

BARRIERS AND FACILITATORS OF CAREER WOMEN'S PARTICIPATION IN SUSTAINABLE CONSTRUCTION DEVELOPMENTS IN SOUTH SOUTH, NIGERIA

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ABSTRACT

Purpose: Unique attribute of professional women in construction industry remains untapped assets in sustainable construction developments (SCD). This study identified the critical barriers and facilitators of career women participation in SCD.

Design/methodology/approach: Data were collected from consulting and contracting firms in Akwa Ibom and Cross River States, in Nigeria through questionnaire administered to registered Architects, Builders, Engineers and Quantity surveyors. Inter-rater analysis was used to spot the critical barriers and facilitators while factor analysis was used to group the critical barriers and facilitators into discernible components.

Findings: Findings revealed sixteen critical barriers to career women's participation in SCD. The foremost critical barriers include family obligation; technological deficiencies, and female preference for other jobs relative to construction jobs with rating weighted agreement (RWG) values of 0.71; 0.63; and 0.61 respectively. Similarly, twenty-one critical facilitators to career women's participation in SCD were derived. Among the critical facilitators were provision of health and safety measures; provision of mentors/roles model at school level/work place; and provision of caregiving support in the first three positions with rating weighted agreement (RWG) values of 0.66; 0.64; and 0.63 correspondingly. The harnessed factors formed four components each for barriers and facilitators. The barriers components are strenuous environment; discrimination; lack of incentive; and inadequate training while the facilitators components are education and learning; mentorship and networking; employment and retention; and health and safety training.

Research limitations/Implications: The limitations include the use of only professional women in Akwa Ibom and Cross River States in Nigeria. The contribution to knowledge is that, this study established barriers and facilitators components to career women's participation in SCD.

Practical implications: It is recommended that employers in the construction sector should introduce condition of service that favourably consider the peculiarities of women and encourage their mentorship.

Originality/value: The study concludes that family care and concerns leading to female's preference for other jobs relative to construction jobs were significantly impacting on women's participation in SCD, and that the need to establish flexible working conditions and provide equal participation with their counterpart at all level in SCD.

Keywords: Barriers, Career women, Facilitators, Participation, Sustainable construction.

1. INTRODUCTION

Career women in the sustainable construction industry remain one of the largest unexploited assets despite the complex activities involved in construction process that requires the services of

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professionals irrespective of gender (Afolabi *et al.*, 2018). Women are economically independent asset that does not compromise their peculiar roles (Salman, Miranda and Amos 2014). Career women in construction sector make up approximately only 1 in 10 employees in their organisations, even in managerial positions their presence is also chronically low. This may lead to annihilation of gifted talents if not properly utilized. Construction organizations find it difficult accommodating the peculiar qualities in women. However, Akomolafe and Muhammed (2015) validated that there is significant advancement in the chase of gender equality in the construction sector over recent years. The increased engagement of women in the construction sector is discovered to be closely linked with achieving the exclusive goals of the United Nations in the year 2030 by the global agenda for sustainable development (Jwasshaka and Amin 2020). The study reported that the goal can be achieved through education, training and re-training programmes by the government, managers of companies, stakeholders and continuous recruitment of women not just as workers, but occupying top managerial position in the construction sector.

Okoyeuzu *et al.*, (2008); Jimoh *et al.*, (2016) and Kiani *et al.*, (2021) expressed, in statistical form, the percentage of career women's participation in sustainable development as being lower than men, where women's participation is 0.2% compared to men's 0.8%. In spite of the increasing recognition of the importance of sustainability in the construction industry, and the growing number of women entering traditionally male-dominated fields, women continue to be underrepresented in the sustainable construction sector. This lack of representation has negative consequences that may lead to lack of career advancement, job satisfaction, gender imbalance, limiting the potential for innovation and progress in the field. This research aims to address more inclusive participation of women in sustainable construction development (SCD). In order to achieve the aim of this study, the following objectives were set to; determine the critical barriers and the critical facilitators of career women participation in SCD in the study area.

2. LITERATURE REVIEW

2.1. Career Women Participation in Sustainable Construction Development (SCD)

The Construction Industry Federation (CIF) noted that the average percentage of men working in the construction sector is estimated at 89% compared to only 11% of women. This was to establish the true picture, in order to achieving a more inclusive women workforce that drives innovation as well as attract and retain key talent for effective SCD (Jean, 2019).

Technically, women are known as great designers, planners and project managers and to be very methodical. Career women often think outside the box and come at things from a different angle and one that is non-confrontational. They often help others see things slightly differently and that ultimately leads to more rounded decision making. In addition to their technical skills, women are known and praised for their emotional intelligence, their flexibility in decision making and problem solving. In many cases women were viewed to be adept managers, employing the appropriate measure of authority and empathy for dynamism, creativity and forging a lifelong career.

Many scholars sanitized the main elements of SCD down to a succinct synthesis of concepts and aligned it with project activity. SCD is described as any human action that impacts on the environment and not only focus on economic aspects. According to Shen *et al.* (2010), SCD remains a practicing technique that focuses on the reduction of harm to the environment, embraces long-term environmental protection and safety by efficiently utilizing resources, minimizing waste and emissions, and protecting the health as well as improving the productivity of workers. However, Bridson *et al.* (2020) described SCD as a tool-driven process that has no sole set path and might be achieved through attending different endeavours. SCD involves numerous activities athwart different industry sectors that meets the needs of the present without compromising the ability of future generational needs (Akpan, 2022).

Career, being human action, had been defined severally by diverse author on academic researches. Mordi *et al.* (2011) considered career as the series of job in a specific field in which an individual spends a period of time in his or her life time to gain some specific experience and organizational objectives with accrued benefits. Career is a life-long, continuous experience of work that can be ramify into many specialties of advancement, beginning with initial ideas about working and ending

with retirement. Meanwhile, Adebisi *et al.* (2021) termed career as the sequence of actions and roles that a person performs during all his or her life-time. This study put it as a job that comprises all that a person has undergone in his/her life so far and what he/she intends to do in the future. Career is images of a lifetime achievements, relationships, events and everything else that goes in the name of profession in the chosen profession or occupation.

In the past, women career was mostly domestic work, not career (job) in a specific profession of field, thereby making the percentage representation of women in construction activities very low. The strenuous labour-intensive activities in construction sector could have equally been a contributory factor. The result has been the low percentage representation of women in the construction sector. Perhaps, this could also be explained by reason of the low level of formal education of female children in the African culture. The construction sector has remained male dominated with only 6% of all workers being women (Akomolafe and Mohammed, 2015). The rate of women enrolment and participation both in academic and industrial facets of the construction sector is wholly low. Whereas, sustainable construction growth globally demands participation of construction professionals irrespective of gender.

2.2. Barrier to Career Women's Participation in SCD

Froelich, Green and Jacobson (2012) stated that the major barriers to women involvement in the SCD is attributed to lack of awareness at the primary and secondary school levels. This is based on the absence/ dearth of career counsellors and role- model, leading to non or low enrolment of female students into courses related to construction from the grass root to higher education. More so, a high level of illiteracy among women, low self-esteem, inferiority complex and poor career aspiration were the major constraints to women at the grass root. The factors make it difficult in choosing courses related to construction and engineering programmes. Notwithstanding, barriers vary from place to place.

However, Akomolafe and Mohammed (2015) and Adebisi *et al.* (2021) submitted that balancing work with family responsibilities, gender discrimination and lack of professionalism in human resource management, career knowledge, male-dominated culture and work environment which made it difficult for women to be recognized in managerial positions in the organisation's hierarchy. Shanmugam *et al.* (2006) highlighted women's lack of confidence, failure to have their contribution recognized, not being taken seriously, and fear of failure as barriers to women's entry into leadership position. Salman *et al.* (2014) found that the most prevalent problems are sexual harassment, long working hours, isolation on jobsite, negative perceptions of women capabilities, expectations to mimic male's aggressive behaviour, lack of mentors/role models, small representation on the jobsite, family/work-life balance, slow career progression, high degree of stress on the job, lack of encouragement from supervisors, limited training opportunities, unfair perception of women performance and pay gap compared to male counterparts. Ikiao and Wanyonyi (2019) and Ahn *et al.* (2013) found that cultural practices, norms, unwritten family codes, outdoor inclement weather, vulgar languages and physical assaults by the male counter-part are some of the prevalent difficulties facing women entering the construction labour force. All these impact on career progression thus, creating fear and scaring career women's involvement and attaining senior position in the construction organization.

2.3. Facilitators of Career Women's Participation in SCD

There are several factors that can inspire and facilitate career women's participation in SCD. Some of the facilitators are academic grass root awareness, apprenticeships training, and recruitment and retention facilitators and others which are discussed as follows.

Academic grass root awareness: Creating awareness at the grass root is one of the major indicators (Claudi, 2010 and Akpinar, 2012). This requires an academia better at educating and promoting communicating among the students so as to broaden their knowledge of choices of courses available (Jean, 2019). The formal education (primary, secondary and tertiary level) environment is recognized to offer critical access points where students learn and are exposed to new innovation in the construction industry (Masidah *et al.*, 2015). Moreso, the breadth of career "employers 'really need to be in the schools from primary to secondary level, to really educate young women on the career's options available and the range of skills and professions to be consider. Young women need to be informed of the avenues and areas of opportunities. Being engaged from primary to secondary school level, career guidance counsellors are acknowledged to be a significant facilitating measures

to mentees into sustainable development. The need for the construction industry to engage female students at primary and post-primary level is borne out by the number of young women participating in both science, technology, ICT application, engineering and mathematics (STEM) and construction related courses (Lip, 2015).

Trade apprenticeships: Managers and directors of companies need to be much better at training, communicating and marketing available skills, because a number of tasks such as planning, project management and design are office work. Technology in the 21st century offer many opportunities such that many of the skills needed can easily be done by a woman. Ortega (2012) spelt out some unique attribute of women participation in SCD. This included management, conservation, exploitation and utilization of natural resources, despite having serious limitations in access and control of the resources. Therefore, the construction sector needs to train, encourage and employ more women in SCD since academic is not the only route to acquire career. Hence, the need to inform young women of the career pathways that exists outside the academic route. Some of these careers include electrical, carpentry, plumbing, tilling, bricklaying among others for trainees; the of whom third level education proves unsuitable. A such apprenticeships enable young women to learn a skilled trade and equally provide a route to direct employment or gain an opportunity for further career advancement via additional study.

Recruitment and retention: Recruiting and retention of women in construction engineering and management programmes remain very pertinent. All over the globe existing literature proposed the need to increase women's representation in the construction sector. In USA, Menches and Abraham (2007) reported principles of support programmes to include unbiased recruitment, training and retention programmes, partnership with the construction industry and local agencies, pay attention to role models, mentorship, and the role of internships in construction. While Purnamawati and Utania (2019) proposed the practices of creating work flexibility, provision of caregiving support, recruiting and rehiring ex-employees, implement a supportive organizational culture, change of culture mind set and belief that whatever a man can do a women can equally do. The suggested programmes or initiatives attract and retain more women into the multiple levels of the construction industry which is unique for each country. Similarly, Bigelow *et al.* (2018) and Del-Puerto *et al.* (2011) highlighted multiple factors facilitating women enrolment and retention in SCD to include: gender friendly culture and environment, opulent industry image, accelerate career progression, flexible work-life practices, presence of masculine and feminine culture belief, childcare support programs, and eliminating negative stereotypes. Adebisi *et al.* (2021) findings were in support of flexible working practices, provision of equality in career development opportunity for both men and women, to be at par with men at the top managerial cadre. as the main facilitators for more women participation in construction programmes.

3. METHODOLOGY

Quantitative research design was adopted for this paper. Questionnaire survey was employed to elicit information from career women in their various companies, ministries, and industries on their motivations and inhibitors of participating in SCD. The target population was 153 professionals. This comprised women professionals: Quantity Surveyors, Builders, Architects, and Engineers. The sample size consists of 110 women construction professionals distributed across private and public enterprises in Akwa Ibom and Cross River States. The targeted population for the study was selected in order to have clear understanding of career women's involvement in SCD. The approach provides a comprehensive information of career women employees in the construction organization. The sample size was established using Taro Yamane formula in Equation 1 as follows:

$$\text{Sample size, } n = \frac{N}{1 + N(e)^2} \quad \dots \text{eqn. 1}$$

Where N is the total population (153) and e is the margin error (0.05). These gave the value of the sample size, n to be 110.

The questionnaire was made up of two parts. Part one elicited information on the respondents' background while part two captured the objectives of this paper which focused on the barriers and facilitating factors encountered by career women in sustainable construction development. The questionnaire was set-up using a five-point Likert scale of 1-5 scale vis-a-vis 1 = strongly disagree, 2= disagree, 3 = moderately agree, 4= agree and 5 = strongly agree. Reliability of adequacy and degree

to the items integrated was determined using Cronbach's Alpha whose scores ranges from 0.74 – 0.89, meaning that the instrument possesses a high degree reliability and suitable for the study (Pallant, 2020). Descriptive statistics, inter-rater agreement, and factor analysis were used to analyse the data for the study.

The critical factors were determined using inter-rater analysis of the variables of the study. To determine the critical barriers/facilitators factors of career women's participation in SCD, which is objective one of this study, inter-rater agreement (IRA) was employed in scoring as expressed in Equation 2. Estimates of IRA are used to justify whether aggregating provided by the respondent is interchangeable or equivalent in absolute terms; IRA represented by **RWG** (rating weighted agreement) was calculated using the Equations 2 and 3 as founded by LeBreton and Senter (2008).

$$RWG = 1 - \frac{S_x^2}{\sigma_E^2} \quad \dots eqn. 2$$

where: S_x^2 = the observed variance on the variable X;
 σ_E^2 = the variance expected when there is a complete lack of agreement among the judges; and

$$\sigma_E^2 = \frac{A^2 - 1}{12} \quad \dots eqn. 3$$

where: A = number of response option in the scale;

Interpretation was according to LeBreton and Senter (2008) vis-à-vis 0.00 - 0.30 = lack of agreement; 0.31 - 0.50 = weak agreement; 0.51 - 0.70 = moderate agreement; 0.71 - 0.90 = strong agreement; and 0.91 - 1.00 = very strong agreement. "The IRA is unique from other critical index parameter in exploring consensus using variance in respondents' judgment rather than mean score seen in others" (LeBreton & Senter, 2008). The effective application of IRA is to identify only the critical factors from many. The IRA as affirmed by Ekanem *et al.* (2020) is meant to manage all identified significant variables. Similarly, adopting the pareto rule of separating out the significant few from the trivial many to focus on the key variables, success is more likely. Therefore, the IRA analysis is to identify the most significant variables that will adequately describe the critical barriers/facilitating factors affecting career women's participation in SCD in the study area. The pareto principle otherwise known as (80:20 rule) states that, for many events, roughly 80% of the effects come from 20% of the events.

The study progressed to objective two by applying factor analysis on the critical factors derived from the first objective. This is an arithmetical technique used basically on the correlation analysis of multi-factors in order to trim down ambiguities and classify variables in their respective components (Tabachnick, Fidell and Ullman, 2020). Suitability of the data was tested using Kaiser-Meyer-Olkin (KMO). KMO of high values between 1.0 – 0.5 and Bartlett's test of sphericity below 0.05 generally indicate the suitability of the data. High values up to 1.0 generally indicate that a factor analysis was useful with the data. If the value is less than 0.50, the data are probably not very practical (Pallant, 2020).

4. PRESENTATION AND DISCUSSION OF RESULTS

The data collected for the study were analysed using descriptive and statistical tools. The demographic traits of the respondents were analysed with their implications for the study.

4.1. Respondent Characteristics

Eighty-six (86) out of 110 copies of the questionnaire administered were returned. Seventy seven percent (77%) were properly filled and were suitable for the study. The analyses were carried out based on the objectives of the study and the results presented accordingly. From the respondent's demographic data of the questionnaire, the study revealed that all the respondents are educated; about 81.8% are BSc and MSc graduates. All had their licence to practise their various professions. About 80.6% had working experiences between 6- 10, 11-20 years in their various firms and organisations, while 16.9% had more than twenty years of experience. The experience and educational qualification of the respondents provide a credible, reliable information suitable for the study.

4.2. Critical Barriers to Career Women's Participation in SCD

Interrater agreement (IRA) was employed to analyse forty-one (41) factors hindering career women's participation in SCD. These were included in the questionnaire to obtain the opinions of the respondents based on their perceptions of the barrier factors to career women's participation in SCD using five-point Likert scales 1-5. The critical factors were spotted with the use of IRA as expressed in Equations 2 and 3. The result showing all critical and some non-critical factors are as presented Table 1. Interpretation is according to LeBreton and Senter (2008) as earlier discussed in this study. The critical factors are those with score $\geq$ moderate agreement of the respondents.

Table 1. Barrier to Career Women's Participation in SCD

Barriers	Mean	Std. Deviation	Variance	RWG	Decision
Family obligation	2.922	0.774	0.59	0.71	SA
Technological deficiencies	2.597	0.862	0.74	0.63	MA
Female preference for other jobs relative to construction jobs	2.935	0.894	0.79	0.61	MA
High degree of stress on the job	3.259	0.894	0.80	0.60	MA
Lack of career counselling/progression	3.259	0.923	0.85	0.57	MA
Nature of the construction industry orientation	3.209	0.951	0.90	0.55	MA
Perceived high cost and impact of maternity care	2.961	0.952	0.91	0.55	MA
Attitudes, perceptions and behaviours of the society	3.143	0.969	0.93	0.53	MA
Limited research on how to improve sustainability	3.142	0.971	0.94	0.53	MA
Lack of self-confidence at the career level when compared to males	3.039	0.979	0.95	0.52	MA
Limited infrastructures and facilities	3.039	0.979	0.95	0.52	MA
Inflexible and harsh working conditions	3.455	0.981	0.96	0.52	MA
Dominance of male culture in the construction industry	3.259	0.992	0.98	0.51	MA
Lack of adequate skills/experience	3.558	0.992	0.98	0.51	MA
Lack of motivation/wages gaps	3.323	0.993	0.98	0.51	MA
Smaller proportion of women training in construction-related fields	3.156	0.992	0.99	0.51	MA
Limited influence of women in construction	2.961	1.006	1.012	0.49	WA
Poor career aspiration.	3.546	1.007	1.014	0.49	WA
Low self-esteem	2.403	1.016	1.033	0.48	WA
Lack of legal enforcement by the government	3.065	1.017	1.035	0.48	WA
Sexist macho attitudes	3.558	1.019	1.039	0.48	WA
Gender discrimination	3.143	1.035	1.071	0.46	WA
No recruitment policies and procedures	3.117	1.038	1.078	0.46	WA
Unequal division of unpaid domestic work	3.065	1.056	1.114	0.44	WA
High level of illiteracy among women	3.008	1.064	1.132	0.43	WA

SA = Strong agreement; MA = Moderate agreement; WA = Weak agreement

As pointed out earlier in this study, adopting the Pareto rule of separating out the "critical few from the trivial many" to focus on the key variables ensures more likelihood of success in determining the outcome of the critical variables. Therefore, as an initial step towards the successful harnessing of critical barrier factors on career women's participation, interrater agreement analysis was adopted. At the end of the analysis, sixteen 16 (39%) critical barrier factors out of 41 variables were derived based on the interpretation rule of $0.51 \leq x \leq 0.70$ = moderate agreement and $0.71 \leq x \leq 0.90$ strongly

agreement. Therefore, number of variables derived demonstrated the Pareto principles earlier discussed that, for many events, roughly 80:20, thirty-nine (39%) critical barriers identified can impact on career women's participation in SCD in the study area as showed in Table 1.

Out of 16 critical factors revealed, family obligation emerged the most strongly agreed factor hindering women's participation in SCD. Family obligation ranked first with an RWG of 0.71. This revealed the conflict that exist between family and work-life balance. This is not only in the construction industry but other jobs women encountered the same experience. This study agrees with the findings of Adebisi *et al*, (2021) which rated family/work-life balance first with MA of 4.11. Tunji-Olayeni *et al*, (2021) revealed that career women face serious pressure of work-load affecting women's ability of meeting their family expectations. Technological deficiencies ranked second with MA of 0.63. showing insufficient technical endowment inhibiting women participation in SCD. Female preference for other jobs relative to construction jobs was other moderately agree factor rated 0.61 that hindered women participation in SCD. High degree of stress on the job with MA of 0.60. Lack of career counselling/progression ranked fifth with MA of 0.57 among the critical factors contributing to career women participation and attaining higher cadre in SCD. Nevertheless, gender discrimination, no recruitment policies, unequal division of unpaid domestic work, high level of illiteracy among women were seen as the least critical barrier factors affecting women involvement SCD in the study.

4.3. Harnessed Barriers to Career Women's Participation in SCD

Furthermore, Factor analysis (FA) was used to group the identified sixteen (16) critical barrier of career women participation in SCD. This process was done to determine the appropriate group of the factors. Factor analysis (FA), being a dimension reduction tools, started with the inclusion of all 16 identified critical barrier variables. The total variance explained showed 60.75% with eigenvalues greater than > 1 . Rotated matrix was used to check for highly correlated factors and complex structures that may lead to difficulty in interpretation and while KMO value was monitored. The result is as showed in Table 2. Fifteen (15) critical barrier factors emerged and were grouped into four (4) components namely: strenuous environment, discrimination, lack of incentive, inadequate training. as presented in Tables 3. The fifteen factors have a cumulative total variance explained of 60.75%, signifying that these fifteen factors can explain more than 20% of the total variance occurring in the factors preventing the participation of career women in SCD. The various harnessed variables are discussed based on their component.

Table 2. KMO and Bartlett's Test Result

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.628
Bartlett's Test of Sphericity	Approx. Chi-Square	348.397
	Df	120
	Sig.	.000

Table 3. Harnessed Barriers to Career Women's Participation in SCD

Component Grouping	Variables	Loadings	% variance Explained
Strenuous Environment	Inflexible and harsh working conditions	.815	27.62%
	Female preference for other jobs relative to construction jobs	.792	
	Attitudes, perceptions and behaviours of the society	.703	
	Smaller proportion of women training in construction-related fields	.696	
	Family obligation	.636	
Discrimination	Dominance of male culture in the construction industry	.774	12.19%
	Perceived high cost and impact of maternity care	.760	

	Lack of self-confidence at the career level when compared to males	.599	
	Nature of the construction industry orientation	.515	
Lack of Incentive	Limited infrastructures and facilities	.770	11.72%
	Lack of motivation/wages gaps	.751	
	Lack of career counselling/progression	.622	
Inadequate Training	Lack of adequate skills/experience	.782	9.23%
	Limited research on how to improve sustainability	.745	
	Technological deficiencies	.520	

Component 1- Strenuous Environment: The strenuous environment emerged the first component hindering career's women participating in the SCD. The component comprises 5 related factors namely: inflexible and harsh jobs working conditions, female preference for other jobs relative to construction jobs, attitudes/perceptions and behaviours of the society, smaller proportion of women training in construction-related fields, family obligation with loadings ranging from 0.636 to 0.815 and collectively explaining about 27.62% of the variance of career women's participation in SCD. The finding is in accordant with the study carried out by Ikiao and Wanyonyi (2019); the study revealed that, condition of working place remains the paramount obstacle that discourages women full partaking in SCD. Women rather preferred less stressful environment that will enable them cope with family responsibility. Attitudes, perceptions and behaviours of the society make the training of women in construction-related fields very small proportion.

Component 2- Discrimination: This comes in the second component related factors causing barrier to women involvement in SCD. These include dominance of male culture in the construction industry, perceived high cost and impact of maternity care, lack of self-confidence at the career level when compared to males, and nature of the construction industry orientation with loadings variance grading from 0.515 to 0.774 and jointly explained about 12.19% of the variance of career women's participation in SCD. The description of male world and nature of construction create fears and lack of confidence in women. Thus, reducing a great percentage of female in SCD. The finding is in line with the study by Akomolafe & Mohammed 2015 stating that male dominated culture inhibits women full participation and recognition.

Component 3- Lack of Incentive: Lack of incentive has 3 related barriers namely limited infrastructures and facilities, lack of motivation/wages gaps, Lack of career counselling/progression rating from 0.622 to 0.770 and collectively explained 11.72% of the variance of career women participation in SCD. Effective learning requires functional facilities in place. limited or non-functional infrastructures and career counsellors hindered women career women involvement in the SCD. Women are not aware, no counsellor to counsel and motivate women on the varieties of opportunity in SCD.

Component 4- Inadequate Training: This component comprises three (3) barriers namely lack of adequate skills/experience 0.782, limited research on how to improve sustainability 0.745, technological deficiencies 0.520, which explained 9.23% of the variance of career women involvement in construction sector. This component causes setback to career women in their attainment and participation in SCD. This finding is consistent with Lip (2015), the study stated that the world is globalised through technology, to improve effective construction development toward sustainability. Lack of women exposure to current innovation on skills and technologies specially in the present digital era creates serious challenges to their participation in SCD. It also hinders interchanges of knowledge, product, ideas and other aspects of culture for better living and next generation.

4.4. Facilitators of Career Women's Participation in SCD

Applying inter-rater analysis on factors facilitating career women's participation on SCD, twenty-one (21) variables were found critical based on the interpretation rule of $0.51 \leq x \leq 0.70$ = moderate

agreement. The result is as presented in Table 4. The number of variables derived could be explained by the Pareto principles stating that, roughly 20% of the factors can explained about 80% of career women participation in SCD in the study.

Table 4. Facilitators of Career Women's Participation on SCD

Facilitators	Mean	Std. Deviation	Variance	RWG	Decision
Provision of health and safety measures	3.273	0.821	0.675	0.66	MA
Provision of mentors/roles model at school level/work place	3.129	0.848	0.72	0.64	MA
Provision of caregiving support	3.052	0.857	0.734	0.63	MA
Adapting construction programmes/structures to suit women as their audience	3.675	0.91	0.827	0.59	MA
Develop link with educational establishment	3.610	0.92	0.846	0.58	MA
Pay attention to the role of internships in construction.	3.286	0.93	0.865	0.57	MA
Implement a supportive organizational culture	3.428	0.938	0.88	0.56	MA
Introduction of retirement benefit	3.298	0.947	0.896	0.55	MA
Organizing excursion	3.727	0.955	0.911	0.54	MA
Enrolment of female students into construction related courses in higher institutions	3.740	0.956	0.901	0.54	MA
Eliminating negative stereotypes	3.039	0.966	0.933	0.53	MA
Support training/ monitoring programmes to improve self-esteem	3.779	0.968	0.937	0.53	MA
Adequate clarification on complexity of the project	3.777	0.967	0.937	0.53	MA
Equal job opportunities for women	3.506	0.968	0.937	0.53	MA
Presence of masculine and feminine culture belief	3.961	0.979	0.959	0.52	MA
Provision of effective communication network	3.760	0.902	0.959	0.52	MA
Creating flexible working practices	3.467	0.978	0.958	0.52	MA
Academic grass root awareness (primary/secondary school level)	3.636	0.982	0.971	0.51	MA
Provide equal opportunity in decision making	3.753	0.984	0.978	0.51	MA
Provision of accommodative and adaptative environment	3.597	0.96	0.981	0.51	MA
Unbiased recruitment and retention policies	3.974	0.98	0.984	0.51	MA
Deploying information technology applications	3.740	1.018	1.037	0.48	WA
Change of image associated with the construction	3.273	1.021	1.043	0.48	WA
Creating scholarship opportunities	3.272	1.021	1.043	0.48	WA
Provision of family/work-life balance	3.896	1.071	1.147	0.43	WA
Proper project management methodologies	3.558	1.032	1.066	0.47	WA
Recruiting and rehiring ex-employees	3.208	1.043	1.088	0.46	WA
Maintaining connection with past employees	4.034	1.044	1.091	0.45	WA
Provision of Standard level of innovation implemented in managing the project	3.337	1.046	1.095	0.45	WA

Mix interview panels	3.416	1.068	1.141	0.43	WA
Change of mind set in the existing culture in construction industry	3.428	1.069	1.143	0.43	WA
unbiased salary scale implementation	2.987	1.07	1.145	0.43	WA

MA = Moderate agreement; WA = Weak agreement

The first three (3) critical facilitators are provision of health and safety measures, provision of mentors/roles model at school level/work place, and provision of caregiving support with RWG of 0.66, 0.64 and 0.63 respectively. This finding indicates the importance of health and safety to workers, that women must be physically fit to perform effectively. Healthy working environment bring about full participation and efficient performance. Provision of mentors/roles model at school level/work place emerged second. Mentoring gives adequate clarification on issues that will facilitate positive thinking perspectives. Provision of caregiving support, adequate infrastructures and programme to suit women as the audience ranked third and fourth positions in facilitating career women participation and progression in SCD. More so, the Table 4 also revealed change of image associated with the construction, Proper project management methodologies, maintaining connection with past employees were seen as least critical factors facilitating career women involvement in SCD in this study shown in Table 4.

4.5. Grouping Facilitators of Career Women's Participation in SCD

Twenty-one (21) identified critical facilitators in Table 4 were subjected to factor analysis to determine the suitable grouping of the factors. Dimension reduction started with twenty-one (21) identified critical facilitators.

Table 5. KMO and Bartlett's Test Result

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.647
Bartlett's Test of Sphericity	Approx. Chi-Square
	Df
	Sig.

Applying the same principle as in previous section of this study, harnessed nineteen (19) out of 21 facilitating factors emerged and were clustered in four (4) components as follows: education and learning related factor, mentorship/networking related factor, employment/retention related factor, and training related factor as presented in Tables 6.

Table 6. Facilitators of Career Women's Participation in SCD

Component Grouping	Variables	Loadings	Initial% Variance
Education and Learning	Academic grass root awareness (primary/secondary school level)	.808	13.052
	Develop link with educational establishment	.726	
	Organizing excursion	.712	
	Enrolment of female students into construction related courses in higher institutions	.695	
	Provision of effective communication network	.679	
	Pay attention to the role of internships in construction.	.819	
	Provision of mentors/roles model at school level/work place	.573	
	Adequate clarification on complexity of the project	.542	11.760
Mentorship and networking	Presence of masculine and feminine culture belief	.525	
	Eliminating negative stereotypes	.512	

	Mix interview panel	.784	
	Unbiased recruitment and retention policies	.695	
Employment and Retention	Creating flexible working practices	.620	11.16
	Introduction of retirement benefit	.610	
	Implementing equal wages/salary scale	.589	
Health and Safety Training	Support training/ monitoring programmes to improve self-esteem	.805	10.88
	Childcare support programmes	.683	
	Provision of health and safety measures	.562	
	Trade apprenticeship training	.539	

Component One- Education and Learning Grouping Factors: This component comprised 5 factors with loading ranging from 0.679 - 0.808 with variance of 13.052%. Academic grass root awareness, developing link with educationist, organizing and going for an excursion, enrolment into construction related courses in higher institutions and effective communication network. Starting from primary to secondary level emerges first among the grouping of facilitators of career women participation in sustainable construction development in the study and account for 13.03% of variance explained in career women involvement in SCD.

The study revealed education and learning as the key to accomplish sustainable construction development. It implies that, education and learning is recognized to offer critical access for young and mature women alike to accrue wider knowledge and new innovation in sustainable construction development at the grass root. Moreso, the trainers “employers ‘need to be in the schools, to really educate young women on the types of careers they can learn and the range of professions for them to consider. Education is a driver that unbundled economic growth, social flexibility driving at future environmental and prosperity wellbeing of the citizen. Jean (2019) reported that education at the grass root do not only impact knowledge but it's also equipped career women to become decision makers and to grasp sustainable development as a holistic concept and discover ideas which offer solutions to coping with the trade-offs between economic, social and environmental goals for sustainability. Sedlacek, (2013) confirmed this finding, as the study submitted that, the pressure on the construction industry to contribute to SCD, is perhaps important to build university education programme imbedding sustainable development in the curricula. Application of the facilitators will reduce the mentality of gender stereotyping that the construction industry is a man's world and that it is not really a place for women.

Component Two- Mentorship/Networking Related Factors: Mentorship/networking emerged the second most significant component facilitating career women's participation in the SCD. Mentorship/networking related facilitators loaded 5 variables ranging from 0.512 to 0.819 with 11.76% variance as shown in Table 6. The variables are: pay attention to the role of internships in construction (0.819), provision of mentors/roles model at school level/work place (0.573), adequate clarification on complexity of the project (0.542), presence of masculine and feminine culture belief (0.525), and eliminating negative stereotypes (0.512). The mentoring/networking facilitators strengthening women's participation in an inclusive SCD. Mentoring is the process of building a relationship in which a more experienced monitors assist in sharing knowledge, skills and assisting mentor (s) with development of a less experienced. While networking build and increase social interactive, provide forum to ease career transitions, raise awareness and collate best practice around gender equality, promote equal opportunities regardless of gender. The role of internship mentoring at school level and work place are very crucial for SCD. Mentoring gives adequate clarification on complex issues that will facilitate different positive thinking perspectives. It brings a new thinking mindset that goes a long way to improve decision making and drives innovation and creativity mindset in young and mature career women for economic growth, social flexibility and wellbeing of the society.

Component Three- Employment and Retention: There are five variables that make up component three with loadings ranging from 0.588 to 0.784 with 10.879% variance as revealed in

Table 4.6. Mix interview panel loaded eigenvalue of 0.784 emerge first among the variables in component three. Meaning, employer's panels should comprise female and male for unbiased recruitment. Even though workforce participation, does not mean full-time work. Women are far more likely to work part-time than men to allow them attain to family life responsibility. Therefore, retention and flexibility in the working hours should be encouraged to really bring out their best and satisfaction. Sometimes even when women work the same hours, their take home seem to be less than men due to persistent gender wage gaps of about 18% (Jean 2019). Nevertheless, wage gaps are highest in managerial cadre which is in rare cases women are given such opportunity, though the educational background and work experience of women and men are very similar. As pointed out by this study education and learning remain number one in combating this imbalance for effective SCD.

Component Four- Training related factor: This component has 6 related factors with variance explained of 10.88%. the factors include Changing of mind set in the existing culture in construction industry, support training/ monitoring programmes to improve self-esteem, childcare support programmes, provision of health and safety measures, trade apprenticeship and fair perception of women performance capabilities. The study showed that with training young and mature women gain full participation in the sustainable construction development with no or little education. Training changes person's mind-set and improve self-esteem to achieve a certain goal. Equally, effective training on health and safety to update their safety, skills and knowledge. Some of the trade's apprenticeship include: carpenters, plumbers, tilers, electricians, plasters among others for young and mature women whom tertiary education prove unsuitable for any reasons. These skills serve as a stepping stone for further career advancement. A study carried out by Jean (2019) in Island construction industry revealed that less than 1% of apprenticeship skills are taken up by women. This alone possess a significant challenge in encouraging women to view apprenticeships as a viable option in entering and developing a talent in the construction industry for SCD. Therefore, women need to be encouraged and be enlightened that one size does not fit all and that if the academic route does not work for whatever reason, there are other ways to forge a career to remain relevant (emotional intelligence, flexible in decision making and becoming problem solver) in the SCD at any level.

5. CONCLUSIONS AND RECOMMENDATIONS

Numerous literatures reviewed on career women's participation in SCD were examined to understand the barrier and facilitating factors that prevent or contributed, respectively to the participation of career women in SCD. Findings from review of literature clarified that, despite women been peculiar asset for growth and development, women found it difficult participating in their professional career, especially in the SCD projects, thereby constituting a very small percentage at the SCD projects. Hence, the study progressed to determine the critical factors preventing career women from participating in SCD and those that are favourable. The inter-rater analysis revealed sixteen (16) critical barriers as challenges to career women's participation in SCD. The foremost critical barriers included family obligation; technological deficiencies, and female preference for other jobs relative to construction jobs with rating weighted agreement (RWG) values of 0.71; 0.63; and 0.61 respectively. Similarly, twenty-one critical facilitators of career women's participation in SCD were derived. Among the critical facilitators were provision of health and safety measures; provision of mentors/roles model at school level/work place; and provision of caregiving support in the first three positions with rating weighted agreement (RWG) values of 0.66; 0.64; and 0.63 correspondingly. The grouping of factors formed four components each for barriers and facilitators. The barriers components namely are strenuous environment; discrimination; lack of incentive; and inadequate training while the facilitators components are education and learning; mentorship and networking; employment and retention; and health and safety training. The study concludes that family care and concerns leading to female's preference for other jobs relative to construction jobs is significantly impacting factor hindering their participation in SCD. It is recommended that employers in the construction sector should introduce condition of service that favourably consider peculiarities of women and encourage their mentorship.

REFERENCES

Adebisi R. T.; Amuda-yusuf, G.; Rasheed, S.A.; and Ekanem, S. F Women (2021) Career Advancement for Sustainable Development in Construction Industry in Nigeria.

- Conceptualizing Challenges and Opportunity in the Construction Industry. Proceeding of the Construction Business and Project Management Conference. 24-25 June 2021, Cape Town, South Africa.
- Afolabi, A. O. Ojelabi, Rapheal A. and Tunji-Olayeni, P. F. and Fagbenle, O. I. and Mosaku, T. O. (2018). Survey Datasets on Women Participation in Green Jobs in the Construction Industry. *Data in Brief*, 17, 856-862.
- Ahn, Y. H.; Pearce, A. R.; Wang, Y.; and Wang, G. (2013). Drivers and Barriers of Sustainable Design and Construction: The Perception of Green Building Experience. *International Journal of Sustainable Building Technology Urbanization Development*.
- Akpan, P. I. (2022). Reengineering Nigerian Systems for Sustainable Development. A Keynote address Presented at Second International Conference of Academic Staff Union of Polytechnics, Akwa Ibom State Polytechnic, Ikot Osurua, Ikot Ekpene. September 21, 2022.
- Akpınar, C. (2012). Career Barriers for Women Executives and the Glass Ceiling Syndrome: The Case Study Comparison between French and Turkish Women Executives, Paper Presented at the 2nd International Conference on Leadership, Technology and Innovation Management, 12th -14th October, Istanbul, Turkey.
- Akomolafe, M. A.; and Mohammed M. A. (2015), Gender Barrier in Construction Industry: a Review of Women Involvement. *International Journal of Modern Management Sciences*, 4 (1), 21-30.
- Babatunde, S. O.; Babalola, O.; and Opawole A. (2012). An Appraisal of Career Development among Female Professionals in the Nigerian Industry, *Global Journal of Research in Engineering* 12 (2), 212- 23.
- Barth, M., Godemann, J., Rieckmann, M. and Stoltenberg, U. (2007). Developing key Competencies for Sustainable Development in Higher Education. *International Journal of Sustainability in Higher Education*, 8 (4), 416-430.
- Bamgbade, J. A., Nawi, M. M., Kamaruddeen, A. M., Adeleke, A. Q.; and Salimom, M.G. (2019). Building Sustainability in the Construction Industry through Firm Capacities, Technology and Business Innovativeness: Empirical Evidence from Malaysia *International Journal management* 1-16.
- Bridson, P. B.; Stoner, J. M. S.; Fransen, M. H.; and Ireland, J. (2020). The Aquaculture Sustainable Continuum – Defining an Environmental Performance Framework. *Environmentally Sustainable Indices* 8.
- Bigelow, B. F., Bilbo, D., Mathew, M., Ritter, L., and Elliott, J. W. (2015). Identifying the most Effective Factors in Attracting Female Undergraduate Students to Construction Management. *International Journal of Construction Education and Research*, 11(3), 179-195.
- Claudi, M. (2010). The Glass Ceiling in Construction Companies is Still Firmly in PLACE, what is the Secret: Gender Differences or Lack of Abilities. M.Sc. Thesis (Construction Management) University of Pretoria.
- Clarke L., Michielsens E., Snijders S., Dainty A. and Barnard S. (2015). 'No More Softly, softly': Review of Women in the Construction Workforce, London, University of Westminster.
- Del Puerto, C., Guggemos, A. C., and Shane, J. S. (2011). Exploration of Strategies for Attraction and Retaining Female Construction Management Students. In 47th ASC Annual International Conference Proceedings, Nebraska 6-9.
- Ekanem, S. F., Godwin, O. J., Akintayo, O., and Timothy, O. A. (2020). Modelling Delay of Road Construction Projects in 'No Funding-Stress' Scenario using Ordinal Logistic Regression Approach. *Journal of Civil and Environmental Research*. 12(9), 60-78. DOI: 10.7176/CER/12-9-07.
- European Commission. The EU Strategy on Sustainable Development. Available online: https://ec.europa.eu/environment/integration/trade_en.htm (accessed on 5th March, 2023).
- Froelich, C. Green, C. B. A. and Jacobson, W. S. (2012). *The Prevalence of Women in Academic Leadership Positions and Potential Impact on Prevalence of Women in the Professorial Ranks*. North Dakota. North Dakota State University
- Ftunji- Olayeni, P., Kajimo-Shakantu. K. and Oni, A.A. (2021). Work-Life Experiences of Women in the Construction Industry: a case of Women in Lagos mainland, Nigeria. The ASOCSA

- 14th Built Environment Conference, IOP Conference Series: Earth and Environmental Science. Doi:10.1088/1755-1315/654/1/012012.
- Hossain J. B. and Kusakabe K. (2005). Sex Segregation in Construction Organisation in Bangladesh and Thailand. *Construction Management and Economics*, 23(6), 609-619.
- Lip, P.L. (2015). Effective ICT for Sustainable Construction Management. Heriot watt University, MALAYSIA. Built Environment. Accessed 29 July 2023.
- Ikiao, A. K. and Wanyonyi, L. (2019). Determinants of Women Participation in Building and Construction Industry in Central Division, Isiolo County, Kenya. *International Academic Journal of Information Sciences and Project Management*, [http://www.iajournals.org/articles/iajispm_3\(3\)_131-163](http://www.iajournals.org/articles/iajispm_3(3)_131-163)
- Jean W. (2019). Women in the Construction Industry: Accurate Information is Central to all Decision Making. Powered by CPAS www. cif.- Construction Industry Federation (CIF). Ireland. Accessed 22nd June, 2023.
- Jimoh R. A., Oyewobi L. O., Adanu A. N., and Bajere P. A. (2016) Women Professional's Participation in the Nigeria Construction Industry: *Finding Voice for the Voiceless, Technology and Management in Construction* 1(8) 1429-36, Doi.10.1515/otmcj-2016-0005.
- Jwasshaka, S. K., and Amin, N. F. (2020). Gender Discrimination in Building Construction Industry in Nigeria: Threat to Achieving Goal-5 of Vision 2030. *World Journal of Engineering and Technology*, 8, 33-41. <https://doi.org/10.4236/wjet.2020.81004>
- LeBreton, J. and Senter, J. (2008). Answers to 20 Questions about Inter-rater Reliability and Inter-rater Agreement. *Organisation Research and Methods*, 11(4) 815-852
- Kiani M. R., Gengatharen, D., Kiani, M.N., Hughes, R., Campbell, A., and Yates, R. (2021). Sustainability in Construction projects: A Systematic Literature Review 13, 1-24, <https://doi.org/10.3390/su13041932>.
- Masidah A., Wardah, F. M. Y. and Abdulrasak, S. (2015). Women as Skilled Labour in the Construction Industry of Malaysia: Potential and Constraints. Proceeding of the International Conference on Social Science Research, 8th and 9th June
- Menches, C. L., ASCE, M., and Abraham D. M (2007). Women in Construction- Tapping and Untapped Resource to Meet Future Demands. *Journal of Construction Engineering and Management* 133(9), [https://doi.org/10.1061/\(ASCE\)](https://doi.org/10.1061/(ASCE)).
- Mordi, C., Adedoyin, H., and Ajonbadi, H. (2011). Impediments to Women Career Advancement: The Nigerian experience. *Petroleum-Gas University of Ploiesti: Bulletin*, 43(2), 11-22.
- Okoyeuzu, C. R., Obiamaka, P. E., and Onwumere J. U. (2008). Shaping the Nigerian Economy: The Role of Women, Government Printer, Nigeria.
- Ortega, L. (2012), "A New Model Patriarchal Family in the Rural Areas," Internal Document, Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), Unpublished.
- Pallant, J. (2020). Survival manual, A Step-by-Step Guide to Data Analysis using IBM SPSS.7th edition. Routledge Taylor and Francis Group London and New York. www.routledge.com/textbooks/97817608775534.
- Purnamawati, G. A and Utania M.S (2019) Women Empowerment Strategies to Improve their role in Families and Society. *International Journal of Business Economics and law*. 18(5). 118-126.
- Salman, A., Miranda, K., and Amos, G. (2014). Women in Construction Success: Challenges and Opportunities AUSACE Case Study of 50th Annual International Conference Proceeding.
- Sedlacek, S. (2013). The Role of Universities in Fostering Sustainable Development at the Regional Level. *Journal of Cleaner Production*, 48, 74-84.
- Shanmugam, M., Amaratunga, D., Haigh, R., Elvitigala, G., Baldary, D., and Ruddock, L. (2007). The Role of Women in Construction Development: The UK Perspective. In: *CIB World Building Congress*, Cape Town, South Africa, 3233-3246.
- Shen, L. Y., Tam, V. W., Tam, L., and Ji, Y. B. (2010). Project Feasibility Study: the key to Successful Implementation of Sustainable and Socially Responsible Construction Management Practice. *Journal of Cleaner Production* 18, 254-59.

- Tabachnick, B. G., Fidell, L. S., and Ullman (2021). *Using Multivariate Statistics*, Pearson India Education Service, 7th edition, 832.
- Tunji-Olayeni P. F., Kajimo-Shakantu. K., and Oni, A, A. (2021). Work-Life Experiences of Women in the Construction Industry: A Case of Women in Lagos Mainland, Nigeria. *The ASOCSA Built Environment Conference* doi:101088/1755-1315654/1012012.
- World Commission on Environment and Development. *Our Common Future*, United Nations, Oxford University Press; Oxford, UK 1987.