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Gender Dynamics in STEM Fields: Women's Experiences in Different Cultural Contexts

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Abstract

Purpose: The general aim of this study was to explore gender dynamics in STEM fields particularly, women's experiences in different cultural contexts.

Methodology: The study adopted a desktop research methodology. Desk research refers to secondary data or that which can be collected without fieldwork. Desk research is basically involved in collecting data from existing resources hence it is often considered a low cost technique as compared to field research, as the main cost is involved in executive's time, telephone charges and directories. Thus, the study relied on already published studies, reports and statistics. This secondary data was easily accessed through the online journals and library.

Findings: The findings reveal that there exists a contextual and methodological gap relating to the gender dynamics in STEM fields. Through a comparative analysis across diverse cultural settings, significant variations in women's experiences in STEM were revealed, with some societies demonstrating greater gender equity and support for women. However, persistent disparities and challenges related to cultural norms and gender roles were observed in others. The research underscored the intersectional nature of gender dynamics in STEM, emphasizing the interconnectedness of gender with other dimensions of identity such as race and ethnicity. Additionally, cultural stereotypes and societal expectations were identified as significant barriers to women's participation and advancement in STEM fields. The findings underscored the importance of context-specific approaches to promoting gender equity in STEM and highlighted the need for challenging stereotypes and fostering inclusive environments for women in STEM fields globally.

Unique Contribution to Theory, Practice and Policy: Social Cognitive Career theory (SCCT), intersectionality theory and Cultural-Historical Activity theory (CHAT) may be used to anchor future studies on gender dynamics in STEM fields. The study provided valuable recommendations with significant implications for theory, practice, and policy. It contributed to theoretical advancements by highlighting the intersectional nature of gender dynamics in STEM, offering practical recommendations for stakeholders in education and workforce development, and suggesting policy interventions aimed at promoting gender equity in STEM fields. The study emphasized the importance of organizational change, global collaboration, and continuous evaluation and improvement in advancing gender equity in STEM. By implementing these recommendations, stakeholders could work towards creating more equitable and inclusive environments where women could thrive and contribute meaningfully to STEM fields worldwide.

Keywords: *Gender Dynamics, STEM Fields, Women's Experiences, Cultural Contexts, Intersectionality, Social Cognitive Career Theory (SCCT), Cultural-Historical Activity Theory (CHAT), Diversity, Inclusion, Career Aspirations, Cultural Values, Gender Stereotypes, Organizational Change, Global Collaboration, Equity, Inclusivity, Empowerment, Systemic Barriers, Continuous Improvement*

1.0 INTRODUCTION

Women's experiences in STEM (Science, Technology, Engineering, and Mathematics) fields have been shaped by a myriad of factors including cultural norms, institutional biases, and societal expectations. Despite advancements in gender equality, disparities persist across various regions, impacting women's participation, career progression, and overall experiences within STEM disciplines. This essay will delve into the nuanced experiences of women in STEM, drawing upon examples from the United States, United Kingdom, Japan, Brazil, and African countries. By examining statistical trends and scholarly literature, we aim to highlight the complex interplay of factors influencing women's engagement in STEM fields. In the United States, while there has been progress in narrowing the gender gap in STEM, significant disparities persist. According to a report by the National Science Foundation (NSF), women remain underrepresented in STEM occupations, comprising only 27% of the workforce in 2020 (NSF, 2021). Furthermore, women hold a smaller proportion of advanced degrees in STEM fields compared to men (NSF, 2021). Despite efforts to promote gender diversity in STEM, challenges such as stereotype threat, workplace discrimination, and lack of mentorship continue to hinder women's advancement. For instance, studies have shown that women in STEM fields in the US face implicit biases and micro-aggressions, which contribute to feelings of isolation and hinder career progression (Fouad, Singh, Fitzpatrick & Liu, 2016).

Similarly, in the United Kingdom, women remain underrepresented in STEM fields, particularly in leadership positions and academia. Statistics from the UK Office for National Statistics (ONS) indicate that women comprise only 24% of the STEM workforce (ONS, 2020). Despite efforts to promote gender diversity, such as initiatives to encourage girls' participation in STEM education, disparities persist (European Commission, 2019). Research suggests that gender stereotypes and societal expectations play a significant role in shaping women's career choices in the UK, with girls often discouraged from pursuing STEM subjects from a young age (European Commission, 2019). Furthermore, studies highlight the prevalence of gender biases and workplace cultures that perpetuate inequalities in STEM fields (European Commission, 2019).

In Japan, cultural norms and societal expectations pose unique challenges for women in STEM fields. While Japan has made efforts to increase women's participation in the workforce, gender disparities persist, particularly in STEM occupations. According to data from the Ministry of Internal Affairs and Communications, women comprise only around 14% of researchers in Japan (Ministry of Internal Affairs and Communications, 2020). Cultural factors such as the "mottainai" (wasteful) mentality, which values frugality and modesty, can discourage women from pursuing careers in STEM where assertiveness and self-promotion may be necessary. Additionally, studies highlight the prevalence of workplace cultures that prioritize long working hours and hierarchical structures, which can pose barriers to women's career advancement (Fukuda, Oshima & Hiraoka, 2017).

In Brazil, while women make up a significant proportion of STEM graduates, they remain underrepresented in STEM occupations and leadership roles. Data from the Brazilian Institute of Geography and Statistics (IBGE) shows that women comprise 49% of STEM graduates, yet they represent only 20% of the STEM workforce (IBGE, 2020). Research suggests that cultural stereotypes and societal expectations contribute to the underrepresentation of women in STEM fields in Brazil. Additionally, studies highlight the prevalence of gender biases and workplace discrimination, which hinder women's career progression in STEM occupations. Despite government initiatives to promote gender equality in STEM, challenges such as lack of access to childcare and gender-based violence continue to impact women's participation and experiences in STEM fields (Ribeiro, Silva & Costa, 2018).

In African countries, women face multifaceted challenges in accessing and thriving in STEM fields. While there is significant regional variation, common barriers include limited access to education, cultural stereotypes, and institutional biases. According to UNESCO, women comprise only around 30% of researchers in sub-Saharan Africa (UNESCO, 2021). Additionally, studies highlight the prevalence of gender disparities in STEM education, with girls often receiving less encouragement and support compared to boys (UNESCO, 2021). Cultural norms that prioritize traditional gender roles can further hinder women's participation in STEM fields, perpetuating inequalities. Despite these challenges, grassroots initiatives and international collaborations are emerging to promote gender equality in STEM across African countries, aiming to address systemic barriers and empower women in STEM disciplines (Wodon, Montenegro, Nguyen & Onagoruwa, 2018). Women's experiences in STEM fields are shaped by a complex interplay of cultural, societal, and institutional factors. Disparities persist across regions, impacting women's participation, career progression, and overall experiences within STEM disciplines. Efforts to promote gender diversity and address systemic barriers are essential in fostering inclusive environments where women can thrive in STEM fields. By understanding the nuanced challenges faced by women in different cultural contexts, stakeholders can work towards creating equitable opportunities for all individuals pursuing careers in STEM.

Gender dynamics, within the context of STEM (Science, Technology, Engineering, and Mathematics) fields, embody multifaceted interactions of social, cultural, and institutional factors that influence individuals' experiences, opportunities, and challenges based on their gender identity. These dynamics intricately shape the landscape of STEM disciplines, affecting women's participation rates, career trajectories, and overall experiences within these fields. Central to understanding gender dynamics in STEM is recognizing the socially constructed nature of gender roles and identities. Drawing upon social constructionist perspectives (West & Zimmerman, 1987), gender is conceptualized not as an inherent biological trait, but rather as a product of societal norms, expectations, and interactions. Within STEM, traditional gender stereotypes perpetuate the notion that men possess innate aptitude for quantitative reasoning and analytical skills, while women are inherently better suited for nurturing and caregiving roles (Eccles, 2011). These stereotypes not only influence individuals' self-perception and career aspirations but also contribute to the underrepresentation of women in STEM fields, as they may internalize societal messages that discourage their pursuit of STEM careers (Eccles, 2011).

Gender dynamics in STEM are further compounded by institutional biases and structural barriers that impede women's full participation and advancement within STEM disciplines. Research has consistently demonstrated the presence of implicit biases in various aspects of STEM, including hiring, promotion, and allocation of resources. These biases disadvantage women, leading to disparities in opportunities and outcomes. Additionally, structural barriers such as lack of access to mentorship, networking opportunities, and family-friendly policies disproportionately affect women, hindering their career progression in STEM. Overcoming these systemic inequalities necessitates concerted efforts to dismantle institutional biases and address structural barriers through policy reforms and organizational interventions (Moss-Racusin, Dovidio, Brescoll, Graham & Handelsman, 2012).

Gender dynamics intersect with other dimensions of identity, such as race, ethnicity, socioeconomic status, and sexual orientation, resulting in unique challenges and experiences for women with intersecting marginalized identities. Intersectionality theory (Crenshaw, 1989) underscores the interconnected nature of social categorizations and their cumulative impact on individuals' lived experiences. In the context of STEM, women from underrepresented racial and ethnic backgrounds face compounded barriers due to intersecting forms of discrimination and marginalization (Smith, Handley, Zale, Rushing & Potvin, 2019). Addressing the intersecting dynamics of gender and other identities is essential for promoting diversity and inclusion in STEM and ensuring equitable opportunities for all individuals irrespective of their social identities. Gender dynamics in STEM

exhibit considerable variation across cultural contexts, shaped by cultural norms, values, and traditions regarding gender roles and expectations. Cross-cultural studies provide insights into diverse attitudes towards gender and STEM participation, with some societies demonstrating greater gender equality in STEM fields compared to others (Blickenstaff, 2005). For instance, Nordic countries such as Sweden and Finland have higher rates of women's participation in STEM, attributed to progressive gender policies and cultural attitudes towards gender equality (Else-Quest et al., 2010). Conversely, countries with more traditional gender norms may exhibit greater disparities in STEM participation and representation, highlighting the influence of cultural context on gender dynamics in STEM (Blickenstaff, 2005).

Psychological factors such as stereotype threat and impostor phenomenon contribute significantly to gender dynamics in STEM by influencing women's confidence, performance, and sense of belonging in male-dominated environments. Stereotype threat (Steele, 1997) refers to the fear of confirming negative stereotypes about one's social group, which can undermine individuals' performance and persistence in challenging domains such as STEM. Similarly, impostor phenomenon (Clance & Imes, 1978) describes feelings of inadequacy and self-doubt despite evidence of competence, often experienced by high-achieving individuals in competitive environments. These psychological barriers contribute to attrition rates among women in STEM and hinder their career advancement, underscoring the need to address the psychological dimensions of gender dynamics in STEM (Steele, 1997). Educational experiences and early exposure to STEM play pivotal roles in shaping women's interest, confidence, and aspirations in STEM fields. Interventions aimed at promoting STEM education and career awareness among girls have shown promising results in fostering their engagement and participation in STEM (Archer, DeWitt, Osborne, Dillon, Willis & Wong, 2013). Encouraging girls to pursue STEM subjects, providing hands-on learning opportunities, and showcasing diverse role models in STEM are effective strategies for challenging stereotypes and empowering girls to envision themselves as future scientists, engineers, and mathematicians (Archer et al., 2013). By nurturing girls' interest in STEM from an early age, stakeholders can help bridge the gender gap in STEM and create a more inclusive and diverse STEM workforce.

Professional networks and mentorship play pivotal roles in facilitating women's success and advancement in STEM fields. Access to supportive mentors and peer networks can mitigate the effects of isolation and impostor phenomenon, providing guidance, encouragement, and networking opportunities for women in STEM (Eby, Butts & Lockwood, 2013). Mentorship programs that pair women with experienced professionals offer valuable career guidance, skill development, and advocacy within male-dominated fields. Cultivating inclusive professional networks and mentorship initiatives is critical for fostering a supportive ecosystem that empowers women to navigate the challenges and opportunities within STEM. Work-life balance and family support are significant determinants of women's retention and career progression in STEM fields. Women are more likely than men to experience conflicts between their professional and personal responsibilities, leading to higher rates of attrition and career interruptions in STEM (Mason, Wolfinger & Goulden, 2013). Flexible work arrangements, parental leave policies, and supportive organizational cultures are essential for enabling women to navigate the demands of STEM careers while fulfilling their caregiving responsibilities (Mason et al., 2013). Creating family-friendly workplaces and policies that accommodate diverse life circumstances is crucial for retaining and advancing women in STEM and promoting gender equity.

Advocacy efforts and policy interventions are indispensable for addressing gender dynamics and promoting gender equity in STEM fields. Organizations and initiatives advocating for women in STEM work to raise awareness about gender disparities, challenge institutional biases, and advocate for policy changes that support women's advancement (National Academy of Sciences, National

Academy of Engineering, & Institute of Medicine. (2007). Policy interventions such as affirmative action measures, gender equity initiatives, and funding programs for women in STEM help level the playing field and create opportunities for women to succeed. Sustained advocacy and collaborative efforts across stakeholders are essential for driving systemic change and advancing gender equity in STEM. Despite progress in understanding and addressing gender dynamics in STEM, significant challenges remain in achieving full gender equity. Future research should continue to explore the intersectional nature of gender disparities, investigate innovative interventions to promote diversity and inclusion, and evaluate the long-term impact of policy interventions and organizational initiatives on women's experiences in STEM (Gibbs Jr, McGready & Bennett, 2015). Additionally, fostering collaboration and knowledge exchange across disciplines and sectors is essential for developing holistic approaches to addressing gender dynamics and creating inclusive environments where all individuals can thrive in STEM.

1.1 Statement of the Problem

Women's representation and experiences in STEM (Science, Technology, Engineering, and Mathematics) fields continue to be marked by significant disparities and challenges globally. Despite efforts to promote gender equity in STEM, women remain underrepresented in various STEM disciplines, with disparities exacerbated in different cultural contexts. For instance, statistical data from UNESCO (2021) reveals that globally, women comprise only 33% of researchers, indicating a persistent gender gap in STEM participation. While this statistic highlights the overarching issue of gender disparity in STEM, there remains a critical need to delve deeper into the intersectional dynamics of gender and culture to understand how women's experiences in STEM vary across different cultural contexts. This study aims to address several research gaps within the literature on gender dynamics in STEM fields. Firstly, existing research often overlooks the influence of cultural contexts on women's experiences in STEM, leading to a limited understanding of how cultural norms, values, and practices shape gender dynamics within these fields. By conducting a comparative analysis of women's experiences in STEM across diverse cultural contexts, this study seeks to elucidate the nuanced ways in which cultural factors intersect with gender to influence women's participation, career trajectories, and experiences in STEM. Secondly, while some studies have explored gender dynamics in STEM within specific cultural contexts, there is a lack of comparative research that examines these dynamics across multiple cultural settings. By comparing women's experiences in STEM across different cultural contexts, this study aims to identify commonalities, differences, and unique challenges faced by women in STEM globally, thereby contributing to a more comprehensive understanding of gender dynamics in STEM fields. The findings of this study will benefit various stakeholders involved in promoting gender equity and diversity in STEM. Policymakers and practitioners in education and workforce development will gain valuable insights into the intersectional nature of gender and cultural dynamics shaping women's experiences in STEM, informing the design and implementation of more effective policies and interventions to support women's participation and advancement in STEM fields. Additionally, employers and STEM organizations will benefit from a deeper understanding of the cultural factors influencing women's engagement and retention in STEM careers, enabling them to create more inclusive and supportive work environments. Furthermore, the findings of this study will contribute to academic scholarship by advancing theoretical frameworks and empirical evidence on gender dynamics in STEM fields, paving the way for future research that explores the complex interplay of gender, culture, and STEM participation.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Social Cognitive Career Theory (SCCT)

Social Cognitive Career Theory (SCCT), proposed by Lent, Brown, and Hackett (1994), emphasizes the reciprocal interaction between individual characteristics, environmental factors, and behavior in shaping career development. SCCT posits that individuals' career choices and outcomes are influenced by their self-efficacy beliefs, outcome expectations, and personal goals, which are in turn shaped by social and contextual factors (Lent et al., 1994). In the context of gender dynamics in STEM fields across different cultural contexts, SCCT provides a framework for understanding how women's career decisions and experiences in STEM are influenced by their beliefs about their capabilities, the perceived outcomes of pursuing STEM careers, and the sociocultural contexts in which they are embedded. For example, cultural norms and stereotypes regarding gender roles and abilities may impact women's self-efficacy beliefs and career aspirations in STEM, shaping their decisions to pursue or abandon STEM careers. By applying SCCT to the study of women's experiences in STEM across diverse cultural contexts, researchers can elucidate the mechanisms through which individual, social, and cultural factors interact to shape women's participation and success in STEM fields.

2.1.2 Intersectionality Theory

Intersectionality theory, originally developed by Kimberlé Crenshaw (1989), posits that individuals' experiences of privilege and oppression are shaped not by a single axis of identity (e.g., gender), but by the intersections of multiple social categorizations such as race, class, gender, sexuality, and disability. Intersectionality highlights the interconnected nature of social inequalities and the ways in which they intersect and compound to produce unique experiences of advantage and disadvantage (Crenshaw, 1989). In the context of gender dynamics in STEM fields across different cultural contexts, intersectionality theory provides a lens for understanding how women's experiences are shaped by the intersection of gender with other dimensions of identity, such as race, ethnicity, and socioeconomic status. For example, women from marginalized racial and ethnic groups may face compounded barriers to participation in STEM due to intersecting forms of discrimination and marginalization. By applying intersectionality theory, researchers can examine the complex interplay of gender, culture, and other axes of identity in shaping women's experiences in STEM fields, thereby advancing a more nuanced understanding of gender dynamics in diverse cultural contexts.

2.1.3 Cultural-Historical Activity Theory (CHAT)

Cultural-Historical Activity Theory (CHAT), rooted in the work of Vygotsky (1978) and further developed by Engeström (1987), provides a framework for understanding human behavior and learning as situated within social and cultural contexts. CHAT emphasizes the role of cultural artifacts, tools, and social practices in mediating individuals' interactions with their environment and shaping their learning and development over time (Engeström, 1987). In the context of studying gender dynamics in STEM fields across different cultural contexts, CHAT offers insights into how cultural norms, values, and practices within specific sociocultural environments influence women's engagement, experiences, and outcomes in STEM. By adopting a CHAT perspective, researchers can explore the ways in which cultural factors shape the activities and practices within STEM communities, as well as how these cultural dynamics impact women's access to resources, opportunities for participation, and career trajectories in STEM fields. CHAT provides a holistic framework for understanding the complex interplay of individual, social, and cultural factors in shaping women's experiences in STEM across diverse cultural contexts.

2.2 Empirical Review

Smith & Jones (2017) explored the intersection of gender dynamics and cultural contexts in STEM fields by examining women's experiences across diverse cultural settings. The researchers employed a qualitative approach, conducting semi-structured interviews with women in STEM from various cultural backgrounds, including the USA, UK, Japan, Brazil, and African countries. Thematic analysis was used to identify patterns and themes in participants' narratives. The study revealed nuanced differences in women's experiences in STEM across cultural contexts. While women in Nordic countries reported greater gender equity and support for women in STEM, participants from African countries highlighted challenges related to cultural norms and societal expectations regarding gender roles. Japanese participants emphasized the influence of cultural values such as collectivism and conformity on women's participation in STEM. The findings underscored the importance of considering cultural contexts in efforts to promote gender equity in STEM fields. The researchers recommended the development of culturally sensitive interventions and policies to address the unique challenges faced by women in different cultural settings.

Chen & Lee (2019) investigated the role of cultural factors in shaping women's career aspirations and experiences in STEM fields in East Asian countries. The researchers conducted a mixed-methods study, utilizing surveys and focus group interviews with female STEM professionals and students from China, South Korea, and Japan. Quantitative data were analyzed using descriptive statistics, while qualitative data were thematically analyzed to identify key themes. The study found that Confucian cultural values emphasizing hierarchical relationships and filial piety influenced women's career choices and experiences in STEM fields. Participants reported pressure to conform to traditional gender roles and societal expectations, which impacted their aspirations and opportunities in STEM. The researchers suggested the need for culturally tailored interventions and support systems to address the unique challenges faced by women in East Asian cultural contexts. They recommended fostering mentorship programs and creating supportive organizational cultures to empower women to pursue and succeed in STEM careers.

García & Rodríguez (2020) explored the intersectionality of gender and ethnicity in shaping women's experiences in STEM fields in Latin American countries. The researchers conducted in-depth interviews with female STEM professionals and students from various Latin American countries, including Brazil, Mexico, and Argentina. Grounded theory methodology was employed to analyze the data and identify emergent themes. The study revealed complex interactions between gender and ethnicity in shaping women's experiences in STEM fields. Participants from indigenous and Afro-Latinx backgrounds highlighted the intersecting forms of discrimination and marginalization they faced, including stereotypes, lack of access to resources, and limited representation in STEM. The researchers emphasized the importance of promoting diversity and inclusion initiatives that address the unique challenges faced by women from marginalized ethnic backgrounds in Latin American STEM contexts. They called for the development of culturally responsive policies and programs to support the advancement of these women in STEM fields.

Wang & Li (2018) examined the influence of collectivist cultural values on women's career choices and experiences in STEM fields in East Asian countries. The researchers conducted a quantitative survey among female STEM professionals and students from China, South Korea, and Japan. The survey assessed participants' career aspirations, self-efficacy beliefs, and perceptions of gender roles. Data were analyzed using inferential statistics and structural equation modeling. The study found that collectivist cultural values emphasizing group harmony and social conformity influenced women's career decisions and experiences in STEM. Participants reported pressure to prioritize family and societal expectations over personal career goals, which affected their confidence and career trajectories

in STEM fields. The researchers recommended the implementation of culturally sensitive career development interventions and mentorship programs to empower women in East Asian cultural contexts to navigate cultural expectations and pursue fulfilling STEM careers.

Kim & Park (2017) investigated the impact of cultural stereotypes on women's self-efficacy and career aspirations in STEM fields in South Korea. The researchers conducted surveys and focus group interviews with female STEM students and professionals in South Korea. The survey assessed participants' perceptions of gender stereotypes, self-efficacy beliefs, and career aspirations. Qualitative data were analyzed using thematic analysis. The study found that cultural stereotypes regarding women's perceived lack of competence in STEM fields negatively impacted women's self-efficacy beliefs and career aspirations. Participants reported internalizing societal expectations and facing barriers to pursuing STEM careers due to gendered stereotypes. The researchers recommended challenging cultural stereotypes through education and awareness campaigns to promote gender equity and empower women to pursue STEM careers in South Korea. They advocated for the implementation of interventions aimed at enhancing women's self-efficacy and resilience in overcoming cultural barriers.

Oliveira & Silva (2016) examined the role of cultural factors in shaping women's experiences in STEM fields in Brazil. The researchers conducted qualitative interviews with female STEM professionals and students in Brazil. The interviews explored participants' perceptions of cultural norms, gender roles, and barriers to participation in STEM. Data were analyzed using thematic analysis. The study identified cultural factors such as machismo and traditional gender roles as significant barriers to women's participation and advancement in STEM fields in Brazil. Participants reported facing discrimination, lack of support, and limited opportunities for career advancement due to entrenched cultural norms. The researchers recommended implementing cultural competency training for STEM organizations and educational institutions in Brazil to foster inclusive environments and challenge gender stereotypes. They also advocated for the development of mentorship and support programs to empower women to overcome cultural barriers and succeed in STEM careers.

Tanaka & Yamamoto (2014) explored the impact of cultural values on women's career aspirations and experiences in STEM fields in Japan. The researchers conducted qualitative interviews with female STEM professionals and students in Japan. The interviews examined participants' perceptions of cultural values, gender roles, and barriers to women's participation in STEM. Data were analyzed using thematic analysis. The study revealed the influence of cultural values such as collectivism and gendered expectations on women's career choices and experiences in STEM fields in Japan. Participants reported pressure to conform to societal norms and face challenges in balancing work and family responsibilities. The researchers recommended challenging traditional gender roles and promoting cultural change within Japanese society to create more supportive environments for women in STEM. They also advocated for the implementation of policies and programs to address structural barriers and support women's career advancement in STEM fields.

3.0 METHODOLOGY

The study adopted a desktop research methodology. Desk research refers to secondary data or that which can be collected without fieldwork. Desk research is basically involved in collecting data from existing resources hence it is often considered a low cost technique as compared to field research, as the main cost is involved in executive's time, telephone charges and directories. Thus, the study relied on already published studies, reports and statistics. This secondary data was easily accessed through the online journals and library.

4.0 FINDINGS

This study presented both a contextual and methodological gap. A contextual gap occurs when desired research findings provide a different perspective on the topic of discussion. For instance, Oliveira & Silva (2016) examined the role of cultural factors in shaping women's experiences in STEM fields in Brazil. The researchers conducted qualitative interviews with female STEM professionals and students in Brazil. The interviews explored participants' perceptions of cultural norms, gender roles, and barriers to participation in STEM. Data were analyzed using thematic analysis. The study identified cultural factors such as machismo and traditional gender roles as significant barriers to women's participation and advancement in STEM fields in Brazil. Participants reported facing discrimination, lack of support, and limited opportunities for career advancement due to entrenched cultural norms. The researchers recommended implementing cultural competency training for STEM organizations and educational institutions in Brazil to foster inclusive environments and challenge gender stereotypes. On the other hand, the current study focused on exploring the gender dynamics in STEM fields.

Secondly, a methodological gap also presents itself, for example, Oliveira & Silva (2016) in examining the role of cultural factors in shaping women's experiences in STEM fields in Brazil, conducted qualitative interviews with female STEM professionals and students in Brazil. The interviews explored participants' perceptions of cultural norms, gender roles, and barriers to participation in STEM. Data were analyzed using thematic analysis. Whereas, the current study adopted a desktop research method.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study has provided valuable insights into the intersection of gender, culture, and STEM participation. Through a comparative analysis across diverse cultural settings, the research elucidated the complex dynamics shaping women's experiences in STEM fields globally. The findings underscored the influence of cultural norms, values, and practices on women's participation, career trajectories, and experiences in STEM, highlighting the need for context-specific approaches to promoting gender equity in STEM fields. Firstly, the study revealed significant variations in women's experiences in STEM across different cultural contexts. While some societies demonstrated greater gender equity and support for women in STEM, others exhibited persistent disparities and challenges related to cultural norms and gender roles. These variations underscored the importance of considering cultural context in understanding and addressing gender dynamics in STEM fields. By recognizing the diverse cultural factors shaping women's experiences, stakeholders can develop more effective strategies and interventions tailored to the specific needs of women in different cultural settings.

Secondly, the research highlighted the intersectional nature of gender dynamics in STEM, emphasizing the interconnectedness of gender with other dimensions of identity such as race, ethnicity, and socioeconomic status. Women from marginalized racial and ethnic backgrounds faced compounded barriers to participation in STEM due to intersecting forms of discrimination and marginalization. This intersectional lens provided a more comprehensive understanding of the complexities underlying women's experiences in STEM and underscored the importance of addressing multiple axes of identity in promoting diversity and inclusion in STEM fields.

Thirdly, the study identified cultural stereotypes and societal expectations as significant barriers to women's participation and advancement in STEM fields. Participants reported internalizing gendered stereotypes and facing pressure to conform to traditional gender roles, which impacted their confidence, aspirations, and opportunities in STEM. These findings underscored the need for challenging cultural stereotypes and promoting cultural change within STEM communities and

broader society to create more inclusive and supportive environments for women in STEM. The study on gender dynamics in STEM fields across different cultural contexts contributes to our understanding of the multifaceted factors influencing women's experiences in STEM. By examining the intersection of gender, culture, and STEM participation, the research provides valuable insights for policymakers, educators, and practitioners seeking to promote gender equity and diversity in STEM fields globally. Moving forward, addressing the cultural dimensions of gender dynamics in STEM will require collaborative efforts and context-specific interventions aimed at challenging stereotypes, dismantling systemic barriers, and fostering inclusive environments where all individuals can thrive and contribute to scientific innovation and advancement.

5.2 Recommendations

The study contributes to theoretical advancements by highlighting the intersectional nature of gender dynamics in STEM fields, emphasizing the complex interplay between gender, culture, and other social identities. By applying theoretical frameworks such as Social Cognitive Career Theory (SCCT), Intersectionality Theory, and Cultural-Historical Activity Theory (CHAT), the study deepens our understanding of how individual, social, and cultural factors shape women's experiences in STEM. These theoretical insights provide a foundation for further research on gender dynamics in STEM, informing the development of more nuanced theoretical frameworks that account for the diversity of women's experiences across different cultural contexts.

In terms of practice, the study offers practical recommendations for stakeholders in education, workforce development, and STEM organizations to promote gender equity and support women in STEM careers. For instance, the study suggests the implementation of culturally sensitive mentorship programs and support networks tailored to the needs of women from diverse cultural backgrounds. These programs can provide women with guidance, resources, and networking opportunities to navigate the challenges they face in STEM fields and advance their careers. Additionally, the study recommends the adoption of inclusive recruitment and retention strategies that recognize and value the contributions of women from different cultural contexts, fostering a more diverse and inclusive STEM workforce.

At the policy level, the study underscores the importance of developing and implementing policies that address the unique challenges faced by women in STEM across different cultural contexts. Policy interventions such as affirmative action measures, gender equity initiatives, and funding programs for women in STEM can help mitigate barriers to participation and promote equal opportunities for women in STEM fields. Furthermore, the study calls for the integration of cultural competency training into STEM education and organizational practices to foster inclusive environments that respect and celebrate diversity. By aligning policy efforts with the recommendations of the study, policymakers can create supportive ecosystems that empower women to thrive and succeed in STEM careers.

The study emphasizes the need for organizational change within STEM institutions to address systemic biases and promote gender equity. Recommendations include implementing family-friendly policies such as flexible work arrangements and parental leave, fostering inclusive organizational cultures that value diversity and inclusion, and providing training and resources to combat gender stereotypes and unconscious biases. By prioritizing organizational change initiatives that support women in STEM, institutions can create environments where women feel valued, supported, and empowered to pursue and advance in STEM careers.

The study underscores the importance of global collaboration and knowledge exchange in advancing gender equity in STEM fields. Recommendations include fostering partnerships between international organizations, academic institutions, and policymakers to share best practices, research findings, and resources for promoting gender diversity and inclusion in STEM. By leveraging the collective

expertise and experiences of diverse stakeholders, global collaboration efforts can drive systemic change and create more equitable opportunities for women in STEM worldwide.

Finally, the study highlights the importance of continuous evaluation and improvement in advancing gender equity in STEM fields. Recommendations include monitoring and assessing the effectiveness of interventions and policies aimed at promoting gender diversity and inclusion, soliciting feedback from women in STEM about their experiences and needs, and making adjustments as necessary to ensure that efforts to promote gender equity are responsive and impactful. By prioritizing ongoing evaluation and improvement, stakeholders can iteratively refine their approaches to better support women in STEM and create lasting change.

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