings for both men and women in the expanse, there is gender inequality in contribution along the cassava value chains with dissimilar levels of access to resources (Uduji et al, 2023). As a result, they get unequal rewards for their involvement in the cassava value chain deliveries, with women normally having less access and lower earnings (Okolo-Obasi et al, 2021). Hence, we hypothesize as follows:

- MOCs CSR making use of GMoU has failed to substantially contribute to the development of rural women in cassava value chain in Nigeria's Niger Delta expanse.
- MOCs CSR making use of GMoU does not have a significant effect on agrifood value chain sustainability among women in Nigeria's Niger Delta expanse.

The successive parts of the paper are organized thus: a brief examination of the literature and theoretical underpinnings (Section 2); description of the materials and methods (Section 3); presentation of the results and corresponding discussion (Section 4), and conclusion with policy implications (Section 5).

2. Literature and theoretical underpinnings

2.1 Cassava value chain in Nigeria

The cassava value chain can be said to be all the value-adding undertakings necessary in bringing cassava products from the farm to the final consumer (Donkor et al, 2022). Value addition processes include supply of input, production, processing, circulation and marketing (Elegbede et al, 2023). The cassava value chain includes vertical and horizontal relationships between the various actors in the chain as the product moves from the farm to the end market (Mcnulty & Oparinde, 2015; PIND, 2023). The vertical relationship concerns the interaction between the various actors at varied nodes of the value and vice versa to the horizontal relationship (Donkor, et al, 2017). The cassava value relationship is known for long chains of actors that generate relatively low value added (Coulibaly et al, 2014). The Nigerian cassava value chain can be taken to be a traditional food value chain, as the chain is dominated by small-scale processors and producers who bring in little value to cassava tubers via processing (Donkor, 2018a). Farmers commonly sell their cassava tubers to middlemen and processors without any value addition (Donkor, 2018b). The monetary limitation and the lack of creativity hinder the farmers' aptitude to upsurge their value addition (Donkor et al, 2022). Women really partake in the growing of cassava, and are key actors in its processing and selling of it (Uduji et al, 2023). Thus, cassava business is a prospect for women to make money, which enables them to purchase commodities, which can add to family (household) food security (Okolo-Obasi et al, 2021).

2.2 Theoretical underpinnings

At the beginning of the twenty-first century some trend of widely discussed phenomenon of corporate social responsibility (CSR) had already drifted across the gender issues, taking into account several facets of CSR. Mapping gender in the facets of CSR with appropriate argumentation, based on theories, approaches and models of CSR, is quite challenging because of several reasons. First, there is still only a few investigations with regard to gender and CSR in general (Uduji et al, 2024). Second, those already implemented investigations do not address most of the models of CSR (Vilkie and Agota, 2014). Third, only approaches towards CSR presented in ongoing gender-CSR research and related debate might be addressed on a conditional conceptual basis for setting gender issues in appropriate facets of CSR (Uduji and Okolo-Obasi, 2020). Therefore, gender issues in the facets of CSR are further discussed in relation to those most relevant theoretical assumptions of CSR by considering further contributions and limitations with regard to research on gender issues in CSR.

Nevertheless, direct scientific debate on the issue of gender in relation to CSR seems to be initiated in literature by Grosser and Moon (2005a). They had investigated the potential and actual contribution of CSR to gender equality in the framework of gender mainstreaming. Grosser and Moon (2005a) introduced gender mainstreaming as combining technical systems (monitoring, reporting, evaluating) with political processes (women's participation in decision-making) and considers the ways in which this is compatible with CSR agendas. They had examined the inclusion of gender equality criteria within three related CSR tools: human capital management reporting, CSR reporting guidelines, and socially responsible investment criteria on employee and diversity issues. Although additional evidence found by Grosser and Moon (2005b) suggests gender equality information being requested within several CSR related reporting framework, these requirements are mostly limited in scope, or remain optional elements. At the same time, they addressed the nature and extent of relevant stakeholder opportunities to explain this unfulfilled potential.

However, the work outlined in this paper made use of a combined liberal feminist theory (Fischer et al, 1993; Unger and Crawford, 1992) and an African standpoint of CSR (Visser, 2006; Amaeshi et al, 2006), to explain the fact that if women are exposed to same openings available to men such as learning, work experience, and other resources, they would behave just like men do. First, the liberal feminist theory as projected by Fischer et al (1993), asserted that the liberal feminist tradition is linkable to feminism's earliest days (the first wave of feminism) and claims that social reform is necessary in order to give women the same status and opening as men. The fundamental basis of liberal feminist theory takes on that men and women are equal and rationality, not sex, should be the basis for individual rights. It puts emphasis on the existence of discriminatory obstacles and systematic bias facing women (for example limited access to resources, learning, business experiences), which must be removed. Liberal feminism is outgrown of political views of parity, entitlement, and individual rights, which has been the foundation for many legal changes that have been used to create greater equality for women. Liberal feminist in the articulation of this theory as it concerns women's entrepreneurship posits that if women are given equal access to the openings available to men such as learning, work experience, and other resources, they would behave just like men do (Unger and Crawford, 1992). Second, Carroll's (1991) CSR pyramid is possibly the most recognised model of CSR, with its four levels showing the relative significance of economic, legal, ethical and philanthropic responsibility in turn. However, the exploration of CSR in Africa is used in challenging the correctness and significance of Carroll's CSR pyramid. According Visser (2006), if Carroll's basic

four-part model is putative, it is suggested that the relative priorities of CSR in Africa are probably going to vary from the classic, American ordering. However, Uduji and Okolo-Obasi (2021), also projected that Carroll's CSR pyramid may not be the best model in comprehending CSR in general, and particularly CSR in Nigeria. Amaeshi et al (2006) have also claimed that the Nigerian idea of CSR is remarkably dissimilar to the Western version. Thus, this paper makes use of a quantitative method, but reflects on the result from the liberal feminist theory and the African outlook while putting into consideration the role of cultural context in determining apposite CSR priorities and programmes for bettering gender receptiveness of Cassava value chain in Nigeria's oil producing expanse.

3. Methods and material

In this study, we embraced a quantitative method, given the lack of quantitative data on the convolutions of CSR effect in the expanse (Uduji et al, 2021; Okolo-Obasi et al, 2021). This study put to use a survey research technique aimed at getting information from a representative sample of female farmers. It is fundamentally cross-sectional and describes as well as give a meaning to what exist at present.

3.1 Sample size

Using the Fisher (1998) formula, we figured out the sample size used in this study, the formula is mathematically stated as shown below:

$$n = \frac{z^2 pq}{\alpha^2} \qquad (1)$$

Where:

n represents the sample size;

z is the standard normal deviation for a given level of confidence, e.g, 95% confidence =1.96.

Then, α stands for the margin of error at 0.05 for confidence interval of 95%;

p represents proportion of the populace with the attribute in question to be assessed. Where the value of p is not known with, the common assumption is that p will be 0.5. with these reasons,

q stands for 1-p.

We thus calculated the sample size used in this study as follows:

$$n = \frac{1.96^2(0.5)(1-0.5)}{0.05^2} = 384.$$

Getting an Approximation of this to the nearest tenth, we have 390. To further bring down the error in sample collection as well as account for both the treatment and control groups, we also multiplied the number by 2. Hence, the sample size we put to use was 780 respondents.

3.2 Sampling procedure

We picked the final respondents for this study using multi-staged (four stages) sampling method. In the stages, we made use of quota, purposeful and simple unsystematic random samplings in choosing the final respondents. In stage one, we listed all the nine states of the expanse with their size (population). With that, we assigned quota to each in line with its population. In stage two, we made use of purposive sampling and picked two local government areas (LGAs) each from the nine states of the expanse as identified in the first stage. The purpose upon which the LGAs were picked was based on the LGA hosting at least one MOC's facility or being very close to a host LGA. In the third stage, we similarly used purposive sampling to pick two communities each from the chosen LGAs. This left us with four communities per state. The purpose of this choice making was in two folds, one, each community picked must be hosting or closer to a community hosting MOC's facility. Secondly, one community must belong to a cluster development board (CDB) with the other not belonging to such. The communities that belong to a CDB we referred to as "CDB communities", (that is, the communities that have enjoyed CSR interventions from the MOCs) is treatment, while the non-CDB communities is the opposite (control). In stage 4, which is also the last stage, we involved community gatekeepers in using systematic random sampling to select 780 rural women from the chosen host communities as our respondents. These respondents were dispersed according to the population of the states as follows: Abia (9%), AkwaIbom (12%), Bayelsa (6%), Cross River (9%), Delta (13%), Edo (10%), Imo (13%), Ondo (11%) and Rivers (17%).

3.3 Validation and Reliability of the Instrument

We embarked on the study with proper understanding that validity of an instrument entails the level such instrument captures the best and right information on what it is set out to measure; and also that reliability of such instrument entails being consistent in the results generated using the same instrument recurrently and maybe at different places. Hence, to ensure the content validity of the data collection instrument, experts were engaged to structure it and a pilot test was carried out in with 40 respondents both in Rivers and Delta States. The data generated were

analysed and the Cronbach Alpha result was 92%. The experts (both in the academia and otherwise) were again involved to finalize the instrument before the final data collection.

3.4 Ethics Observation

Conducting this study, we took note of the fact that 'informed consent' is the bedrock of the ethical research; to that effect, we incorporated the ethics of informed consent. We made sure that every survey participant was equipped and well informed of why we are asking the questions and how their responses will be utilized only for the purpose of the study. We guaranteed the participants that there is and will not be any implications thereafter. This consent agreement was entered into with each community gatekeeper because we were pre-informed that nobody will participate in the study unless sanctioned by the gatekeeper, consequently, what was needed was the consent of the community leaders who in turn assisted us in selecting the final respondents. In the consent agreement, the aims and objectives of the study, what data to be collected from participants, who the researchers and their assistants are, and how the data will be reported were spelt out. We in no way forced, coaxed or pressured any respondent to participant in the survey. The privacy and discretion of information were kept as we guaranteed the voluntary participants.

3.5 Data collection

Primary data was the core data used in this study, cross sectional primary data were composed from the respondents using participatory appraisal technique. We went for such technique because according to Uduji and Okolo-Obasi (2020), Okolo-Obasi and Uduji (2024), the opinions of the respondents being studied is always very vital. We adopted the survey and key informant interview methods in garnering CSR impact data particularly as it is connected to the women in the rural host communities of multi-national oil companies in the Niger Delta. The structure questionnaire we made use of for the study was administered to the respondents to elicit qualitative information in such a way that can be converted into quantitative information. The administration of the questionnaire was carried out by the researchers with the aid of local research assistants engaged to help out with the multiple language challenge in the area by sub tribes that makes up the over fifty ethnic group there. In using this questionnaire, we circulated scores in line with the aim of the study.

Secondary data were gathered from secondary sources like publication of the MOCs and the archives of the various communities in addition to previous publications. We made use of the secondary data to authenticate the findings from the primary data.

Both the primary and secondary data used in this study were collected in the last quarter of 2023, and the sorting, cleaning and editing were done in January 2024.

3.4 Framework for Data Analysis

To evaluate the effect of multi-national oil companies' corporate social responsibilities in bettering gender responsiveness to cassava value chain in their rural host communities in Niger Delta expanse, this study made use of a combination of both descriptive and inferential statistics to answer the research questions while actualizing the aims of the study. To accomplish the first two aims, we made use of descriptive statistics while objectives three and four were accomplished using inferential statistics. For the inferential statistics, we embraced a combination of combined propensity score matching (PSM) and logit model. These methods were picked because we needed to put into control the selectivity and endogeneity challenges as much as we had the need of the counterfactual in a quasi-experimental design.

In assessing the PSM, we picked respondent women from the CDB communities who were used as treatment (women from communities that belong to CDB), while the respondent women from the non-CDB communities were used as the control (women from the non-CDB communities). Propensity score matching as projected by Erin *et al* (2004), Odozi *et al,* (2010) entails projecting the possibility of treatment for both the treatment and the control groups as it concerns the observed covariates. The pre-treatment features of each subject are rounded up into a single index variable by the propensity score and then utilized in matching comparable individuals. In this case, we matched the women chosen from the control group (that is from a larger survey) to the women picked from the treatment group (also picked from a larger survey) based on a set of observed features that are not affected by the treatment.

The first supposition here is that the choice to be treated although not arbitrary pivot on the variables observed. To this, we are in agreement with Rosenbaum and Rubin (1983) that matching variable X shows that probability of X can match. So, to evaluate the effect of CSR on women's involvement in the cassava value chain; the treatment group is represented as $R_i = 1$ for respondent woman$_i$, and $R_i = 0$ for the control group. Matching both group (Treatment and Control) based on the propensity score (Likelihood of getting CSR given some observed features) is mathematically expressed thus:

$$P(X_1) = Prob(R_2 = 1/X_2)\ (0<P(X_2) < 1) \quad (2)$$

Where X_i is a vector of control variables before CSR, if R_i's are independent over all 1's so long as X_i is given, the results are independent of CSR. Also the results are also independent of CSR

given $P(X_i)$, just as they will do if CSR is obtained arbitrarily. In drawing a conclusion on the effect of CSR of the MOCs using GMoU on empowering host communities' women in cassava value chain, we looked at the need to evade the biasness of picking observables by matching the likelihood of the treatment (covariates *X);* thereby, we explained out the propensity scores of Vector X as:

$$P(X) = Pr\ (Z = 1/X) \quad (3)$$

Here Z is the treatment indicator =1, for treatment, and = 0 for control. Because as postulated by Erin *et al* (2004), the propensity score is a balancing score, the observables *X* will be distinct same for both the control and the treatment while the variances are the attribute of treatments.

To ascertain the robustness of our study, we followed Erin et al (2004), Uduji et.al (2021) and Okolo-Obasi et al (2021). We projected the unbiased effect by adapting four steps. In the first step, we are in agreement that a binary response model predicts the probability of treatment with apposite observable features. So, we pooled the two discrete groups (treatments and Controls) and assessed the logit model of possibility of treatment as a result of some socio-economic features variables which include individual, family (household) and community variables. Mathematically, the logit model is written thus:

$$P(x) = Pr(Z= 1/X) = F(\alpha_1 x_1 \ldots\ldots\ldots + \ldots . \alpha_n x_n) = F(x\alpha) = e^{x\alpha} \quad (4)$$

The study created value of the likelihood of treatment from the logit regression as we allotted each woman a propensity score. We put aside low propensity scored control group that falls outside the range found for treatment at this point. Then, for each woman from the treatment group, a woman from the control group with the closest propensity score as measured by absolute variance in score known as nearest neighbour was acquired. The mean values of the result of indicators for the nearest neighbours were computed. We then assessed the variance between the mean and actual value for treatment as the gain following the corporate social responsibility intervention of the multinational oil companies using Global memorandum of understanding. The study then assessed the average treatment effect (ATT) as the variance between treatment and control groups based on PSM stated thus:

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

In the equation, EP(X) represents expectation with respect to the circulation of propensity score in the populace. The true ATT reveals the mean variance in empowering women.

We then utilized three dissimilar matching techniques, radius matching (RM); nearest neighbor matching (NNM); and kernel-based matching (KM) in matching the treatment and control. Thereafter, we checked the matching estimators' quality by standardized variances in observables' means between treatment and control. After matching with X for the covariate X, we represented the variance in sample means for treatment as ($\acute{X}_1$) and matched control as ($\acute{X}_0$). Hence, we put the sub-samples as a percentage of the square root of the average sample variance as: $(\int_1^2 and \int_0^2.)$.

To this:

$$|SD = 100 * \frac{(\acute{X}1 - \acute{X}0)}{\left(.05 \int_1^2 and \int_0^2.)1/2\right)} \quad (6)$$

In the next stage, we acknowledged 5% as the bias left below after matching. This is even when there is no clear threshold of effective or failed matching. The study then took as a sign that the balance among the various observable features between the treatment and control as matched is satisfactory. However, knowing that the problem of hidden bias will always abound, we tried bringing down the hidden bias by the bounding method. And to do this, we complemented equation 3, to evaluate the propensity score by a vector U which consist of all the variables not observed but we captured their impacts on the possibility of treatment by γ:

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

In the last stage, we took the sensitivity examination to look at the strength of the effect of γ on treatment so as to manage the effect of treatment on potential results. The assumption here is that the unobservable variable is a binary variable taking values 1 or 0. Hence, the treatment possibility of both treatment and control is applied in line with the bounds on the odds ratio as stated thus:

$$\frac{1}{e\gamma} \leq \frac{P(Xm)(1-P(Xn))}{P(Xn)(1-P(Xm))} \leq e\gamma \quad (8)$$

As postulated by Okolo-Obasi and Uduji (2024), both the treatment and control have the same likelihood of getting CSR, as long as they are identical in X, only if $e\gamma$ =1

3.5 SCOTDI

To add more to the above analytical framework, it is essential to note that MOCs operational in the Niger Delta still face the challenge of how to ascertain the success or failure of their CSR undertakings either as it is linkable to its effects on community development or its Petroleum Development Company (SPDC) in 2013 launched the Shell Community Transformation and Development Index (SCOTDI). SCOTDI represents an innovative framework that assimilates and adapts a number of international principles into a merged index in a way that is handy to local content (SPDC, 2013). The framework is utilized in this study to access and rank the involvement of women in the cluster development boards and the usage of the GMoU as compared to that of their male counterpart. While we got data for the women from the primary data sources, the comparative data were gleaned from secondary sources.

4. Results and Discussion

4.1 Average value of Direct CSR receipts from the MOCs by women

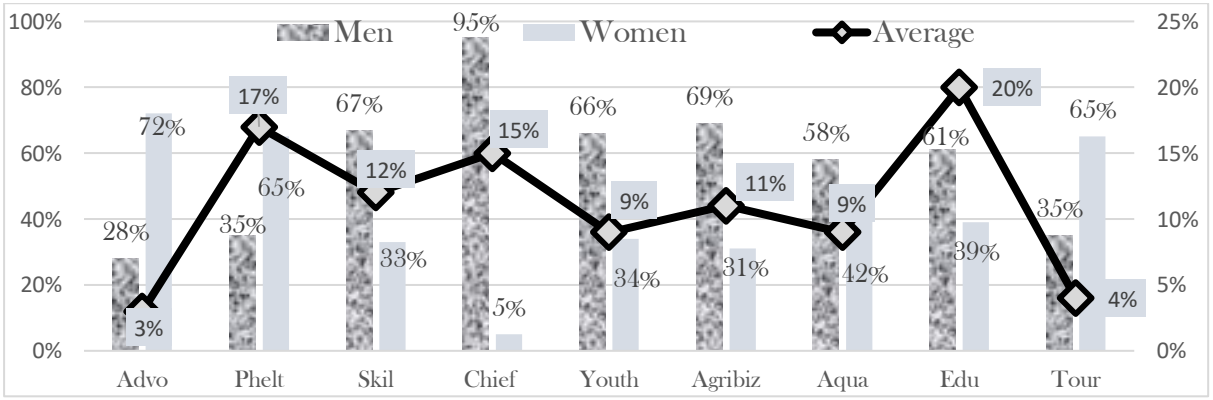

Figure 1. Percentage distribution of CSR intervention of MOCs using GMoUs by major sectors in the Niger Delta[2].

[2] Edu = Scholarship and oversea training; PHelt = Usage of Primary Healthcare Facilities Provided; Skil = Skill Acquisition and Local Training Chief = Chieftaincy Matter; Agribiz = Provision of Farming Input; Aqua = Provision of Fishing Input; Youth = Direct Youth Employment, Advo = Advocacy visits, Tour = Tourism Development.

Source: Authors' compilation based on field survey.

Analysis (Figure 1) makes known the major sectors that MOCs intervene with their CSR in the Niger Delta expanse. In this study, we made a comparison of what the men are taking away in these areas with that of the women noting that in the CSR intervention in education regarding bursaries, scholarships, oversea training etc accounts for roughly 20% of the whole interventions.

4.2 Level of Gender Participation in the CSR Intervention of the MOCS

Probing further to establish the level of women's involvement in the CSR undertakings via the GMoU, the respondent women ranked both their involvement and that of their male counterparts. Also we used secondary data generated on the involvement of men in the GMoUs to authenticate the mean rating of the involvement of men by the respondent women. We then used SCOTDI, an innovation framework in drawing and weighing the mean rating of women's involvement as compared to the mean rating of men' involvement in the GMoUs.

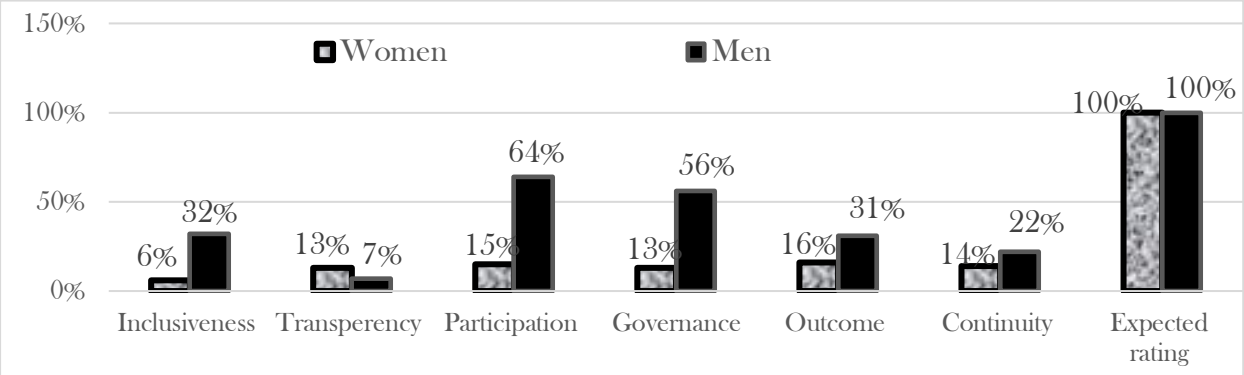

Figure 2. Gender involvement in CSR interventions in the host communities of Niger Delta
Source: Authors' compilation based on Field Survey.

The result of the SCOTDI framework analysis (Figure 2) reveals that, the involvement of women's in the MOCs' CSR activities using the GMoUs is still low when compared to the involvement of men. In the result of the analysis, to the women, they are not fully included like their male counterpart in the undertakings of the CDBs. According to the mean rating by the women respondents, the male folks benefit more than the female folks in the empowerment made available by the MOCs via the use of GMoU, which is administered by male dominated CDBs. Yet, further examination shows that these women are eager to partake in any CSR

undertaking that will better their chances of being empowered to partake in all socio-economic and political actions so as to broaden their political and economic prospects.

Table 1. Percentage rating of MOCs' CSR in helping women participate in cassava value chain in the Niger Delta.

Activities	Total E&P	Exxon Mobil	Chevron	Shell	Agip	Others	Average	MOC's Data	Diff.
Advocacy visits to and dialogues with relevant stakeholder	4%	6%	3%	5%	4%	3%	4.2%	3.50%	0.67%
Inclusive business development targeting women	5%	4%	3%	8%	6%	5%	5.2%	6.30%	(1.13%)
Acquisition of land for women to lease in groups	8%	7%	9%	10%	9%	10%	8.8%	7.40%	1.43%
Provision of short loans targeting only women	7%	4%	5%	7%	6%	11%	6.7%	8.20%	(1.53%)
Provision of fertilisers and crop protection chemicals for women	11%	17%	15%	12%	10%	11%	12.7%	14.60%	(1.93%)
Skill acquisition and management training for women entrepreneurs	18%	15%	17%	13%	16%	16%	15.8%	16.90%	(1.07%)
Provision of High yielding cassava stems	16%	18%	15%	16%	17%	18%	16.7%	17.50%	(0.83%)
Provision of seed grant for women entrepreneurs	11%	10%	12%	11%	13%	9%	11.0%	17.90%	(6.90%)
Provision of processing and storage facilities for women	20%	19%	21%	18%	19%	17%	19.0%	19.40%	(0.40%)

Source: Computed from the field data by authors

Analysis (Table 1) shows the percentage rating of CSR undertaking of the MOCs in helping rural women contribute fully in the cassava value chain. Originally cassava is seen as women's crop in key parts of the expanse, hence, knowing how best to better the value chain is indirectly heightening the economic power of women. To accomplish objective two, we looked at the following undertakings done via the MOCs' CSR using GMoUs. They are provision of short loans aimed at women only; acquisition of land for women to lease in groups; making available seed grant for women entrepreneurs, advocacy visits to cum dialogues with relevant stakeholders; acquisition of skill as well as management training for women entrepreneurs, and making available high yielding cassava stems. Others are provision of fertilisers as well as crop protecting chemicals for usage by women; provision of processing cum storage facilities for women, and inclusive business development directed at women.

The result of our examination points out that on average among the major MOCs, making available of short loans aimed only at women according to the women accounts for 6.7% of the undertakings while the recorded average by the MOCs was 8.20% (that shows a difference of 1.53%). Also, providing seed grant for women entrepreneurs according to the rating of the women averaged 11.0% in comparison to 17.90% recorded by the MOCs. This reveals that CSR effort to better women's access to credit by provision of loan/grant to the women is about 17.7% of the undertakings. To this study, this is a sensible effort to grant the women access to credit to better their taking part in agribusiness particularly the cassava value chain. While procurement of land for women to lease in groups accounts for an average of 8.8% from the rating of the women, advocacy visits to cum dialogues with pertinent stakeholder accounted for 4.2%. Also making available high producing cassava stems accounted for 16.7% while provision of fertilisers as well as crop protecting chemicals for women accounted for 12.7%. By these, it is seen that provision of variable farm input to the rural women farmer accounted for about 29.4% of the undertaking. It indicates that for the women, the CSR of the MOCs making use of GMoUs is sensibly empowering women to partake in cassava production in the value chain. Acquisition of skill and management training for women entrepreneurs was 15.8%; provision of processing cum storage facilities for women to boost addition of shelve life took 19.0%, then, inclusive business development aimed at women to ensure mop up for all that is produced accounted for 5.2%. Generally, it can be stated here that the MOCs are making efforts to better the condition of women in the expanse to be able to take their place in cassava value chain. Yet, the effort is still low but worthwhile. Hence, we see it that if the MOCs and the CDBs will raise intervention aimed at vesting the women with power (mostly the rural women) in cassava value chain in Niger Delta the cumulative effect will be greatly evident in a short while.

4.3 Econometric analysis

Table 2. Comparison of mean score and observable characteristics across Treatment and control for financial inclusion (N = 780)

Score in Percentage of maximum score	Treatment	Control	Difference
Scores on women's access to storage and preserving facilities	26.34	19.56	6.78**
Scores on women's access to processing facilities	31.35	24.33	7.02**
Scores on women's access to market information	19.54	10.89	8.65**
Scores on women's access to trained extension agents	28.65	19.43	9.22**
Scores on women's access to land and cassava inputs	38.09	26.26	11.83**
Scores on women's access to fertiliser and chemicals	32.34	19.94	12.4**
Scores on women's access to credits	34.87	21.56	13.31**

Scores on women's access to widened economic opportunities.	42.44	25.35	17.09**
Socio-Economic Characteristics			
Age	22.15	21.24	0.91
Education	23.35	13.43	9.92
Marital Status	22.61	23.02	-0.41
Primary Occupation	28.05	26.35	1.7**
Household Size	21.24	26.21	-4.97
Annual Income	32.25	23.43	8.82**
Income of other household members	19.54	18.32	1.22
Household Characteristics			
Access to medical care	18.51	12.14	6.37***
Socio-economic activities participation	29.32	21.35	7.97**
Access to Shelter	16.16	12.32	3.84***
Access to portable water	24.27	23.53	0.74**
Access to road and other civic infrastructure	26.85	22.42	4.43***
Observation	390	390	

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

Source: Authors' compilation based on household survey

To accomplish the third aim of this study, we assessed the average variance between the propensity scores of both the treatment and the control groups. Analysis (Table 2) shows the summary of the average variances in the basic scores and independent observable features between the treatment and control. The mean discrepancy shows that scores on women's access to credits is 13; their access to land and cassava inputs is 12, and their access to processing amenities is 7. Other scores include: women's access to storage and conserving facilities is 7; their access to market information is 9, their access to trained extension agents is 9; their access to fertiliser and chemicals is 12; and their access to expanded economic openings is as high is 17. This variance shows the rate of effect that the treatment created on the treated. The result indicated that there are encouraging positive changes in all the areas measured. This predicted outcome supports that the MOCs' CSR making use of the GMOUs significantly impacts on the women of the rural host communities in the area of bringing about positive changes on rural women in cassava production, processing, transport, storage as well as marketing in the Niger Delta expanse.

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

Variables[3]	Coefficient	Odd Ratio	Marginal Effect	Std. Error
Constant	8.124	2.842	0.00231	0.652
Pri_Occ	0. 251	0.352	0.0120*	0.124
Age	-0. 103	0.313	0.0021	0.013
Edu	0.278	0.342	0.041**	0.016
M_Sta	0.034	1.321	0.0203	0.123
Anu_Inc	-0.024	0.521	0.028	0.032
Inc_OHhM	-0.234	0.321	0.042	0.032
CDB_Mgt	0.012	0.328	0.110	0.034
GCSR	1.123	7.541	0.123*	0.031
Part_Ben	0.739	1.451	.0012***	0.021
Observation	780			
Likelihood Ratio - LR test (ρ=0)		X^2 (1) =1374.213**		
Pseudo R^2	0.64			

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

Source: Authors' compilation based on household survey.

Moving on to apply the model in equation 3 by utilizing the features that capture relevant observable variances of both the treatment and control groups, we projected the probability treatment. Analysis (Table 3) reveals the marginal effect and standard error as well as the evaluated coefficients and the odd ratio conveyed in terms of odds of Z=1. In the single observation, we pointed out that, primary employment, highest academic level, GMoU standpoint, CDBs management system, and gains of partakers are factors that positively influence the rural woman in search of direct CSR in the GMoU programmes. Also, how old the respondent is, the respondent's yearly income as well as the earnings of other member of the respondent's family has a negative influence on seeking for CSR.

To act in accordance with the possibility of treatment predicted in the model, the effect of CSR of the MOCs using the GMoU on women's involvement in cassava value chain was assessed via the average treatment test (ATT) as measured. This was done after having fully certified that the observations were arbitrarily ordered without large discrepancies in the distribution of propensity scores. Comparing the three algorithms of nearest neighbour matching (NNM), radius Matching (RM) and Kernel-based Matching (KBM), the NNM produced the highest and most noteworthy treatment effects as were assessed in line with the following classifications of result: scores on women's access to credits as about 15. 31%; their access to land and cassava inputs as about

[3] 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

11.83%; their access to processing amenities as about 7.02%; their access to storage and conserving facilities as about 6.78%; their access to market information as about 8.65%; their access to trained extension agents about as 9.22%; their access to fertiliser and chemicals as about 12.4 %, and their access to expanded economic openings (17.09%).

The analysis makes it clear that the NNM evaluation of women's access to expanded economic openings due to CSR as roughly 17%. With this, we moved to other methods (Radius and Kernel-based matching) believing that the result from NNM method matches poorly maybe due to scantiness of information. Making use of radius matching algorithm however, the valued effect of women's access to credit was taken to be about 9% while Kernel-based matching algorithm produced an average treatment effect of 6%. To this, we conclude that CSR of MOCs have been gainful in rural women's involvement in the cassava value chain in Nigeria's Niger Delta expanse.

Further analysis reveals the full balance of all covariates between the treatment and control. This makes it obvious that the NNM is of higher quality and produced a better outcome when compared to others. The NNM is rationally below the threshold of 5% while the kernel-based matching and radius in both the mean and the median of the absolute standardized variance after matching are very much above the threshold of 5%.

We also noted from the analysis that the kernel-based matching yielded more robust treatment effect when compared to RM and NNM in line with evaluations to hidden bias in women's access to credits, their access to land and cassava inputs, their access to processing facilities, their access to storage and conserving amenities, their access to market information, their access to trained extension agents, their access to fertiliser and chemicals, and their access to expanded economic openings. This is why there is a likelihood that matched pairs may be different by up to 100% in unobservable features, while the effect of CSR of the MOCs making use of the GMoU as monitored by the CDBs on women's access to credits, their access to land and cassava inputs, their access to processing facilities, their access to storage and conserving amenities, their access to market information, their access to trained extension agents, their access to fertiliser and chemicals, as well as their access to expanded economic openings still being significant at a level of 5% (P Value = 0.0018, 0.0322, 0.0252, 0.0123, 0.0031, 0.0023, 0.0065 and 0.003) in that order. Same classes 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 method of radius matching.

4.4 The study argument

Overall, the outcome of this study suggests that, the CSR undertakings of the MOCs making use of GMoU model have been substantially effective on agribusiness value chain sustainability among women in the Nigeria's Niger Delta expanse, particularly in the cassava value chain. In contrast, the case study of Shell and the Ogoni by Hummels (1998) revealed that in the past, the oil companies' approach was to help or appease the communities whenever the need arose. Yet, the findings of this research backs the liberal feminist theory (Fischer et al, 1993; Unger and Crawford, 1992), in that if women were given equal access to the openings available to men such as academic enlightenment, job experience, and other resources, they would respond the same way. The findings put forward that the relative priorities of MOCs' CSR activities in the Niger Delta should vary from the classic, American ordering, as projected by Carroll (1991). Importance should then be placed on a cultural context in the determination of apposite CSR priorities and programmes, as recommended by Visser (2006), which is essential in the context of the rural Niger Delta. Flexibility is also a need, as suggested by Amaeshi et al (2006), in addressing the distinctiveness of the socio-economic problems in the expanse, which requires closing the gender gap in agricultural value chain. Uduji and Okolo-Obasi (2023) also assented in that it is vital for CSR interventions in sub-Saharan Africa to include bringing down of impoverishment, providing intellectual enlightenment and creating room for training. However, in addition and input, if we are to lend our voice to how CSR intervention can advance gender parity in cassava value chain, in the Niger Delta, we would maintain that MOCs' CSR is in a position to play a significant role in bettering gender receptiveness when investment in cassava value chain deliveries is put in place for the intricacies of real life. Putting into consideration the web of challenges within families, communities and at the formulation of plans that shape a woman's experience as critical to executing fruitful CSR programming. These power dynamics are intricate and difficult to navigate, but by going for gender even-handedness, MOCs would make things better for all in the expanse. Hence, it is our disputation in this study that the private sector, generally, is well positioned to address some of the logistical and cultural glitches that face women's access to the resources for cassava value chain deliveries in the Niger Delta. MOCs, in particular, are properly placed to be able to transfer responsible business practices and standards, technologies and groundwork that expedite knowledge creation as well as encourage gender diversity. In addition to their ability to provide more equal access to economic openings and improvement on human capital. Thus, embracing gender fairness in agribusiness, particularly cassava value chain should be prioritized in CSR practices in the Niger Delta so as to help in improving the environment for engaging in business in the expanse.

5. Conclusion and policy implications

When profit-making is a part of the agricultural value chain, it results in changes in the production and circulation relationships among men and women in the areas of access to and control of markets, resources and gains coming from product value chain involvement. In Nigeria, this impacts on not only individual revenues but also gender parity. In the Niger Delta expanse of Nigeria, proof shows that men dominate activities in the production of the agrifood value chain as they are in control of productive resources such as land, money, as well as better access to extension services, agricultural innovations and markets, which facilitate their venturing into cassava production. Due to unequal yields, the ability of women to tap into the openings presented by economic growth in the expanse is limited. Thus, we made up our minds to find out how MOCs' CSR undertakings influence improving gender receptiveness of cassava value chain in the Niger Delta. Outcomes from the valuation of a logit model and utilization of propensity score matching to define the mean variance between variables in the treatment and control reveals that little but considerable success have been recorded by the MOCs' CSR making use of GMoUs model in bettering rural women's involvement in the cassava value chain. This suggests that if CSR undertakings are not tailored to heighten openings for women, they may end up resulting in lowering the involvement of women in monetary, political and social advancement and, by addition, inhibiting efforts of bringing down impoverishment and realising the sustainable development goals (SDGs) in the Niger Delta.

The indication is that though women involvement in the CSR is lower than that of the men, but the use of the cluster development boards through the GMoU model has improved female involvement in the treatment group. This increase in involvement has shown that the CSR investment of MOCs, when well channel and targeted would create positive impact on women participation in the cassava value chain. The GMoU activities have demonstrated the capacity to improve women's access to storage and preserving facilities, processing facilities, market information, trained extension agents, land and cassava inputs, fertilizer and chemicals, and credits. These factors that have been improved, are the drivers of food security in the region. Also among the treatment group, CSR of the MOCs using the GMoUs has given women wider economic and political participation opportunities. The more the women have equality in socio-economic participation, the more the issue of food insecurity is reduced. Hence, it is our contention from the result of this study that both men and women are significantly getting involved in the GMoU intervention of the MOCs in the host communities, and that the MOCs' CSR investment using GMoU is engendering food security in Nigeria's Niger Delta region. Also,

the increased involvement of women in the treatment group is a confirmation that GMoU is positively impacting on women activities in cassava production, processing, transportation, storage as well as marketing, thereby creating positive significant effect on agrifood value chain sustainability of gender sensitivity in the oil host communities of Nigeria's Niger Delta region. These findings remain speculative and provocative and would therefore benefit from the further empirical research. However, if confirmed, would raise several important issues regarding gender in cassava value chain deliveries.

5.1 Policy implications

In terms of implications for practice, it is apparent from the findings that if CSR interventions are not tailored to enhance opportunities for women, they may contribute towards reducing the participation of women in economic, political and social development and, by extension, damping efforts for reducing poverty and achieving the sustainable development goals (SDGs) in the Niger Delta region of Nigeria. The implications for policy largely surrounds the relevance of how MOCs' CSR interventions in the cassava value chain can be consolidated by policy makers in the oil industry to benefit men and women and alleviate hosehold poverty in oil producing communities. On the implications for research, although, this study shows that CSR plays an important role in enhancing rural women participation in the cassava value chain, it is imperative to extend this research with a study that determines whether CSR can be a substitute for public resources, especially in a country that is already overstretched to address its resource gap for the citizens.

5.2 Extension and contribution

The study provides more material for the literature on gender parity in access to agrifood value chain openings in five notable ways. Firstly, we identified the main gender cavities in accessing agrifood value chain openings made available by MOCs in Nigeria's Niger Delta expanse. Secondly, the study provides insight into how CSR undertakings can advance gender equity in rural areas of Nigeria's Niger Delta expanse. Thirdly, departing from previous studies, this research embraces the quantitative methodology to tackle the lack of quantitative works on the importance of CSR in the expanse. Fourthly, the investigation aims at exploring the nature of an African CSR model in the development of rural women farmers. Fifthly, we bring to the board

policy suggestions that would guide MOCs to effectively tackle the problems of equitable agricultural value chain programmes in Nigeria's Niger Delta expanse. What is clear from this study, therefore, is that gender in cassava value chain deliveries is a rich and fascinating area of enquiry, which is becoming evermore important in food security theory and practice, and represent a tremendous opportunity for improving our knowledge and understanding about rising food insecurity.

5.3 Limitation and Suggestion for Further Studies

It is worth re-emphasizing as a caveat in this study that philanthropic responsibility has two faces – welfare contribution on the one side and welfare dependence on the other. When host communities become overly dependent on multinationals for their economic welfare, there is risk of governments compromising ethical, social, or environmental standards in order to retain their investmment, or suffering huge social disruption if those businesses do decide to disinvest, as occur with Anglo American in Zambia. However, the main limitation of the study is that it is only concerned with the scope of oil host communities in Nigeria. Hence, the outcomes cannot be generalized to other emerging countries with the same hitches in policy. Based on the aforementioned limitation, replicating a similar work in other countries is worthwhile in ascertaining whether the established nexuses withstand empirical scrutiny in diverse oil host communities of evolving countries.

Declaration of conflict of interests

The authors declared no potential conflict of interest as it concerns the research, authorship and /or publication of this article.

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