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Determinants of Gender Inequality in Research Productivity and Career Advancement of Women Academics in Nigerian Universities

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Abstract

Gender inequality persists as a challenge in academia, considerably affecting research productivity and career advancement of women academics in Nigerian universities. This study carefully investigates the determinants of gender inequality in research productivity and career advancement among women academics at the University of Nigeria, Nsukka. Adopting a quantitative descriptive approach and a survey research design, a sample of 134 women academics were drawn randomly to investigate the sociocultural and institutional factors contributing to these inequalities. Despite several research on gender inequality in academic research productivity, there is paucity of studies investigating the underlying factors perpetuating these inequalities. Employing descriptive statistics and principal component analysis, the study offers experiential evidence that sociocultural norms, institutional barriers, and systemic biases greatly limit the research productivity and career advancement of women academics. Findings demonstrate that the contributory factors to gender inequality include embedded gendered expectations, workload imbalances, mentorship and lack of access to research funding. These structural constraints produce a "glass ceiling" effect, which hinders women academics from progressing their career. This study illustrates the urgency with which institutional interventions, policy changes, and focused support systems such as work-life balance policies, mentorship programs, and unbiased research funding are needed to enhance research productivity and career advancement of women academics in Nigerian universities. It is vital that these inequalities be addressed to promote a more inclusive and equal academic environment.

Keywords: *Gender Inequality; Research Productivity; Career Advancement; Women Academics; Sociocultural Factors; Institutional Factors; Nigerian Universities.*

Introduction

Despite efforts to sustain equal opportunity in research productivity, gender inequality continues to persist in Nigerian universities. Notwithstanding the growing number of women participating in research, they are largely marginalized in major academic positions (Adewale and Potokri, 2023). These inequalities emanate from lack of female role models in high-ranking positions, biases, stereotypes and limited funding, which are evident in several fields of study as such, present hurdles for women at every phase of their academic careers (Olusanya et al., 2021; Van der Weijden et al., 2019). According to (UNESCO Institute for Statistics, 2019), women constitute less than thirty percent of academic researchers globally.

Authors such as (Okoro and Chukwuemeka, 2020) opined that patriarchal systems and gender power dynamics have hindered women's participation in research, which subsequently, restrict them to domestic roles. This marginalization and undervaluation of African women's knowledge have also led to the underestimation and devaluation of women's intellectual contributions (Assié-Lumumba, 2020). Despite their qualifications and achievements, women academics often see themselves as less committed, less qualified, or more inclined toward "softer" fields of study. These prejudices if not checked, can erode women academics research capabilities` confidence, cultivate the attitude of “imposter syndrome” and hinder their advancement to leadership positions in academia (Odejomi and Babalola, 2020). Furthermore, recruitment decisions are repeatedly swayed by either implied or obvious gender stereotypes, which set hurdles for women in obtaining research positions, particularly in male-dominated careers, such as STEM (Okeke-Uzodike and Ogbu, 2021).

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Accordingly, Nigeria, like other African nations, encounters historical, cultural, social, and economic challenges, which engender inequality in research productivity and career advancement of women academics. These factors include lack of research facilities, disproportionate educational opportunities, and deeply embedded patriarchal system (Tushabe et al., 2023). Various authors have highlighted a number of factors that hinder women academics from progressing in their research careers. For instance, (Ojo-Ebenezer and Olofin, 2022) contend that women frequently have less opportunity to obtain grants for research when compared with their male counterparts, which affects their research productivity and career advancement. Women's participation in research is further hindered by the lack of gender-supportive practices and the subsequent gender inequality in many academic and research institutions (Thompson-Burdine et al., 2019). Women struggle with networking and mentoring opportunities because of underrepresentation of women academics in leadership positions, and this limits their access to important professional networks (Okojie, 2020; Olaoye, 2021). In their opinion, (Tai et al., 2021) contend that academics that are requesting promotions must exhibit a high degree of proficiency in both current research and publications in high impact factor journals. Therefore, prejudiced institutional practices that are majorly evident in resource allocation, in recruiting, promotions as well as sexual harassment can negatively affect women academic`s research productivity and career development (Olaoye, 2021; Ojo-Ebenezer and Olofin, 2022).

Family and environmental factors have also been highlighted as barriers to research productivity and career development of women academics. Women struggle to balance their work and family life because of family and environmental factors, which negatively affect their research productivity and career development (Sougou et al., 2022). Therefore, juggling research commitments with family responsibilities ultimately limit women`s time to household duties while they dedicate less time to their research work (Sougou et al., 2022; Sayer, 2005). According to (Ojo-Ebenezer and Olofin, 2022), societal expectations surrounding household responsibilities and gender roles frequently lead to work-family conflicts for women academics in Nigeria, which hinder their career development and ability to produce high-quality research work. Furthermore, the traditional role of subordination of women in Africa entails that they seek the approval and support of their husband in order to succeed in their research career (Sathiparsad et al., 2008). As much as they had to bargain for domestic support from their spouse and family, women also have to deal with the male-dominated practices in the research field (Sougou et al., 2022). Despite the growing body of research and the ample evidence on the experiences of women academics on gender inequality in research productivity, little attention has been paid to socio-cultural and institutional factors that affect women academics in research productivity and career advancement in Nigerian universities. This study seeks to close the corresponding literature gap. Therefore, this study aims to examine the socio-cultural and institutional factors that engender inequality in research productivity and career advancement of women academics in Nigerian universities. Given that University of Nigeria Nsukka, like other institutions in Nigeria may also harbour institutional barriers that disproportionately hinder the advancement of women researchers, the purpose of this study therefore is to investigate the sociocultural and institutional barriers that affect women academics` research productivity as well as their career advancement in University of Nigeria Nsukka.

The study seeks to answer the following questions: what sociocultural factors affect research productivity and career advancement of women academics in University of Nigeria Nsukka? What institutional factors affect research productivity and career advancement of women academics in University of Nigeria Nsukka? The findings of this study would be important to decision-makers in the policymaking, government, private, and productive sectors as well as stakeholders in the universities as they consider how to create an environment that facilitate efficient knowledge production and equality in Nigerian Universities. Additionally, by providing a strong basis for the expansion of the country's knowledge economy, the study's findings are anticipated to alter the higher education landscape in Nigeria. It is also intended that it would act as a readily available reference source and a basis for further investigation in this area. The rest of the paper was organized subsequently with the second section which reviewed the literature, the theory and the hypotheses development focusing on the Socio cultural and institutional barriers to women academics` research productivity and career advancement. The third section is the methodology, which spelt the study design, instrumentation, and analytical tool, the fourth section is the results, discussions while the fifth section is the conclusion.

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Review of Literature

Gender inequalities emerged from the historical undervaluation of African knowledge systems and the emphasis on Western epistemologies, which have marginalized women's traditional and indigenous knowledge (Assié-Lumumba, 2020). These inequalities limit women's access to resources, opportunities, and visibility in the creation and dissemination of information. These inequalities stemmed from patriarchal structures, gender-based power dynamics, and cultural norms that limit women's visibility in knowledge creation and exchange as well as their access to resources and opportunities. When women academics are less able to access funds for their studies, publication channels, and professional networks than their male counterparts are, resource disparities occur (Global Partnership for Education, 2021).

Theoretical Review and Development of Hypotheses

Gendered Organisation Theory (GOT)

In this study, gendered organization theory was applied to emphasize the significant role of organizational practices in hindering women academics' research productivity and career advancement. Gendered organization theory offers a strong framework for analysing how universities engender inequalities that limit women's contributions to knowledge and constrain their research capabilities. Acker (1990) asserts that gendered organizations involve five processes that engender inequality in organizational settings and subsequently present challenges to women in the organisation. These include inequities emanating from the instituted power dynamics in employment, appointment, upgrades; traditional symbols that denote and support gendered division; organizational social system and relations that lead to domination and subordination; the establishment of a gendered identity that eliminates other aspects of gender and its production; and, finally, conceiving a gender-neutral organization whereby jobs are available to all but workers are seen as abstract workers who are dedicated to organization and lack domestic life.

Socio Cultural Barriers to Women Academics` Research Productivity and Career Advancement.

Socio-cultural barriers are those embedded hegemonic social norms that women should adhere to in any society (Nguyen, 2013). In Africa, traditional roles have long been recognized as a major obstacle to women's involvement in research. These roles, according to (Mlambo-Ngcuka, 2019), are firmly entrenched in cultural norms and practices that often restrict women to household responsibilities, limiting their access to education and intellectual development opportunities as well as perpetuating gender inequality by preventing women from participating in academics and research. Women encounter several challenges, which negatively affect their research and academic development globally (O'Connor, 2020; Nyoni and He, 2019). For instance, (Romanin and Over, 1993) opined that sociocultural factors, repeatedly put women at the pith of family duties, unequally, assigning disproportionate domestic chores such as managing home, caring of the elderly and children to them. The study by (Hunter and Leahey, 2010) revealed that being a parent with little children is the major barrier to women academics` research productivity and career advancement. Additionally, the findings of (Njoku, 2020) revealed that traditional gender roles buttress the belief that women are primarily caregivers and homemakers, which hinder their capacity to pursue jobs in disciplines like science, technology, engineering, and mathematics (STEM). Because of these caring and domestic obligations, excess workload, and the stress of balancing work family conflicts and objectives, women academics` work are frequently disrupted (Adewale and Potokri, 2023). Women academics also suffer mental health as they juggle academic work with family and domestic responsibilities that ultimately leads to weariness and burnout (Tushabe et al., 2023). In an attempt to prioritize family responsibilities, women academics frequently rebuff opportunities for leadership positions, circumvent conferences, or avoid responsibilities that will require them to be away from home for a longer period. As a result, they are less productive than their male colleagues, who may gain greater domestic support (Olusanya et al., 2021). These lost opportunities hinder their recognition and advancement in their careers. By presuming their crucial position in the family, the sociocultural system hinders the research productivity and career advancement of women academics. Hence, the underrepresentation of women academics in leadership roles as well as the gender inequality in academia cannot be overemphasized (Herbst, 2020). Women in a

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traditional society like Nigeria, are expected to carry out their family and domestic responsibilities, which, according to (Neale and Ozkanli, 2010; Nguyen, 2013), hinder their ability to pursue academic careers. The result of the study by (Abubakar, 2019) found that socio-cultural factors such as patriarchy, gender discrimination, early marriage, role stereotypes, and household responsibilities are challenges that affect women academics' career advancement in Nigerian universities. Based on this, the first hypothesis is

H1: Socio-cultural factors contribute to gender inequality in research productivity and career advancement of women academics in Nigerian Universities.

Institutional Barriers to Women Academics` Research Productivity and Career Advancement

Institutional practices remain a major barrier to women academics in Africa, resulting to gender inequality in their career advancement and research productivity. Several studies have demonstrated that research productivity and career advancement of women academics are significantly influenced by institutional factors. For instance (Aiston and Jung, 2015) claimed that apart from the family-related factors, structural and systemic biased policies within the university negatively also affect the research productivity of women academics. Practices such as Gender inequality in employment, tasks distribution, inadequate support systems, such as suitable childcare facilities worsen the assumptions that family and domestic responsibilities create structural and systemic impediments to research productivity career advancement of women academics. Because of lack of institutional family-friendly support policies, such as flexible work schedules, on-site childcare, and sufficient maternity and parental leave entitlements, women academics find it difficult to balance work and family obligations.

The result of the study carried out by (Karam and Afiouni, 2014) showed that maternity leave periods were brief and that only ten of the 234 universities investigated had on-site childcare. Similarly, (Makama, 2003; Okpe, 2005) argued that the current structure in Nigerian higher institutions has impeded women academics' ability to develop their careers. In the same vein, (Astegiano et al., 2019), also claimed that the Science, Technology, Engineering and Mathematics (STEM) field which is predominantly dominated by the male academics poses socio-psychological barriers to women academics. In the same vein, the result of the studies carried out by (Bland et al., 2005; Shin and Cummings, 2010) showed that among other institutional factors, research output was increased by mentorship and adequate time dedicated to research activities. Quality time devoted to research work is a crucial factor that enhance research productivity of academics. Therefore, inadequate mental capacity and lack of quality time committed to research can result to poor research outputs (Okeke-Uzodike and Ogbu, 2021) which ultimately, affects the overall quality of the research contributions of women academics within the research landscape. Women's scholarly output and visibility in their field are limited because they have less time and energy to devote to publishing, grant applications, or conference participation (Tushabe et al., 2023). Consequently, women's participation in joint research is impeded and their morale is undermined. Collaboration in research, especially collaboration with international colleagues has been acknowledged as one of the factors that influences research productivity of academics (Kwiek, 2016; Nguyen et al., 2017; Akbaritabar et al., 2018; Vuong et al., 2019). In most countries, women academics are negatively impacted by cultural stereotypes that are related to research collaboration with their male counterparts, which affect their research productivity (Abramo et al., 2013). In addition, women academics encounter collaboration and international publication difficulties because of gender inequality in networking as well as absence of networking (Huang, 2019). Explicit discrimination such as exclusionary work environment in most of the institutions have also been identified as barrier to women academics` career progression and research productivity. For instance, women academics encounter elusive exclusion from policymaking and leadership positions as well as the subsequent undervaluing of their contributions (Odejomi and Babalola, 2020).

In most institutions, the requirements for promotion do not consider the unique challenges faced by women academics, such as time spent in mentoring and unequal service positions, or career disruptions brought on by family responsibilities. When promotion and leadership criteria place a strong focus on research production, women who bear disproportionate service obligations are at a systemic disadvantage in comparison to men, who might be given greater institutional support for their research endeavours. Similarly, (Olusanya et al., 2021) argued that although these positions are essential to the efficient operation

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of organizations, the overbearing expectations imposed on women might significantly hinder their capacity to concentrate on research, writing, and participating in academic activities. Women may be forced to make tough decisions because of this circumstance, such as cutting back on their work hours or withdrawing from challenging research projects, which may ultimately hinder their productivity and ability to advance their careers. Furthermore, the result of the study conducted by (Czech et al., 2024) showed that women may not likely get promoted since a fair increase in the quality of research leads to a diminutive increase in women`s possibility of being promoted.

Women academics in Africa often face challenges in obtaining funding for research. Thus, they receive fewer research grants and have fewer high impact factor publications which are the criteria for their academic career progression (Olusanya et al., 2021; Okeke-Uzodike and Ogbu, 2021; Witteman et al., 2019; Burns et al., 2019; Lundine et al. 2018; Filardo et al. 2016). Lack of access to support networks can strip women academics of strategic direction, hinder their prospects for collaboration and present them with more hurdles to leadership positions. Based on this, the second hypothesis is

H2: Institutional factors contribute to gender inequality in research productivity and career advancement of women academics in Nigerian Universities.

Methodology

Research Design, Population and Sampling

This study adopted quantitative research approach, employing survey research design to examine the determinants of gender inequality in research productivity and career advancement among women academics. To ensure a strong and representative sample, three faculties were purposively selected based on their disciplinary categorizations: Faculty of Engineering, Faculty of Physical Sciences, and Faculty of Social Sciences. The justification for choosing these faculties is based on their discrete disciplinary orientations—Physical Sciences and Engineering signify the hard sciences, while Social Sciences represent the soft sciences. This provides a relative viewpoint on gender inequality across different academic fields. A proportionate stratified sampling technique was utilized to determine the number of women academics to be studied within each faculty, ensuring fair representation on all disciplines. Consequently, a simple random sampling method was employed in choosing the respondents from each faculty to reduce selection bias and improve the generalizability of findings.

A structured questionnaire, using a 5-point Likert scale to capture respondents' perceptions on gender inequality factors affecting research productivity and career advancement was the instrument for primary data collection. The study population comprised 202 women academics from the three selected faculties. To determine an appropriate sample size, the Taro Yamane (1967) formula for sample size determination was applied, yielding a final sample of 134 women academics.

Techniques of Data Analysis

Analysis of the research data employed descriptive statistics and principal component method of factor analysis. The descriptive statistics provided quantitative explanation of the behaviour of the data series. However, the factor analysis revealed the latent factors contributing gender inequality in research productivity and career advancement of women academics in Nigerian universities. The choice of factor analysis is underpinned to its ability to identify patterns, reduce dimensionality, and uncover underlying structures in complex datasets. So, in extracting the key factors engendering inequality in research productivity and career advancement of women academics in Nigerian universities, the principal component method of factor analysis was used. This technique worked on the assumptions that the variables were linearly related, the data were normally distributed, and the variance were similar (or homogeneous), and samples used were independently selected. On these grounds, the PC results were accurate. In the component selection, eigenvalues greater than 1 (Eigenvalue>1) and scree plot methods were applied. In addition, in the PCA result, the eigenvalues were obtained while selection of components was by eigenvalues greater than 1 and using the elbow of scree plot; thereby, retaining only components

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with high explained variances.

Underlying mathematical equations for estimation of the principal components are as follows:

$$\sum = \frac{1}{n}\sum_{i=1}^{n}(F_i - \underline{F})(F_i - \underline{F})^1 \quad (3.1)$$

Where $\sum represents\ the\ covariance\ matrix$, F_i is the data vector, $\underline{F}$ is the mean vector, and n is the number of observations.

$$\sum E_v = \lambda E_v \quad (3.2)$$

Where Σ is the covariance matrix as defined in (3.1), λ represent the eigenvalue, while E_v is the eigenvector.

$$Propotion\ of\ explained\ varinace = \frac{\lambda_i}{\sum_{i=1}^{t}\lambda_i} \quad (3.3)$$

Where λ_i is the i-th eigenvalue, and t is the total number of eigenvalues.

$$Principal\ Component\ Score\ (PC)_j = F \times (E_v)_j \quad (3.4)$$

Where F is the original data matrix, $(E_v)_j$ is the j-th eigenvector.

$$Total\ Varinace\ Explained\ = \sum_{j=1}^{k}\left(\frac{\lambda_i}{\sum_{i=1}^{t}\lambda_i}\right)_j \quad (3.5)$$

Where k stands for number of principal components used in reconstructing the data series.

Results

Table 1: Summary of Descriptive Results

Parameter/Variables	***Results [n=128; total number correctly filled and returned]***
Years of experience as a researcher	*3.1% have worked for 1-3 years* *0.8% have worked for 3-5 years* *64.8% have worked for 5-10 years* *31.3% have worked for more than 10 years*
Marital status	*18.0% are single* *78.1% are married* *3.9% are divorced*
Highest academic qualification	*59.4% are Ph.D. holders* *40.6% have Master's degree*
Academic Rank	*3.9% are Professors* *3.9% also are Assoc. Professors* *35.2% are Senior Lecturers* *48.4% are Lecturer 1* *5.5% are Lecturer II* *3.1% are Assistant Lecturers*
Departments	*20.3% of the respondents are from Economics Department* *10.2% are from Sociology and Anthropology* *6.3% are from Mathematics* *7.0% are from Department of Pure and Industrial Chemistry*

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	11.7% are from Computer Science *9.4% are from Physics* *14.8% are from Engineering* *7.0% are from Statistics* *13.3% are from Psychology Department.*

Source: Extract from Field Survey, 2024

The descriptive result highlights that the respondents are well experienced as about 96.1% indicated to have been a researcher for 5 years and above. 78.1% are married, 18.0% are single while 3.9% are divorced. 59.4% are Ph.D. holders while 40.6% have Master's degree. Majority of the respondents have academic rank of lecturer 1 (48.4%) and senior lecturers (35.2%). Only a very few 5.5%, 3.9%, 3.9% and 3.1% are Lecturer II, Professors, Associate Professors, and Assistant lecturers respectively. Various Departments captured by the study include Economics Department (20.3%), Sociology and Anthropology (10.2%), Mathematics (6.3%), Pure and Industrial Chemistry (7.0%), Computer Science (11.7%), Physics (9.4%), Engineering (14.8%), Statistics (7.0%), and Psychology Department (13.3%). This highlights good representation of the Departments in the study.

Table 2: Variable labels and Coding

S/N	Variable labels	Coding
1	Balancing research commitments with family obligations such as childcare and domestic responsibilities significantly hinder my ability to publish articles in good academic journals.	F_1
2	Societal expectations of women's domestic roles limit the time and energy I can dedicate to research projects.	F_2
3	I believe my research productivity would be higher if there were more support systems available to manage household responsibilities.	F_3
4	Traditional gender roles often make it challenging for me to prioritize research activities over other commitments.	F_4
5	In my experience, societal expectations regarding women's roles at home negatively impact their ability to be productive researchers.	F_5
6	Managing work and domestic duties affect my research productivity as well as my career development	F_6
7	Raising and caring for young children largely limit women academics' research productivity and academic career development	F_7
8	Cultural- related biases in collaborating with male academics negatively affect women academics` research productivity	F_8
9	Lack of networking opportunities affects women academics' collaboration patterns.	F_9
10	The societal expectation that women's family obligations supersede their research career can be a hindrance to attending conferences or engaging in collaborative research that require time commitments	F_{10}
11	Predominance of male-oriented research environments, especially in STEM discipline, create series of socio-psychological barriers for women academics	F_{11}
12	Family obligation as well as gender bias affect women academics' research productivity	F_{12}
13	Excess workload and a lack of suitable support system affect women academics' research productivity	F_{13}
14	Time devoted to caregiving responsibilities for family dependents negatively impact research productivity	F_{14}
15	The socio-cultural expectation that assume women`s fundamental role within the family and domestic setting limit their time and energy to focus on publishing thereby hindering women academics scientific research productivity	F_{15}
16	Dedicating extensive hours to non-research related activities such as teaching and administration affects the level of my research output	F_{16}
17	Spending longer hours to access the university's equipped laboratory facilities significantly affects the quality and level of women academics' research output.	F_{17}
18	I collaborate often with my male colleagues to publish in high impact factor journal.	F_{18}
19	Collaboration in research work with colleagues enhances women academics' research productivity.	F_{19}

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20	Collaboration in research work has enabled me to produce a first-authored or corresponding authored impact factor journal article.	F_{20}
21	Taking the initiative to lead grant applications empowers me to pursue my research interests and potentially increase my publication output.	F_{21}
22	Unavailability of on-campus childcare facilities affects the number of hours I dedicate to my research work hours as a nursing mother.	F_{22}
23	Access to a good academic mentor has provided valuable guidance and support, ultimately impacting on my research productivity.	F_{23}
24	I have accessed the University Institution Based Research grant [TETFUND] in the last five years.	F_{24}
25	Access to research funding has enabled me to publish in high impact factor journal.	F_{25}
26	My Institutions` academic promotion policy, which values research contributions alongside teaching significantly, affect my research output.	F_{26}
27	Teaching/Excess workload and students` supervision significantly affect the time I dedicate to my research work thereby reducing the level of my research productivity.	F_{27}
28	Juggling my non-research related workload and research work significantly affects the level of my research output.	F^{28}
29	The way I prioritize my workload at UNN significantly impacts the volume of research I am able to produce.	F_{29}
30	Feeling overwhelmed with Teaching/Excess workload and students' supervision hinders my ability to progress in my research work.	F_{30}
31	A well-organised approach to my responsibilities at UNN contributes to my success in publishing impactful research work.	F_{31}

The variable labels and codes are presented in table 3 above. In the subsequent analysis, the variable codes were used.

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Table 3: Result of Inter-correlations among the variables

Var.	M±SD	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22	F23	F24	F25	F26	F27	F28	F29	F30	F31
F_1	4.30±0.896	1																														
F_2	4.16±1.155	0.737	1																													
F_3	4.40±0.947	0.717	0.577	1																												
F_4	3.82±1.248	0.415	0.72	0.622	1																											
F_5	3.96±0.853	0.359	0.489	0.7	0.809	1																										
F_6	3.98±1.075	0.238	0.023	-0.151	-0.193	-0.332	1																									
F_7	4.59±0.493	-0.036	-0.185	-0.019	-0.132	0.058	-0.359	1																								
F_8	2.50±1.204	0.238	0.094	-0.01	-0.12	-0.15	0.58	0.127	1																							
F_9	4.24±0.739	-0.223	-0.114	0.036	0.003	0.107	-0.715	0.139	-0.802	1																						
F_{10}	4.41±0.493	-0.17	-0.1	0.072	0.146	0.293	-0.72	0.685	-0.35	0.265	1																					
F_{11}	3.32±1.224	0.039	0.126	0.152	0.048	0.13	-0.31	0.297	0.547	-0.1	0.083	1																				
F_{12}	4.19±0.392	0.166	-0.1	-0.11	-0.35	-0.3	0.459	0.397	0.598	-0.16	-0.4	0.269	1																			
F_{13}	4.63±0.484	-0.255	-0.113	0.034	0.149	0.222	-0.727	0.127	-0.948	0.756	0.629	-0.426	-0.631	1																		
F_{14}	4.41±0.493	-0.168	-0.103	0.072	0.146	0.293	-0.723	0.685	-0.348	0.265	1	0.083	-0.397	0.629	1																	
F_{15}	3.41±1.186	-0.016	-0.085	-0.021	-0.233	-0.146	-0.146	0.201	-0.03	0.578	-0.313	0.306	0.647	-0.082	-0.313	1																
F_{16}	4.41±0.572	-0.118	-0.053	0.237	0.231	0.203	-0.344	-0.066	-0.247	0.166	0.24	0.057	-0.386	0.286	0.24	-0.154	1															
F_{17}	4.17±0.743	0.415	0.397	0.496	0.572	0.683	-0.067	0.213	0.05	-0.151	0.301	0.003	-0.111	0.061	0.301	-0.275	0.064	1														
F_{18}	3.25±1.507	-0.07	-0.17	-0.14	-0.18	-0.05	-0.11	0.404	0.178	-0.17	0.379	0.174	0.031	-0.02	0.379	-0.19	-0.26	0.305	1													
F_{19}	4.20±0.964	-0.097	-0.132	-0.122	-0.223	-0.289	-0.035	0.134	0.042	-0.113	0.194	0.003	-0.076	0.031	0.194	-0.192	0.09	0.079	0.615	1												
F_{20}	3.24±1.477	-0.203	-0.056	-0.32	-0.213	-0.266	-0.156	0.166	0.016	-0.016	0.227	0.117	-0.077	0.064	0.227	-0.097	0	-0.059	0.698	0.537	1											
F_{21}	3.00±1.437	-0.229	-0.227	-0.295	-0.311	-0.16	-0.048	0.266	0.114	-0.054	0.173	0.112	0.117	-0.035	0.173	0	-0.08	-0.015	0.761	0.521	0.865	1										
F_{22}	4.34±0.788	0.516	0.488	0.497	0.338	0.228	0.116	-0.357	0.068	-0.06	-0.318	0.074	-0.049	-0.164	-0.318	0.043	0.193	0.18	-0.481	-0.099	-0.352	-0.435	1									
F_{23}	3.27±1.274	-0.1	-0.303	-0.211	-0.335	-0.224	0.059	0.279	0.178	-0.087	0.086	0.087	0.244	-0.119	0.086	0.068	-0.233	-0.031	0.754	0.277	0.663	0.765	-0.386	1								
F_{24}	2.51±1.565	0.094	0.212	-0.056	0.081	0.096	-0.265	0.453	-0.082	0.153	0.408	0.064	0.056	0.206	0.408	0.041	-0.294	0.291	0.706	0.297	0.65	0.663	-0.462	0.584	1							
F_{25}	2.80±1.563	0.185	-0.01	-0.01	-0.15	-0.03	-0	0.424	0.199	-0.07	0.193	0.141	0.29	-0.1	0.193	0.089	-0.3	0.242	0.822	0.38	0.61	0.755	-0.41	0.789	0.824	1						
F_{26}	3.08±1.529	-0.18	-0.37	-0.28	-0.34	-0.25	0.046	0.37	0.16	-0.13	0.217	0.021	0.193	-0.06	0.217	-0.06	-0.01	0.038	0.813	0.495	0.728	0.824	-0.61	0.847	0.623	0.817	1					
F_{27}	4.41±0.495	-0.04	-0.26	0.134	-0.13	0.001	0.081	0.125	-0.09	0.057	0.043	-0.23	0.104	0.091	0.043	0.032	0.344	-0.06	-0.44	-0.27	-0.45	-0.4	0.202	-0.3	-0.56	-0.46	-0.26	1				
F_{28}	4.28±0.453	0.272	0.255	0.307	0.308	0.263	-0.19	0.265	0.096	-0.09	0.322	0.206	-0.07	0.03	0.322	-0.16	0.079	0.122	-0.25	-0.07	-0.33	-0.39	0.346	-0.39	-0.23	-0.35	-0.41	0.237	1			
F_{29}	3.92±0.673	-0.1	-0.09	-0.08	-0.09	-0.02	-0.23	0.394	-0.35	0.37	0.348	-0.27	0.058	0.412	0.348	0.145	0.067	0.192	0.158	0.088	0.234	0.22	-0.07	0.14	0.25	0.179	0.158	0.373	-0	1		
F_{30}	3.72±1.096	0.302	0.45	0.178	0.281	0.04	-0.16	0.26	-0.09	0.155	0.21	0.005	0.064	0.148	0.21	0.093	0.158	0.139	0.112	0.09	0.385	0.229	0.205	0.247	0.456	0.288	0.136	-0.06	0.028	0.403	1	
F_{31}	3.27±1.139	0.33	0.266	0.25	0.178	0.197	0.126	0.181	0.08	0.029	-0.06	-0.04	0.309	-0.09	-0.06	0.21	-0.15	0.304	0.414	0.139	0.22	0.361	-0.07	0.481	0.52	0.616	0.421	-0.16	-0.29	0.093	0.526	1

The inter-correlation analysis is a diagnostic test, measuring the degree of association among the independent variables. The mean and standard deviations indicate acceptance of all the factors contributing gender inequality in research productivity and career advancement of women academics in Nigerian universities. Having descriptively proven (mean≥3.0) that all the above (outlisted) factors contribute to gender inequality in research productivity and career advancement of women academics in Nigerian universities, the researcher carried out a factor analysis to extract the key determinant factors contributing greatly in the phenomenon. Meanwhile, before the factor analysis proper, diagnostic test of inter-relatedness was conducted among the descriptively identified factors. The result as presented in table 3 shows that the variables are correlated among themselves. This finding confirmed and strengthened the need to conduct factor analysis so as to collapse and simplify the large list to its smallest possible and major contributory

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factors. The factor analysis used Principal Component (PC) method, starting with the scree plot presentation in fig. 1 below.

Scree Plot Analysis

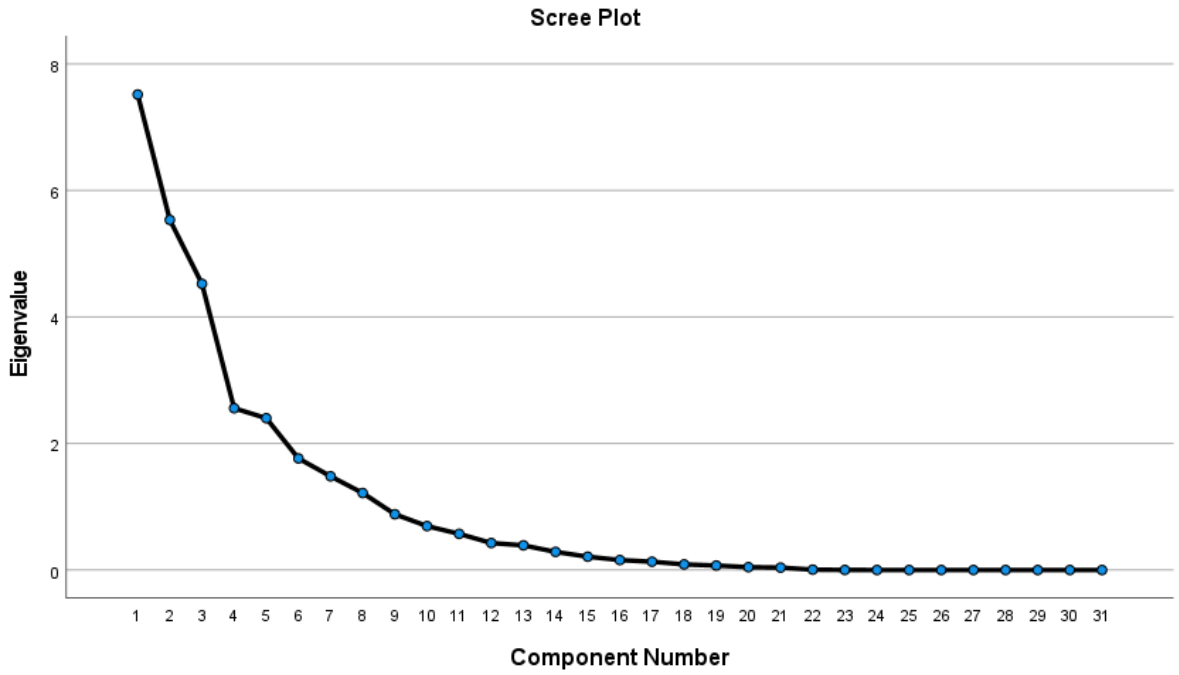

Figure 1: Scree Plot of factors contributing gender inequality in research productivity and career advancement of women academics in Nigerian universities

The scree plot in fig. 1 above has its elbow at component number 8. However, after extraction of eight (8) components, the plot shows a level off, indicating that out of the comprehensive list of 31, only 8 factors were significant in contributing gender inequality in research productivity and career advancement of women academics in Nigerian universities. The study therefore went further to identify these eight critical factors contributing gender inequality in the system. Outcome of the analysis showing the principal component was presented in table 4 below:

Table 4: Component Factor Analysis Result

Variable codes	Component								Total Extraction
	1	2	3	4	5	6	7	8	
F1	-.227	.047	**.807**	.133	-.074	.152	.016	-.145	.773
F2	-.281	.238	.771	.024	-.245	-.134	.123	-.310	.920
F3	-.335	.403	.654	.090	.002	.032	.034	.290	.797
F4	-.336	.529	.596	-.141	-.162	-.115	-.071	.068	.817
F5	-.233	.600	.524	-.065	.017	-.114	-.284	.340	.903
F6	-.158	-.803	.244	-.144	-.135	.433	-.130	-.070	.978
F7	.496	.312	.045	.333	**.676**	.131	-.115	-.099	.954
F8	.057	-.670	.483	-.141	.511	-.016	.089	.031	.975
F9	.027	.548	-.409	.597	-.266	-.262	-.003	.057	.968
F10	.372	.788	-.131	-.155	.399	.048	-.052	-.097	.976
F11	.099	-.081	.295	.101	.577	-.612	.298	.173	.939
F12	.156	-.601	.222	.615	.348	.104	-.079	-.002	.951
F13	.079	**.824**	-.445	.064	-.288	.030	-.092	-.059	.983

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F14	.372	.788	-.131	-.155	.399	.048	-.052	-.097	.976
F15	.020	-.187	-.074	**.895**	.018	-.317	.045	.118	.958
F16	-.191	.412	-.150	-.140	.026	.127	**.557**	-.358	.866
F17	.059	.425	.610	-.165	.059	.235	-.270	.182	.747
F18	.891	.025	.196	-.242	.078	.003	-.080	.043	.906
F19	.528	-.004	.001	-.318	-.024	.104	.411	-.059	.564
F20	.815	.006	.001	-.158	-.193	-.083	.384	-.100	.890
F21	.885	-.104	.031	-.075	-.107	-.027	.182	.105	.856
F22	-.616	.041	.389	.102	-.100	.095	.452	-.046	.769
F23	.830	-.212	.095	.065	-.073	.061	.004	.157	.781
F24	.807	.257	.303	.102	-.157	-.142	-.163	-.227	.942
F25	.866	-.062	.366	.103	-.056	.001	-.130	.052	.921
F26	**.907**	-.145	.009	-.099	-.002	.143	.016	.244	.934
F27	-.414	.093	-.276	.253	.303	**.650**	.067	.253	.902
F28	-.382	.330	.180	-.070	.564	.043	.135	**.539**	.758
F29	.281	.381	-.170	.400	-.007	.537	.084	-.145	.729
F30	.275	.311	.375	.357	-.204	.216	.452	-.264	.803
F31	.436	-.006	.535	.347	-.299	.175	-.095	.193	.763
Eigenvalue	**7.517**	**5.535**	**4.524**	**2.558**	**2.400**	**1.765**	**1.482**	**1.217**	
%age of explained var.	**24.25**	**17.86**	**14.60**	**8.25**	**7.74**	**5.69**	**4.78**	**3.93**	
Cumulative %age	**24.25**	**42.10**	**56.70**	**64.95**	**72.69**	**78.38**	**83.16**	**87.09**	

The extracted components are: My Institutions' academic promotion policy which values research contributions alongside teaching significantly affect my research output (F26) from component 1, Excess workload and a lack of suitable support system affect women academics' research productivity (F13) from component 2, Balancing research commitments with family obligations such as childcare and domestic responsibilities significantly hinder my ability to publish articles in good academic journals. (F1) from component 3, The socio-cultural expectation that assume women`s fundamental role within the family and domestic setting hinder women academics scientific research role and productivity (F15) from component 4, Raising and caring for young children largely limit women academics' research productivity and academic career development (F7) from component 5, Teaching/Excess workload and students' supervision significantly affect the time I dedicate to my research work thereby reducing the level of my research productivity (F27) from component 6, Dedicating extensive hours to non-research related activities such as teaching and administration affects the level of my research output (F16) from component 7, and Juggling my non-research related workload and research work significantly affects the level of my research output (F28) from component 8.Juggling my non-research related workload and research work significantly affects the level of my research output (F28) from component 8. These factors collectively accounted for 87.09% of the total variations in research productivity and career advancement of women academics in University of Nigerian Nsukka.

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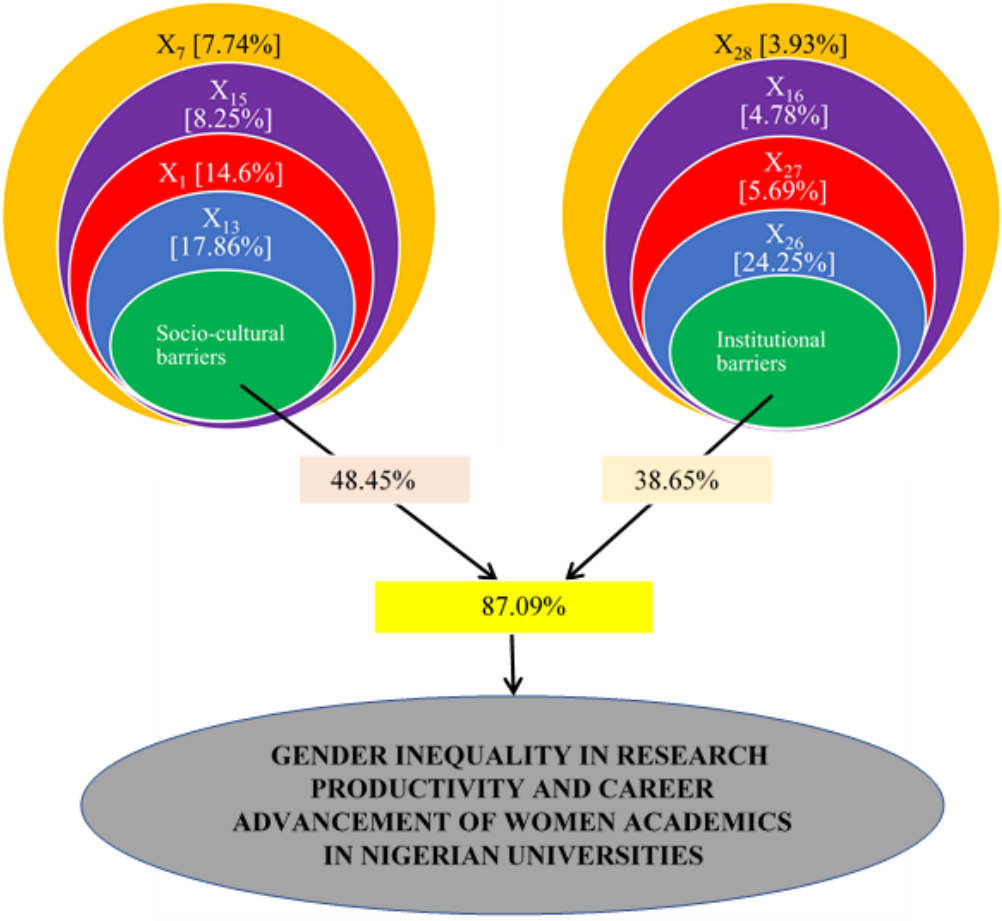

Figure 2: Diagrammatic representation of major contributing factors to gender inequality in research productivity and career advancement of women academics in Nigerian universities.

Source: Researcher's design (2024)

Discussion

The result from the analysis showed that this factor - my institutions' academic promotion policy which values research contributions alongside teaching significantly affect my research output (F26) from component 1 contributes to the factors that engender inequality in research productivity and career development of women academics. This implies that when promotion and leadership criteria place a strong emphasis on research productivity, women who bear disproportionate service obligations are at a systemic disadvantage in comparison to men, who might be given greater institutional support for their research endeavours. The finding aligns with the result of the study by (Czech et al., 2024) which revealed that women are more unlikely to be promoted since a proportionate increase in the quality of research results to a little increase in women`s probability of being promoted. Also, the university's appraisal of academics' scientific publications for promotion utilizes the same scale for both gender groups, and based on this the women might have been going extra mile to write despite their other social duties in order to gain their promotion.

The result from the analysis also revealed excess workload and a lack of suitable support system affect women academics' research productivity (F13) from component 2 as one of the most impacting factors. This indicates that any institutional policy that is not family friendly could impact negatively on the research productivity and career development of women academics. This is consistent with the study of (Olusanya et al., 2021) that submitted that though these workloads are essential for institutions to function effectively,

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the undue demands made on women could impede their research and writing capacity as well as negatively affect their research productivity. This in turn, push women to take tough decision such as staying away from challenging research projects or devote little time to their academic work, which would ultimately hinder their productivity and ability to advance in their careers. Furthermore, women's professional advancement in academia is impacted by deteriorating institutional circumstances and a weak research climate.

The result of the analysis also revealed Balancing research commitments with family obligations such as childcare and domestic responsibilities significantly hinder my ability to publish articles in good academic journals (F1) from component 3 as well as Raising and caring for young children largely limit women academics' research productivity and academic career development (F7) from component 5, as factors engendering inequality in women academics research productivity and academic career development. The findings underscore the significant impact of traditional roles on women academics' ability to balance research with domestic responsibilities and childcare. Implementing support systems such as on-campus childcare facilities and flexible work arrangements would enhance research productivity and career advancement of women academics in Nigerian universities. These align with the study of (Sougou et. al, 2022) which identified familial and communal obstacles as significant challenges to career advancement of women in Ghana, Senegal, Burkina Faso, Niger, and Mali. The socio-cultural expectation that assume women`s fundamental role within the family and domestic setting limit their time and energy to focus on publishing thereby hindering women academics scientific research productivity (F15) from component 4 was also extracted as one the major components of factor analysis. This implies that women academics find it challenging to dedicate a significant amount of time to research as a result of the societal expectations concerning gender roles and household chores, which in turn, affects their career advancement and research productivity. These results support the conclusions of (Ojo-Ebenezer and Olofin, 2022) that societal expectations concerning household chores frequently result in work-family conflicts for women academics in Nigeria.

The result of the analysis showed that teaching/excess workload and students' supervision significantly affect the time I dedicate to my research work thereby reducing the level of my research productivity (F27) from component 6 emerge as one of the impacting factors affecting women academics. This means that women had no time to do research due to excessive teaching loads and student project supervision. Women usually have heavier teaching load and student project supervision because they are mostly at the lower level of academic rank and these affect women negatively in building research capacity. This result revealed that unfair workload pressure is a major obstacle to women academics' productivity and career advancement. Furthermore, teaching workload and research obligations are unequally distributed as a result of the policies in Nigerian universities. Suggesting the need for policy changes to allow women academics to focus on their research work. The above finding corroborates the research of (Tushabe et al., 2023) that found that women research output visibility in their field are limited because they have less time and energy to devote to publishing, grant applications, or conference participation. Dedicating extensive hours to non-research related activities such as teaching and administration affects the level of my research output (F16) from component 7. This supports the research of (Okeke-Uzodike & Ogbu, 2021) which concluded that inadequate mental capacity and lack of quality time committed to research could result to poor research outputs which ultimately, affects the overall quality of the research contributions of women academics within the research landscape. Juggling my non-research related workload and research work significantly affects the level of my research output (F28) from component 8. This also uncovers a complex relationship between managing non-research related workloads and research output among women academics. The overwhelming majority of respondents find it challenging to balance childcare, household chores with academic work, which suggests the necessity for institutional support like childcare centers or flexible work schedules. This result is consistent with the result of study conducted by (Tushabe et al., 2023) which found that women academics experience mental health issues as a result of balancing their academic work with household and family obligations, which eventually results in fatigue and burnout.

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Conclusion

This study has provided strong empirical evidence that both sociocultural and institutional factors significantly contribute to gender inequality in the research productivity and career advancement of women academics in Nigerian universities. The findings reveal that deeply entrenched gender norms continue to place disproportionate household and caregiving responsibilities on women, limiting their ability to compete equally in academia. Additionally, institutional biases, discriminatory promotion policies, and a lack of gender-supportive initiatives further hinder women's academic progress, reinforcing systemic inequalities. Breaking these barriers requires urgent institutional reforms, including family-friendly policies, equitable workload distribution, and targeted research support for women academics. Universities must actively dismantle gendered stereotypes and create a more inclusive academic environment where women can thrive. Without deliberate interventions, the glass ceiling in Nigerian academia will remain firmly in place, stifling both gender equity and overall research productivity. It is time for transformative action.

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