THE INFLUENCE OF STRUCTURAL BARRIERS ON REPRESENTATION OF WOMEN IN AVIATION SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) ROLES: A CASE OF FEMALE PILOTS AT EAST AFRICAN NATIONAL CARRIERS

BY

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DECLARATION

Declaration by Candidate

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DEDICATION

I dedicate this document to my mother, Ruth Ndege Okoth, whose unwavering hard work, sacrifice, and resilience have been my constant source of inspiration.

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ABSTRACT

Despite women's growing presence in various STEM fields, the aviation sector significantly lags behind, with 3.11% of engineers and 4.1% of pilots being women in airlines globally (ICAO).This research addresses structural barriers influencing the representation of women in aviation STEM roles, with a specific focus on female pilots at East African national carriers (Kenya Airways, Ethiopian Airlines, Rwanda Air, Air Tanzania, and Uganda Airlines). To delve into this issue, an investigation was conducted involving 116 female pilots, aiming to assess the influence of structural barriers such as inadequate flexible work policies, gender biases, work-related stress, and unfriendly maternity policies on women's representation in aviation STEM. To support its findings, the research drew upon three theories: the Glass Ceiling Theory, stereotype threat theory, and social role theory. An explanatory research design was adopted to determine causal links between structural barriers and the representation of women in aviation STEM. A census approach covered the entire target population of 116 female pilots and achieved a response rate of 90.5%. Data was collected through structured online questionnaires, providing invaluable insights into the challenges and perspectives of female pilots. The findings reveal that these barriers significantly influence the representation of women in the aviation industry. The coefficient of determination (R-squared) is 58.6%, revealing that the studied independent variables can predict 58.6% of the observed representation. Within East African national carriers, the percentage of female pilots varies, with Ethiopian Airlines at 5%, Kenya Airways at 7%, Rwandair at 10%, Air Tanzania at 15.8%, and Uganda Airlines at 8%. Overall, the representation of female pilots in these airlines is low, accounting for just 6.5% of the total pilot workforce. Valuable insights are provided into gender diversity in aviation and present concrete strategies to dismantle these structural barriers and drive lasting transformation. Higher gender bias is linked to reduced maternity policies and increased work-related stress, potentially hindering women's representation. Conversely, increased maternity policies are associated with decreased work-related stress, likely supporting women's representation. Furthermore, the presence of flexible work policies is correlated with more maternity policies, offering potential benefits for women in aviation STEM by creating accommodating work environments. These interconnections highlight the intricate dynamics influencing women's representation in aviation STEM. Furthermore, the research offers a set of practical policy and practice recommendations. Flexible work policies (β_1 =0.086; p=0.043), designed to provide greater control over work schedules and cultivate a supportive culture, can substantially enhance gender diversity. Addressing gender biases (β_2 =-0.209; p=0.004), entails implementing diversity and inclusion initiatives, training, and clear reporting mechanisms for harassment. To manage work-related stress (β3 = -0.079; p= 0.028), airlines should establish support mechanisms and explore flexible scheduling options. Additionally, friendly maternity policies (β_4=0.192; p=0.005), should include provisions for dedicated alternative ground duties, flexible return-to-work options, extended maternity leave, and suitable accommodations to support female pilots during and after maternity leave. By implementing these recommendations, airlines can foster an aviation industry that is inclusive, which empowers women to excel in STEM roles.

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OPERATIONAL DEFINITION OF TERMS

Flexible work policies: refer to a range of practices and arrangements developed to give workers great control over their work schedules (Magda & Lipowska, 2021). These policies recognize that employees have diverse needs, responsibilities, and preferences outside of their professional roles, and aim to strike work- life balance. In the context of this research, flexible work policies encompass various approaches, including part-time work, job sharing, and career breaks, all aimed at accommodating the unique circumstances and demands of female pilots such as irregular schedules and time away from home, while also understanding the importance of family and personal well-being. These are all aimed at improving representation.

Gender biases: refer to ingrained beliefs, stereotypes or prejudices that favor one gender over another, leading to unequal treatment, opportunities or expectations based on an individual's gender (Omura, 2020). In the context of the study, it involved any prejudices or preferences that could contribute to the female pilot representation in the aviation industry.

Maternity policies: refer to the set of policies are organizational guidelines and provisions designed to address the rights, benefits and support extended to female employees during pregnancy, childbirth, and the postpartum period (Hidalgo-Padilla, Toyama, Zafra-Tanaka, Vives, & Diez-Canseco, 2023). In the context of this study, these are maternity policies that contribute to representation of female pilots such as duration of maternity leave.

National carriers: also referred to as flag carriers or national airlines. They are operated and owned by the government of a specific country and often represent the country's flag or emblem on their aircraft.

Representation of women: refers to the quantitative assessment of the presence of women in a particular field, profession, or organization relative to their demographic composition in the broader population (Harris, Dassopoulos, Sahl, & Starostina, 2021). In the context of this study, it specifically illustrates the proportion of female pilots in the aviation industry compared to their male counterparts.

Structural barriers: refer to the systemic and institutional obstacles that hinder the progress and representation of certain groups in various aspects of life, such as employment and leadership positions (Hong, Gumz, Choi, Crawley,, & Cho, 2021). In the study's context, structural barriers encompassed institutional and systemic factors in the aviation industry obstructing the progress and representation of women in aviation STEM roles, particularly as female pilots in East African national carriers. These factors include lack of flexible work policies, gender biases, work-related stressors, and unfriendly maternity policies.

Work related stress: refer to the adverse physical, emotional, and mental effects encountered by individuals as a result of various industry-specific factors (Esin & Ornek, 2020). In the context of this study, work related stressors include increased scrutiny of women, lack of mentorship and support, long/irregular hours, extended durations away from home and demanding nature of aviation STEM roles, compounded by balancing societal expectations and family responsibilities which impacts job satisfaction, well-being, and overall retention rates among female pilots.

ABBREVIATIONS AND ACRONYMS

FAA -	Federal Aviation Administration
FWP-	Flexible work policies
GB-	Gender Biases
IATA-	International Air Travel Association
ICAO-	International Civil Aviation Organization
ISWAP -	International Society of Women Airline Pilots
LRW-	Low Representation of women
MP-	Maternity Policies
RW-	Representation of women
STEM-	Science Technology Engineering and Mathematics
UN -	United Nations
WAI -	Women in Aviation International
WRS-	Work Related Stress

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter provides an overview of the research report's background, statement of the problem, research objectives, hypothesis, justification, significance, scope, and limitations. Additionally, it delves into the concept and context of the research topic, offering a comprehensive analysis of female representation in aviation Science, Technology, Engineering and Mathematics (STEM) from both global and local perspectives.

1.2 Background of the Study

In professions where success is perceived to rely on exceptional brilliance, women tend to be underrepresented (Meyer, Cimpian, & Leslie, 2015). Despite women outnumbering men in obtaining bachelor's degrees in all fields combined, their representation in STEM careers remains limited. This underrepresentation often leaves female STEM professionals feeling discouraged and marginalized in the workforce (Conrad, Abdallah, & Ross, 2021). Notwithstanding considerable progress in promoting gender equality in various STEM fields, the representation of women in certain domains, especially in aviation STEM roles, remains remarkably low. This study delves into the structural barriers causing the scarcity of women in aviation STEM, with a spotlight on female pilots within East African national carriers, a pivotal step toward devising actionable strategies for enhancing gender parity in this crucial sector.

Women account for only 4.1% of airline pilots and 3.11% of licensed aircraft maintenance engineers and technicians in airlines globally (ICAO, 2021). In stark contrast, female flight attendants account for a significant 79.2% of the workforce (WIAAB, 2022), while air traffic controllers represent 20.6% (ICAO, 2023). These statistics underscore the urgent need to explore and address the underlying factors contributing to women's representation in aviation STEM roles on both a global and regional levels.

This research investigated the influence of structural barriers on representation of women in aviation STEM, focusing on female pilots at East African National Carriers. It scrutinized key independent variables, such as flexible work policies, gender bias, work related stress, and maternity policies, which directly influence women's engagement and career progression within the aviation industry. By examining these variables and their consequences for women's representation, this study seeks to offer guidance for the creation of successful strategies and policies that support gender diversity and equality in the aviation STEM workforce. Throughout history, women engaged in aviation STEM have confronted notable challenges that have impeded their advancement and access to opportunities. Marie Marvingt, a French aviator, achieved an incredible milestone by becoming the third woman worldwide to obtain a pilot license. Her unyielding determination led her to disguise herself as a man and volunteer as a pilot during World War I, fearlessly taking on bomber missions over Germany in 1915. Although she was eventually discovered and sent home, her unwavering spirit drove her to return to the frontlines, serving as an infantry soldier in Italy. Marie's expertise as both a surgical nurse and pilot, have created a lasting legacy because her efforts directly led to the inception of the first air ambulance service, leaving an unforgettable imprint on the field of medical air evacuation (Neikirk, 2022).

The first female pilot to be employed by an airline, Helen Richey, began her career with Central Airlines in 1934. However, she faced challenges as the Bureau of Air Commerce advised the airline to limit her flying in unfavorable weather conditions. Additionally, her application to join the pilot's union was rejected, depriving her of crucial support. She resigned from the airline and redirected her professional path towards training aspiring pilots (Graves, 2022).

The representation of women in aviation STEM roles remains notably low on a global scale, as indicated by a survey conducted by ICAO from 2016 to 2021. While there has been a slight improvement in the percentage of women pilots over the five-year period, rising from 3.6% to 4.0%, the overall numbers remain concerning. ICAO's analysis of regional distribution showed varying levels of representation across different regions. North America had the highest representation at 4.61%, followed by Europe at 4.0%, Africa at 4.1%, the Middle East at 3.05%, Asia/Pacific at 2.69%, and Latin America/Caribbean had the lowest representation at 1.62%. For female engineers and technicians, the numbers were also relatively low, with North America at 2.64%, Europe at 4.08%, Africa at 2.79%, the Middle East at 1.91%, Asia/Pacific at 4.41%, and Latin America/Caribbean at 2.6% (ICAO, 2021).

Despite efforts to enhance gender equality, the aviation industry continues to grapple with challenges hindering the entry and advancement of women aviation STEM. These structural barriers can be exemplified by different situations in various parts of the world. In the context of Turkey, research revealed that a substantial number of female pilots encounter gender-based biases and discriminatory treatment in their work environment, impacting their overall performance (Yanıkoğlu, Kılıç, & Küçükönal, 2020). In Pakistan, an investigation highlighted that increased work-family conflict had a detrimental impact on job performance of female pilots (AIJAZ , SHAHAB , & KHAN , 2020).

In the United States, perceived beliefs regarding the existence of an established "boy's club" and adverse impact on family life often discourage young girls from pursuing careers as pilots (Lutte, 2020). Retention of those in the industry is influenced by lack of balance between family, work/personal life balance, the prevailing male-dominated culture, and insufficient support systems (Lutte, 2020) . In some European countries like Germany , airlines provide flexible work in the form of part-time duties to cater to pilots' work-life balance requirements but these measures are not always well-received by airline management due to the higher costs associated with training and sustaining two part-time pilots compared to a single full-time pilot (Fong, 2011).In the United Kingdom, aspiring women pilots endeavor to gain acceptance within their male peers' circles and face increased pressure to succeed, as they feel the constant need to prove their worth and rightful place in the field. Additionally, they may dwell more on any criticisms received from their instructors (McCarthy, Budd, & Ison, 2015) . In certain parts of Asia, such as India, cultural norms and organizational policies affect representation of women in male dominated professions (Sachdeva, 2022). The impression that aviation careers are more suited for men can limit opportunities and discourage girls from pursuing relevant education and training.

Turning to Africa, structural barriers unmistakably contribute to the ongoing underrepresentation of women in aviation STEM. Aspiring STEM professionals encounter a multitude of challenges in their journey, from barriers to accessing education and training, to the scarcity of aviation-specific learning centers and financial support, all of which collectively hinder their path to becoming pilots. Furthermore, deeply ingrained gender stereotypes consistently reinforce the image of STEM as a field dominated by men, discouraging women from seeing it as a feasible and inclusive career choice. (Ahmed,, Hayden, Nkopane, & Yosra, 2022). These deeply ingrained societal norms create a challenging environment for women seeking to break into the aviation industry, contributing to the disproportionately low representation of female pilots in these countries.

Similarly in East Africa, encompassing countries like Kenya, Tanzania, Uganda, Rwanda, and Ethiopia, cultural beliefs deeply rooted in patriarchy exert major influence on the employment of women pilots. These beliefs perpetuate stereotypes, discrimination, bias, prejudice, and intimidation, creating challenges like those faced in other regions of the continent. Societal norms and expectations always discourage women from pursuing aviation careers, deeming it an unconventional and unsuitable path for them (chavera, 2022) . The deeply rooted belief that certain professions, including piloting, are better suited for men, poses a significant barrier, limiting the number of female candidates entering the aviation industry. As a result, the gender gap in pilot representation in East Africa remains prevalent, raising concerns about the lack of diversity and inclusivity within the region's aviation sector.

The outcome of addressing the structural barriers affecting attraction, participation, and retention of women in aviation STEM is crucial for achieving sustainable and meaningful change. By getting to the root cause of the representation of women in these roles, we can identify the specific obstacles and challenges faced by women in the industry. This deeper understanding allows us to develop drastic and targeted interventions that address the core issues and create lasting impact. Focusing on root causes will empower us to design comprehensive strategies against the barriers at their source.

This commitment to making sustainable interventions will lead to a positive ripple effect, inspiring future generations of women to pursue aviation careers and encouraging the broader STEM community to embrace diversity and gender equity. It is by understanding and addressing the root causes of the underrepresentation of women in aviation STEM that we can develop a more inclusive and successful industry for all.

1.3 Statement of the Problem

Despite significant advancements in advocating gender parity across multiple industries, the presence of women in certain areas, such as aviation STEM positions, continues to be strikingly limited. A study by Graham & Ferla (2019) , found that career progression among women has significantly increased. However, there is still considerable underrepresentation of women in aviation STEM positions, such as pilots, engineers, and technicians (ICAO, 2021). Based on the trends, this underrepresentation is likely to persist unless substantial interventions are made. This challenge carries vital ramifications, not only limiting the potential for a more diverse aviation workforce, but also depriving the industry of the invaluable talents and contributions of women.

Current research often focuses solely on numerical gender representation, leaving the underlying and distinctive issues contributing to these statistics less explored. This study addresses these research gaps by delving into the intricate interplay between structural barriers and the representation of women in STEM careers.

Within the East African context, the research terrain remains uncharted concerning the examination of challenges encountered by women pursuing STEM careers.

Particularly, the absence of tailored flexible work policies for aviation, a nuanced examination of maternity policies, the challenge of unique work-related stressors and an investigation into the role of gender biases in shaping STEM participation present noteworthy gaps. Africa Airlines Association (2021) sounded an alarm about the continent's significant gender imbalance in STEM fields and leadership roles. They reported that in most African airlines, female pilots represent less than 8% of the total crew. This imbalance could lead to decision-making processes that primarily benefit the majority and, as a result, contribute to workplace stress and policies that are unfavorable to the minorities. Research by Marintseva et al. (2022) highlights how the emotional well-being of female pilots can be compromised due to a lack of support and acceptance from both male crew members and passengers. However, the study does not delve into the long-term consequences of this emotionally challenging workplace environment on retention and gender equity. The intricate relationship between work-related stress and the representation of women in STEM fields within East Africa is underexplored.

This study offers a region-specific perspective, enriching existing literature with insights to inform the development of policies, practices, and initiatives aimed at promoting a more equitable and diverse STEM landscape within East Africa and beyond. By investigating the fundamental structural barriers hindering women's progress in aviation STEM roles, this research fosters an inclusive professional environment, encouraging greater female participation in aviation STEM careers. Its implications extend beyond the study's scope, influencing future inquiries and advocacy efforts working to address gender disparities in STEM fields. Furthermore, the research emphasizes the need to bridge the gap between theoretical ideals and practical realities, acknowledging the considerable implementation challenges faced by past initiatives aimed at increasing women's presence in aviation STEM.

1.4 Research Objectives

1.4.1 General Objective

To examine the influence of structural barriers on the representation of women in aviation STEM roles, specifically as pilots in East African national carriers.

1.4.2 Specific Objectives

i. To determine the influence of flexible work policies on the representation of women in aviation STEM roles as pilots in East African national carriers.

ii. To assess the influence of gender biases on the representation of women in aviation STEM roles as pilots in East African national carriers.

iii. To evaluate the influence of work-related stress on the representation of women in aviation STEM roles as pilots in East African national carriers.

iv. To establish the influence of maternity policies on the representation of women in aviation STEM roles as pilots in East African national carriers.

1.5 Research Hypotheses

i. **$H_0$1**: There is no significant relationship between flexible work policies and the representation of women in aviation STEM roles as pilots in East African national carriers.

ii. **$H_0$2**: There is no significant relationship between gender biases and the representation of women in aviation STEM roles as pilots in airlines in East African national carriers

iii. **$H_0$3**: There is no significant relationship between Work-related stress and the representation of women in aviation STEM roles as pilots in airlines in East African national carriers

iv. **$H_0$4**: There is no significant relationship between Maternity policies and the representation of women in aviation STEM roles as pilots in East African national carriers.

1.6 Significance of the Study

By focusing on gender disparities within East African national carriers, the research addresses the issue of gender inequality and seeks to promote greater gender diversity in aviation STEM roles. Understanding the specific challenges faced by female pilots in these carriers is crucial in creating an inclusive and diverse work environment. The findings will enable airlines to assess and enhance their human resource practices and organizational policies, including recruitment, training, promotion, and work-life balance initiatives, to better support female pilots' representation and retention. Moreover, the study's insights will provide valuable information to government agencies, aviation authorities, and pilot associations, helping them make informed decisions and implement proactive measures to foster gender equality.

By shedding light on broader issues which women in male-dominated entities go through, the study contributes to discussions on gender equity and diversity in workplaces, making a meaningful social impact. Academically, the study fills a crucial gap in knowledge in the fields of aviation, gender studies, and organizational behavior, enriching existing literature and serving as a foundation for future research on gender dynamics and workforce diversity within aviation.

Furthermore, this study has practical implications for aspiring female pilots, as it raises awareness of the challenges and opportunities in the aviation industry. Armed with valuable knowledge, women can make informed career decisions and be empowered to pursue successful aviation careers. It highlights that with proper support and policy changes, women can excel as pilots and in other STEM fields, breaking down gender barriers and promoting a more inclusive society overall.

By identifying the factors influencing female pilot representation, the study contributes to addressing gender disparities and promoting equal opportunities, working towards a more equitable future for women in aviation worldwide.

1.7 Scope of the Study

This study is specifically focused on women in aviation STEM roles, with a particular emphasis on female pilots at East African national carriers: Kenya airways, Ethiopian airlines, Uganda airlines, Air Tanzania, and Rwanda Air. The research was conducted over four months, from July to October 2023. The study explored the barriers and challenges faced by these women in advancing their careers within the aviation industry. It investigated the influence of several factors, such as flexible work policies, gender biases, work-related stress, and maternity policies, on the representation of female pilots in this region.

The study delved into the unique experiences and perspectives of female pilots working for East African national carriers, aiming to gain a comprehensive understanding of the factors influencing their representation and career trajectories. By narrowing its focus to this specific group, the research provides valuable insights into the gender dynamics within the aviation sector in East Africa.

It is essential to highlight that the scope of this study was limited to female pilots because they represent a specific and underrepresented segment within the aviation industry, constituting a minority of the workforce. This deliberate selection allows for a more detailed examination of the unique challenges and experiences they encounter, which may differ significantly from other roles within aviation. By concentrating on female pilots, the research provides a targeted, contextually relevant analysis that can yield actionable insights and recommendations for promoting gender diversity and inclusivity in aviation STEM roles. Additionally, this focused approach aligns with the research's aim to address the representation of women in a particular subset of the aviation industry, thereby offering a comprehensive understanding of the factors affecting their representation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section delves into existing studies related to the four variables under research. It includes literature on the representation in aviation STEM, structural barriers, foundational theories shaping this research, an overview of empirical studies, a summary of the reviewed literature and the conceptual framework that guided the study.

2.1.1 Concept of Representation of women in aviation STEM roles

Refers to the quantitative assessment of the presence of women in a particular field, profession, or organization relative to their demographic composition in the broader population (Harris, Dassopoulos, Sahl, & Starostina, 2021). In the context of this study, it specifically illustrates the small proportion of female pilots in the aviation industry compared to their male counterparts. It highlights an imbalance in demographic distribution, often indicating disparities in opportunities, access, or inclusion for that group. This phenomenon is common for women in STEM and STEM-related fields (Harris, Dassopoulos, Sahl, & Starostina, 2021). This brings attention to the structural barriers and challenges that hinder women's entry, progression, and retention in aviation STEM roles such as pilots.

2.1.2 Concept of Structural Barriers

Structural barriers refer to the systemic and institutional obstacles that hinder the progress and representation of certain groups in various aspects of life, such as employment and leadership positions (Hong, Gumz, Choi, Crawley,, & Cho, 2021). These barriers are deeply rooted in societal norms, policies and practices that perpetuate discrimination and inequity, making it difficult for individuals from marginalized or underrepresented groups to fully participate and thrive in certain fields or industries

(McGEE, Griffith, & HOUSTON, II, 2019) . In the context of the study, structural barriers in the aviation industry include gender biases, flexible work policies, maternity policies and work-related stressors that contribute to representation of women in STEM roles.

2.1.3 Concept of Flexible work policies

Flexible work policies are arrangements that provide employees with the opportunity to have greater autonomy over when, where, and how they work (Magda & Lipowska, 2021). These policies aim to accommodate their diverse needs and responsibilities while maintaining productivity in the workplace (Magda & Lipowska, 2021). Examples of flexible work policies include flexi time (adjustable work hours), compressed workweeks (longer workdays for fewer days), job sharing (two employees sharing one full-time position) and part-time work options. Such policies contribute to improved satisfaction at work and better work-life balance (Rangel, 2023). In the context of the study, juggling demanding work schedules with domestic commitments becomes intricate due to the considerable time pilots spend away from home. This distinct feature amplifies the significance of flexible work policies, as they need to be tailored to accommodate the demands of pilot careers, ensuring that female pilots can effectively manage their professional and personal lives while contributing to the aviation industry's representation goals. Exploring flexible work policies is important for understanding their influence on the representation of female pilots.

2.1.4 Concept of Gender biases

Gender biases are the ingrained beliefs, stereotypes or prejudices that favor one gender over another, leading to inequitable treatment, opportunities or expectations based on an individual's gender (Omura, 2020) . Within the context of the study, gender biases manifest as societal and cultural perceptions that inform the representation of women in the aviation industry. These biases can influence how female pilots are perceived, evaluated, and provided with opportunities for career advancement. They can also result in negative interactions and lack of support, affecting their retention and overall career progression.

2.1.5 Concept of Work related stress

Stress that is work-related is the physical, emotional, or mental strain an individual goes through due to demands, pressures and challenges encountered in their professional roles such as irregular working hours, lack of social support, excessive workloads, interpersonal conflicts, and high expectations (Esin & Ornek, 2020) . In the study's context, work-related stress pertains to the demanding nature of aviation STEM roles compounded by balancing societal expectations and family responsibilities which impacts job satisfaction, well-being, and overall retention rates among female pilots.

2.1.6 Concept of Maternity policies

Maternity policies are organizational guidelines and provisions designed to address the rights, benefits and support extended to female employees during pregnancy, childbirth, and the postpartum period (Hidalgo-Padilla, Toyama, Zafra-Tanaka, Vives, & Diez-Canseco, 2023). These policies typically include maternity leave duration, access to medical support during pregnancy, compensation, necessary job accommodations and job security. This research explores uncertainties about suitable ground-based duties when flying is not feasible for pilots due to pregnancy. Given the demanding nature of their jobs and extended periods away from infants, which can contribute to stress, the study examines the duration of maternity leave and emphasizes structured time-limited career break options with job security upon their return. It also delves into potential temporary roles to accommodate pilots facing challenges with young children, ensuring work-life balance, and enhancing gender representation in the aviation industry.

2.2 Theoretical Perspectives

Three theories provided support for the variables examined in this study: Glass Ceiling Theory, stereotype threat theory, and social role theory.

2.2.1 Glass Ceiling Theory

The glass ceiling theory, popularized by Marilyn Loden in the 1980s, refers to a metaphorical or invisible barrier that hinders the career advancement and representation of certain groups, particularly women and minorities, within organizations (U.S Department of labour, 1995). Despite their qualifications and potential, individuals encounter obstacles that prevent them from reaching top leadership positions or higher ranks in the organizational hierarchy. This theory highlights systemic and structural biases that limit opportunities for underrepresented groups in the workplace (Kalvakolanu, Gottumukkala, & Shireesha, 2023).In the context of female pilots, this theory suggests that despite their qualifications and capabilities, they encounter barriers that impede their representation and career growth in key roles within airlines and aviation organizations.

Regarding flexible work policies, women embracing these options to balance caregiving roles can inadvertently face barriers. Despite the intention of these policies to enhance work-life balance, they can unintentionally penalize women's career progress. Opting for flexible work arrangements, such as reduced hours, might lead to perceptions of lesser commitment compared to full-time peers. Consequently, women may miss out on promotions, significant projects, or leadership roles, reinforcing the glass ceiling effect (Torry, 2022). These outcomes discourage women from embracing flexible work or aspiring to leadership positions, thereby perpetuating their underrepresentation. Hence, this study delves into the interaction between flexible work policies and the glass ceiling, exploring potential strategies to counter these repercussions and foster women's representation and aviation industry advancement.

Gender Biases reinforce stereotypes and affect the roles and capabilities attributed to female pilots, which severely limits women's advancement and representation. Discriminatory attitudes and practices create an invisible barrier, obstructing their access to top positions and career-enhancing opportunities. Women often find themselves excluded from decision-making roles and leadership tracks due to preconceived notions of their capabilities (Yanıkoğlu, Kılıç, & Küçükönal, 2020). This bias perpetuates a cycle of underrepresentation, restricting their presence in industries like aviation. Addressing gender bias is essential for dismantling the glass ceiling and enabling women to break through these barriers, fostering equal representation and a more inclusive and diverse workforce.

Work-related stress is a crucial factor affecting the representation of female pilots in aviation STEM roles. The nature of piloting and other high-stakes positions within the industry entails immense pressure and responsibility. Female pilots may encounter additional stress due to societal expectations and gender-related pressures. The accumulation of work-related stress can negatively impact job satisfaction and retention rates among female pilots, further exacerbating the glass ceiling effect (Zhang & Basha, 2023). As stress hampers career progression, it becomes more challenging for women to advance and break through the barriers that hinder their representation and equitable access to leadership roles within the aviation industry. Addressing work-related stress and promoting a supportive environment are vital steps towards fostering a more diverse and inclusive workforce in aviation.

The glass ceiling effect extends its influence on maternity leave policies, exerting a considerable influence on the career paths of female pilots. The adequacy of maternity policies becomes a pivotal factor that can either facilitate or hinder the progress of women in the workplace (Del Rey, Kyriacou, & Silva, 2021). Insufficient or rigid maternity policies may result in the loss of experienced pilots as they grapple with the challenging task of balancing their family responsibilities, particularly during maternity periods. Such policies may even discourage women from considering pilot careers altogether, fearing the potential conflict between their professional aspirations and family obligations. The availability of supportive maternity policies not only acknowledges the unique challenges faced by female pilots but also contributes to fostering a more inclusive and equitable environment, thereby addressing the glass ceiling effect and promoting gender diversity and equity within the realm of aviation.

2.2.2 Stereotype threat theory

Originating in the 1990s, Stereotype Threat Theory is a psychological construct crafted by social psychologists Claude Steele and Joshua Aronson (Steele & Aronso, 1995). This theory encompasses the psychological dilemma individuals may face when they recognize negative stereotypes associated with their social group and hence get apprehensive that their actions or achievements could validate those stereotypes (Schmader & Hall, 2014). This apprehension can result in reduced performance, heightened anxiety, and lower career aspirations in situations pertinent to the negative stereotype (Steele & Aronso, 1995).

The theory suggests that when individuals belong to a group that is negatively stereotyped in a particular domain (for instance, women and math, or African Americans and academic achievement), the awareness of the stereotype can create a self-fulfilling prophecy (McGEE, Griffith, & HOUSTON, II, 2019). The fear of confirming the stereotype impairs their performance, and as a result, they may underperform compared to their actual capabilities. In the context of female pilots, the prevailing gender norms and stereotypes within the aviation industry may affect their confidence and belief in their abilities. The perception that piloting is a male-dominated profession may lead female pilots to internalize doubts about their suitability for the role, potentially hindering their career aspirations and progression.

Stereotype threat explains flexible work policies, which, though designed to support disadvantaged groups, can inadvertently exacerbate stereotype threat, and generate backlash. These policies might inadvertently reinforce the stereotype that women require special accommodations, potentially affecting their confidence and performance (Schmader & Hall, 2014). Therefore, considering the potential influence of stereotype threat, it becomes imperative to carefully design and implement flexible work policies in ways that mitigate negative psychological effects and promote gender equity.

Regarding gender bias, female pilots often face pervasive stereotypes. The theory highlights how such biases can create a psychological predicament, negatively impacting their performance, career ambitions and overall representation (McGEE, Griffith, & HOUSTON, II, 2019). To counter this, essential initiatives can be introduced such as awareness campaigns and educational programs that enlighten stakeholders about unconscious biases and their consequences. Additionally, cultivating a supportive and inclusive work environment, one that genuinely appreciates diversity, can establish a psychological support network for female pilots. This approach empowers them to surmount stereotypical threats, fostering the confidence needed to excel in their careers. Programs for mentorship also play a significant role in guiding, supporting, and providing a platform for female pilots to navigate and succeed in the aviation industry. Thus, by employing Stereotype Threat Theory, this research not only underscores the adverse influence of gender biases on female pilot representation but also provides actionable approaches to advance gender parity and augment the presence of women within the aviation sector.

Applying the theory to the context of maternity policies reveals that such policies can inadvertently reinforce traditional gender norms and expectations, amplifying the stereotype threat experienced by female pilots. The fear of confirming negative stereotypes about their ability to balance motherhood and a demanding career can hinder their confidence and performance (Zimmermann, et al., 2023). To address this issue, strategic initiatives can be enacted to address the influence of maternity policies and bolster the representation of female pilots within the aviation sector.

2.2.3 Social role theory

Social Role Theory originated from Ralph Linton, a sociologist, and George Herbert Mead, a social psychologist (Georgas, 2004). It asserts that individuals' behavior is influenced by their societal roles, suggesting that actions, attitudes, and beliefs are shaped by the expectations associated with the roles they occupy (E a g l y & Wood, 2012). These roles come with a set of expectations and responsibilities which are culturally defined and understood. For example, the role of mother is associated with caregiving and society expects all women to be caregivers both at home and in the workplace. People internalize role-associated behaviors and attitudes to meet societal norms, conforming to values that guide conduct in diverse social settings (Rafat, 2022). This theory is especially relevant to examining the influence of structural barriers on the representation of female pilots in East Africa's national carriers, focusing on flexible work policies, gender biases, work-related stress, and maternity policies.

Regarding the scarcity of flexible work policies, the social role theory highlights that despite successfully defying conventional gender roles in their professional contexts, female pilots face significant obstacles due to unequal division of domestic responsibilities, leading to a disproportionate burden of caregiving duties at home (Chen, Jheng, & Liu, 2022). The nature of pilot responsibilities, often requiring prolonged periods away from home, presents a formidable challenge in achieving a harmonious work-life balance. Consequently, the combination of rigid work policies and persistent gender norms hinders the ability of female pilots to fully engage and advance in their careers, underscoring the critical importance of implementing more accommodating work policies to achieve gender balance and enhance female representation in the aviation field.

Similarly, Social Role Theory recognizes the impact of societal norms and stereotypes on career decisions. Regarding gender biases, the theory acknowledges the role of societal norms and stereotypes in shaping career choices. Traditionally, women are encouraged and expected to opt for people-oriented and caregiving roles, while men are directed towards fields involving objects and tangible subjects (Rafat, 2022) . Conformity with these norms often leads to acceptance, whereas deviations are often met with disapproval and can disrupt social interactions (E a g l y & Wood, 2012) . In the aviation industry, prevailing unconscious gender biases can influence the perception and assessment of female pilots, particularly since they defy expected gender roles.

These biases, rooted in the perception of piloting as a male-dominated field, can discourage women from pursuing pilot careers and may foster negative interactions in the workplace affecting both the retention of female pilots and their overall career progression. By embracing the insights provided by this theory, the industry can take significant steps towards dismantling gender biases, promoting diversity, and ensuring a more equitable representation of female pilots in the aviation field.

Moreover, Social Role Theory relates strongly to work-related stress among female pilots due to the compounded demands of their designated social roles, particularly within a male-dominated profession. This stress is exacerbated by the prevalence of imposter syndrome, where individuals question their abilities and fear exposure, and by the heightened scrutiny influenced by gender biases (Oliveira-Silva & de Lima, 2022). Female pilots, defying traditional gender norms, often confront these stressors while navigating a career path with limited support. The combination of a demanding aviation field, societal expectations, and the absence of adequate support intensifies their stress levels. Recognizing and addressing these intricate stress factors, airlines must establish effective stress management programs that consider the specific needs of female pilots, providing them with guidance, support, and an environment conducive to their professional growth.

Furthermore, the application of Social Role Theory can shed light on the potential connection between stringent maternity policies and representation of female pilots within the aviation industry. The unique reproductive responsibilities that women bear, impose considerable demands as they entail energy-intensive and time-consuming tasks associated with gestation, nursing, and infant care (Huber, 2007) . Engaging in these tasks poses challenges for women to participate to the same extent as men in activities that involve extensive travel away from their homes (E a g l y & Wood, 2012). In this context, maternity policies that are punitive or inflexible can inadvertently compel female pilots to make substantial career sacrifices including exiting the workforce altogether during critical phases of their careers. Consequently, this inhibits their participation and progression as pilots within the aviation STEM domain. Additionally, these punitive policies can result in barriers when attempting to reenter the workforce after maternity leave. The demands of their reproductive roles, coupled with inflexible policies, may hinder a smooth transition back into their pilot roles. Progressive and flexible maternity policies play a pivotal role in attracting and retaining female pilots in the aviation industry. By addressing the unique demands of reproductive responsibilities, these policies can create an inclusive environment that fosters work-life balance and gender diversity, leading to a more thriving and equitable aviation STEM domain.

2.3 Empirical Literature Review

2.3.1 Flexible work policies and representation of women in aviation STEM

The gender disparity within the aviation STEM sector, particularly in pilot roles, remains a critical concern that necessitates comprehensive examination and innovative solutions (UNDP, 2022). As organizations strive for gender equity and inclusivity, the implementation of flexible work policies has gained prominence as a potential avenue for fostering a more balanced representation of women in aviation. Flexible work, as conceptualized by various scholars and experts, includes a spectrum of arrangements that empower employees to exercise greater control over how, where, and when they fulfill their job responsibilities (Rau & Hyland, 2002). This dynamic concept recognizes the diverse needs and circumstances of individuals, allowing them to customize their work routines to accommodate personal commitments, family obligations and other life demands. At its core, flexible work signifies a departure from the traditional work model since it comprises of several key dimensions, including part-time work, compressed workweeks, telecommuting, job sharing and flexible hours (Rawashdeh, Almasarweh, & Jaber, 2016) . Part-time work involves reducing the standard number of working hours per week, allowing individuals to allocate more time to personal pursuits. Compressed workweeks concentrate full-time hours into fewer days, enabling longer periods of time off and Job sharing involves the splitting of one full-time role between two or more individuals, granting each participant more flexibility (Mamaghani, F. , 2006).

In the context of the aviation industry and its persistent gender imbalance, the significance of flexible work takes on a new dimension. For aspiring female pilots, the ability to reconcile the demands of pilot training, frequent travel, and irregular schedules with family responsibilities becomes a critical determinant of career viability (Marintseva, Mahanecs, Pandey, & Wilson, 2022). Workers are voicing difficulties in maintaining distinct boundaries between their professional and personal lives. This struggle has led to experiences of burnout and conflict between work and life responsibilities, resulting in discontent, diminished well-being, fatigue, and disruptions in daily functioning (Samtharam & Baskaran, 2023). Flexible work offers a potential solution by enabling women to pursue their passion for aviation while managing their familial commitments (Rawashdeh, Almasarweh, & Jaber, 2016) . This, in turn, can contribute to a more balanced representation of women in aviation STEM, enriching the industry with diverse perspectives and skills.

The significance of flexible work lies not only in its potential to enable work-life balance but also in its broader implications for employee well-being, job satisfaction, and organizational performance (Akyeampong, 1993). By accommodating the diverse needs of employees, particularly women, who often shoulder a disproportionate share of caregiving responsibilities, flexible work policies create an atmosphere which enhances both professional and personal growth. This empowerment fosters a sense of agency, contributing to enhanced job satisfaction and reduced stress levels. Furthermore, the adoption of flexible work policies has been linked to increased productivity and job performance (Samtharam & Baskaran, 2023) . When employees are afforded the flexibility to structure their work around their natural rhythm and personal commitments, they are better positioned to optimize their output. This alignment between work tasks and individual preferences can lead to improved concentration, creativity, and overall efficiency.

Furthermore, the implementation of flexible work arrangements holds the potential to positively influence retention rates among female pilots. Research has shown that such arrangements can lead to higher employee retention rates, as individuals are more inclined to stay committed to organizations that recognize and cater to their changing requirements (Tamara, Gultom, Sianipar, & Lee, 2021). By providing female pilots with flexible work options that align with their personal circumstances, the aviation industry could address the challenges associated with attrition and foster a more inclusive and supportive environment that encourages them to continue their careers in aviation.

A consensus is emerging among scholars that flexible work policies could serve as a valuable tool in addressing the representation of women in STEM (Harris, Dassopoulos, Sahl, & Starostina, 2021) . Research by O’Brien et al. (2023) revealed that a misalignment between organizational policies and the flexible work needs of women continues to impede their career advancement in several male-dominated fields.

The study conducted in Australian trades, sports, and surgery sector, explored the roles played by gender social practices on workplace gender equality. O'Brien et al. (2023) interviewed 15 women leaders focusing on the systematic sexism that have often resulted into male-domination of the STEM sectors. It was established that although the flexible work arrangements existed in paper, the women had to make complex decisions such as when to have children and its impact on the career.

However, a notable gap exists in the available literature, particularly concerning the practical implementation and feasibility of flexible work policies specifically tailored to pilots. The operational intricacies, safety imperatives, and economic considerations inherent to aviation introduce uncertainties that warrant thorough examination. Furthermore, while the concept of flexible work holds considerable promise, its successful implementation requires a nuanced approach that considers both individual preferences and organizational constraints (Yin & Wei, 2023). Striking a delicate balance between accommodating employee needs and maintaining operational efficiency remains a challenge, particularly in industries with unique demands like aviation.

Amidst the aviation industry's current struggle with a shortage of pilots, (Boeing, 2022), the integration of flexible work policies emerges as a pivotal stride toward achieving gender equality and enhancing the representation of women, particularly in pilot positions. In the quest for innovative strategies to bridge the gender divide, the transformative potential of flexible work to reshape aviation careers and bolster diversity emerges as an intriguing avenue for exploration. Leveraging these policies to attract and retain women offers a solution that not only addresses the gender gap but also meets the industry's pressing need for an increased number of pilots. As we delve further into the relationship between flexible work and the representation of women in aviation STEM, it becomes imperative to explore how these arrangements can be tailored to the intricate demands of pilot roles and the broader operational context of airlines.

2.3.2 Gender biases and representation of women in aviation STEM

Gender bias is a deeply entrenched and pervasive issue that continues to contribute to the representation of female pilots in airlines. It stems from societal norms, cultural beliefs and historical stereotypes that perpetuate the perception of certain professions, including piloting, as being more suitable or even exclusive to one gender (Yanıkoğlu, Kılıç, & Küçükönal, 2020).Historically dominated by men, the aviation industry has been influenced by such biases, dissuading women from pursuing pilot careers. According to the International Labor Organization, (2019), 17 states have sexist laws that hinder women access to the transport sector including civil aviation occupations. For instance, Russia that passed a law declaring some careers as exclusively male jobs as they are deemed harmful to the females.

Numerous studies argue that gender biases in the aviation industry reinforce stereotypes and preconceptions about women's abilities and roles (Schmader & Hall, 2014). This may lead to assumptions about women's suitability for certain aircraft types or flight routes, unequal distribution of challenging assignments, pay disparities, and limited access to leadership roles. These minor biases can accumulate over time, creating an environment where female pilots may feel marginalized, undervalued, and less confident in pursuing their career aspirations, negatively impacting their confidence, career prospects and opportunities for advancement, contributing to their representation in STEM professions (Graham & Ferla, 2019).

Additionally, pervasive stereotypes about gender roles in society can influence how female pilots are perceived by their colleagues and superiors, further influencing career opportunities and prospects (Van Veelen, Derks, & Endedijk, 2019). They may face unequal treatment in terms of flight assignments, working conditions, or opportunities for professional development. Gender-based harassment further hinders the progress of women in the aviation industry. Addressing and dismantling these biases is essential for enhancing gender diversity and equality in aviation STEM roles (Reidy, Salazar, Baumler, Wood, & Daigle).

One of the key areas where gender bias becomes evident is during the recruitment and selection process. Biased perceptions that associate piloting with masculinity may lead to unconscious biases in the hiring decisions, favoring male applicants and inadvertently hindering the recruitment of qualified female pilots (Tawfiq, Wahab, & Belal, 2023) . Marintseva et al. (2022) Studied the factors that contribute to the limited appeal of female candidates in pilot training and recruitment. The qualitative study employed semi-structured interviews of nine female pilots based in Europe, Australia, and UK. The findings indicate that the gender imbalance is attributable to the few role models for young women and girls, cultural sexism and low acceptance rates from male passengers and peers. The study, therefore, reveals a worrying trend that even some passengers have low trust levels towards female pilots. These biases can also affect the evaluation of female pilot candidates, leading to the underrepresentation of women in the pool of applicants and subsequently limiting their entry into the aviation industry (Marintseva, Mahanecs, Pandey, & Wilson, 2022).

Stereotypes that women are less competent or less committed to their careers due to family responsibilities or assumptions about their physical capabilities can undermine their opportunities for training, advancement, and promotion. Female pilots, as a result, find it hard to access leadership positions or higher-ranking roles within airlines, perpetuating the gender gap in the profession (Torry, 2022).

The scarcity of women in pilot roles reinforces the perception that piloting is primarily a male occupation, discouraging young women from considering aviation careers or even viewing it as a viable option (Casebolt, 2023). This lack of representation further limits the visibility of successful female role models in the field, making it difficult for aspiring female pilots to envision themselves succeeding in such roles. Addressing gender bias in airlines requires a comprehensive and multi-faceted approach. Implementing gender-inclusive policies and practices is essential, starting from the recruitment process, which should focus on attracting and promoting diversity (McGEE, Griffith, & HOUSTON, II, 2019). To promote positive conduct, organizations can implement confidential reporting mechanisms and impose stringent consequences for those who engage in biased behavior (Yanıkoğlu, Kılıç, & Küçükönal, 2020). Providing training and awareness programs for hiring committees and decision-makers can help them recognize and challenge unconscious biases during the selection process (UNESCO, 2016) . Offering mentorship and sponsorship programs specifically designed to support female pilots can play a significant role in breaking down gender biases and supporting their career development. Female pilots can benefit from guidance, encouragement, and networking opportunities, allowing them to overcome barriers and achieve success in their aviation careers. Furthermore, educational and outreach initiatives are vital for addressing gender bias from an early age (LUTTE & Morrison, 2022). Encouraging young girls to pursue interests in aviation and highlighting successful female pilots as role models can challenge stereotypes and eventually dismantle gender biases (Omura, 2020).

2.3.3 Work related stress and representation of women in aviation STEM

Numerous studies have explored the topic of work-related stress across various professions. Research by Oliveira-Silva (2022) revealed that increased perceptions of barriers among women in aviation STEM correspond to higher instances of anxiety and depression symptoms. Conversely, heightened perceptions of support correlate with reduced manifestations of anxiety and depression. This underscores the significance of fostering an environment that offers substantial support to female pilots in aviation STEM. By cultivating a supportive ecosystem, the aviation industry can effectively mitigate the adverse mental health effects experienced by women, thus promoting their health and retention.

It has been suggested that work-related stress poses a significant and widespread challenge for women in STEM, primarily due to the demanding and high-stakes nature of their roles (Esin & Ornek, 2020). Pilots often confront extended working hours, irregular schedules, and the pressure of multiple simulator checks and exams, all requiring sustained peak performance and proficiency. The added responsibility of ensuring passenger safety and successful flight operations further intensifies the pressure and anxiety they experience. Moreover, on top of these challenges, women in STEM often face extra pressure from doubters questioning their abilities in a traditionally male-dominated field, which can impact their confidence, well-being, and representation (Van Veelen, Derks, & Endedijk, 2019).

Additionally, the constant need to stay abreast of evolving technologies adds to their workload and potential risk of burnout. The aviation industry's work culture may also present work-life balance challenges for female pilots, as they must balance the demands of their professional roles with personal responsibilities and relationships. The social isolation experienced while spending extended periods away from home further exacerbates stress levels. The cumulative impact of these stressors can result in fatigue, burnout, reduced job satisfaction, and jeopardize the well-being of professionals (Schmader & Hall, 2014). Given the low representation of female pilots in the industry, addressing work-related stress becomes even more crucial to develop an atmosphere that ensures the safety and efficiency of the workforce. By recognizing and mitigating these stress factors, the aviation industry can foster a healthier and more resilient workforce for women in STEM roles. Empowering female pilots and providing them with the necessary support and resources will not only contribute to their success but also promote gender diversity and inclusivity within the aviation community.

Work-related stress for women in the context of piloting can also influenced by a range of factors, including the aviation industry's historically male-dominated nature. While the situation has been improving over the years, it is essential to recognize that certain challenges may persist. Women in piloting may face stereotypes and biases that can contribute to stress. People may hold traditional views about gender roles, leading to misconceptions about women's abilities as pilots. Discrimination and prejudice can manifest in several ways, such as unequal opportunities for career advancement, pay disparity, or being assigned less desirable flight routes. Like in many demanding careers, pilots often struggle to maintain a healthy work-life balance due to irregular schedules and long hours away from home. This challenge can be intensified for women, especially those with family responsibilities.

Moreover, the scarcity of women in leadership positions within the aviation industry can be discouraging for female pilots, leading to feelings of isolation, and limiting role models for career growth. Piloting is a mentally and physically demanding profession, and while women can perform as well as men in these roles, they may face additional scrutiny or pressure to prove their abilities. In some cases, training and employment policies may inadvertently favor male pilots, making it harder for women to enter or succeed in the industry. Additionally, women may experience sexual harassment or uncomfortable behavior from colleagues or superiors, leading to stress and anxiety.

To address work-related stress for women in piloting, a multi-faceted approach is necessary. Airlines should adopt initiatives that are inclusive and to create a more welcoming and supportive environment for women. This includes providing equal opportunities, promoting gender equality, and fostering a culture of respect. Establishing mentorship programs and support networks can help women pilots connect with experienced colleagues who can guide them through their careers. Airlines can explore flexible scheduling options and support mechanisms to assist pilots in achieving a better work-life balance. Efforts should be made to challenge gender stereotypes and biases during training programs, and education on unconscious bias can help create a fairer working environment.

Moreover, airlines must have strict policies against harassment and provide a safe reporting mechanism for any incidents that may occur. Celebrating successful women pilots and highlighting their achievements can inspire others and dispel stereotypes. By raising awareness about the difficulties experienced by women pilots, the aviation sector can cultivate understanding and stimulate proactive measures to tackle these challenges. Through these initiatives, airlines can help reduce work-related stress and enhance opportunities for women to thrive in the aviation industry.

2.3.4 Maternity policies and the representation of women in aviation STEM

The aviation industry, like many others, has historically faced challenges in creating a supportive environment for female pilots who want to balance their professional careers with family responsibilities. Maternity policies or the lack thereof, can have a profound influence on the recruitment, retention, and advancement of female pilots. Regarding duration of leave, some countries have enacted maternity laws. In Kenya, a woman is entitled to a fully paid three-month maternity leave. At the end of the leave, she must return to her previous job or a suitable alternative with terms and conditions not less favorable than if she had not taken maternity leave. Maternity leave can be extended with employer consent, or a woman can immediately transition to other forms of leave upon maternity leave's expiry (CAP. 226, 2012). In Uganda, leave of sixty working days is granted, with at least four weeks following childbirth or miscarriage (International Labour Organization, 2011). In Tanzania, the duration is 84 days (about 3 months) and 100 days (about 3 and a half months) if an employee gives birth to multiple children simultaneously (ILO, 2011). Rwanda and Ethiopia guarantee 84 and 120 calendar days, respectively (The World Bank, 2022).

Due to the unique nature of their job involving safety of passengers and crew, some countries have enacted laws to deal with this safety issue. The Kenya Civil Aviation Regulations limit the period of flying for pilots during pregnancy to between the 12th to the 26th week (Kenya Gazette, 2018). This scenario results in a specific pregnancy phase where female pilots are legally unable to fly, highlighting the essential requirement for policies detailing productive tasks they can perform during this period. Pilots who are paid based on productivity also face monetary loss during the periods on ground. However, limited studies have examined this aspect in female pilots' career trajectories.

Certain scholars contend that maternity laws and policies may inadvertently transfer additional financial responsibilities of potential unproductive periods to employers. Consequently, this could lead to the discrimination of women, particularly in the hiring phase, due to concerns over potential future maternity leaves (Yin & Wei, 2023). The fear of potential career disruptions and the associated costs may discourage airlines from hiring female pilots, contributing to their underrepresentation. The lack of accommodating maternity policies and the perceived risk of productivity loss could reinforce gender biases and impede the recruitment and advancement of female pilots, perpetuating the industry's gender imbalance. Addressing these concerns and implementing gender-inclusive maternity policies could help mitigate such barriers and promote greater gender diversity among pilots, fostering a more equitable and balanced aviation workforce.

Furthermore, Yin & Wei argue that organizations also face additional costs related to pregnancy. When female employees take maternity leave, companies may have to train or pay for substitutes, leading to financial and time-related expenses (Yin & Wei, 2023). Additionally, after a female employee returns from maternity leave, simulator training on a synthetic device is often necessary to reacquire skills before resuming flight duties. The cost of a one-hour simulator session can start at £399 ($548) and multiple hours are typically needed (Hayward & Singh, 2023). These financial considerations, whether for substitute pay or retraining, pose significant matters for airlines to deliberate when hiring female pilots and may contribute to their representation.

Numerous studies have argued that comprehensive family and maternity leave initiatives significantly contribute to the overall physical and mental health of mothers and their children. The provision of paid leave is linked to reduced instances of postpartum depression, lower rates of infant mortality, and decreased hospital re-admissions for both infants and mothers. Additionally, it fosters stronger mother-infant attachment and boosts attendance at pediatric visits (Zimmermann, et al., 2023) . The significance of promoting optimal physical and mental well-being is particularly crucial for female pilots, considering the demanding responsibilities and safety standards they uphold in their profession. The absence of such support could prove detrimental and potentially contribute to lower retention rates among female pilots in the aviation industry.

Various research proposes a significant correlation between the availability of paid maternity leave rights and the employment rates of mothers, especially those with young children. This stems from the fact that women are more inclined to join the workforce to meet the prerequisites for maternity leave benefits. Additionally, these policies increase the likelihood of women rejoining the labor force post-childbirth, attributed to the preservation of their human capital (Low & Marcos, 2015). Importantly, such policies not only impact general employment rates but also hold relevance for the representation and sustained involvement of female pilots in the aviation industry.

Balancing family responsibilities, especially during maternity, can be a significant challenge for women. Maternity policies within airlines, such as the period of maternity leave, provision of flexible work arrangements upon return and support for work-life balance, can have a considerable impact on female pilots' decisions to continue or temporarily pause their careers (Cruz, 2012). Inadequate maternity policies may result in a loss of experienced pilots or discourage women from pursuing pilot careers altogether, perpetuating the gender gap in the industry. Moreover, maternity policies can foster a positive organizational culture that values gender diversity and acknowledges the unique contributions of female pilots. When female pilots feel supported and valued during their maternity journey, they are more likely to be motivated to continue their careers, pursue professional growth opportunities, and contribute their skills to the success of the airlines.

2.4 Research Gap

The aviation industry within the East African region faces a significant and unique research gap pertaining to the combined influence of structural barriers, such as flexible work policies, gender biases, work-related stress, and maternity policies, on the representation of women in aviation STEM roles, particularly focusing on the case of female pilots at East African national carriers. While existing research has examined individual elements of these barriers, often in the context of airlines in the West and with a focus on varied factors, there exists a noticeable lack of comprehensive investigations that address how these factors interact within the specific socio-cultural and economic context of East Africa. This comprehensive study fills this gap by examining the intricate interplay of these variables and their implications for female pilots' careers, while considering the broader goal of enhancing gender diversity and equity within the aviation industry in East Africa.

2.5 Conceptual Framework

This is a schematic diagram or model that visually depicts the theoretical relationships between key concepts, variables, and elements of a research study. It serves as a graphical roadmap, illustrating how numerous factors are interconnected and how they contribute to the phenomenon under investigation. The conceptual framework visually outlines the intricate connections between structural barriers, such as flexible work policies, gender biases, work-related stress and maternity policies and their influence on the representation of female pilots in aviation STEM roles, specifically as pilots in East African National carriers. Through this visual representation, the conceptual framework will provide a clear and organized overview of the complex dynamics at play, helping audiences grasp the underlying mechanisms and patterns that shape gender disparities in the aviation industry.

CONCEPTUAL FRAMEWORK

INDEPENDENT VARIABLES **DEPENDENT VARIABLE**

STRUCTURAL BARRIERS

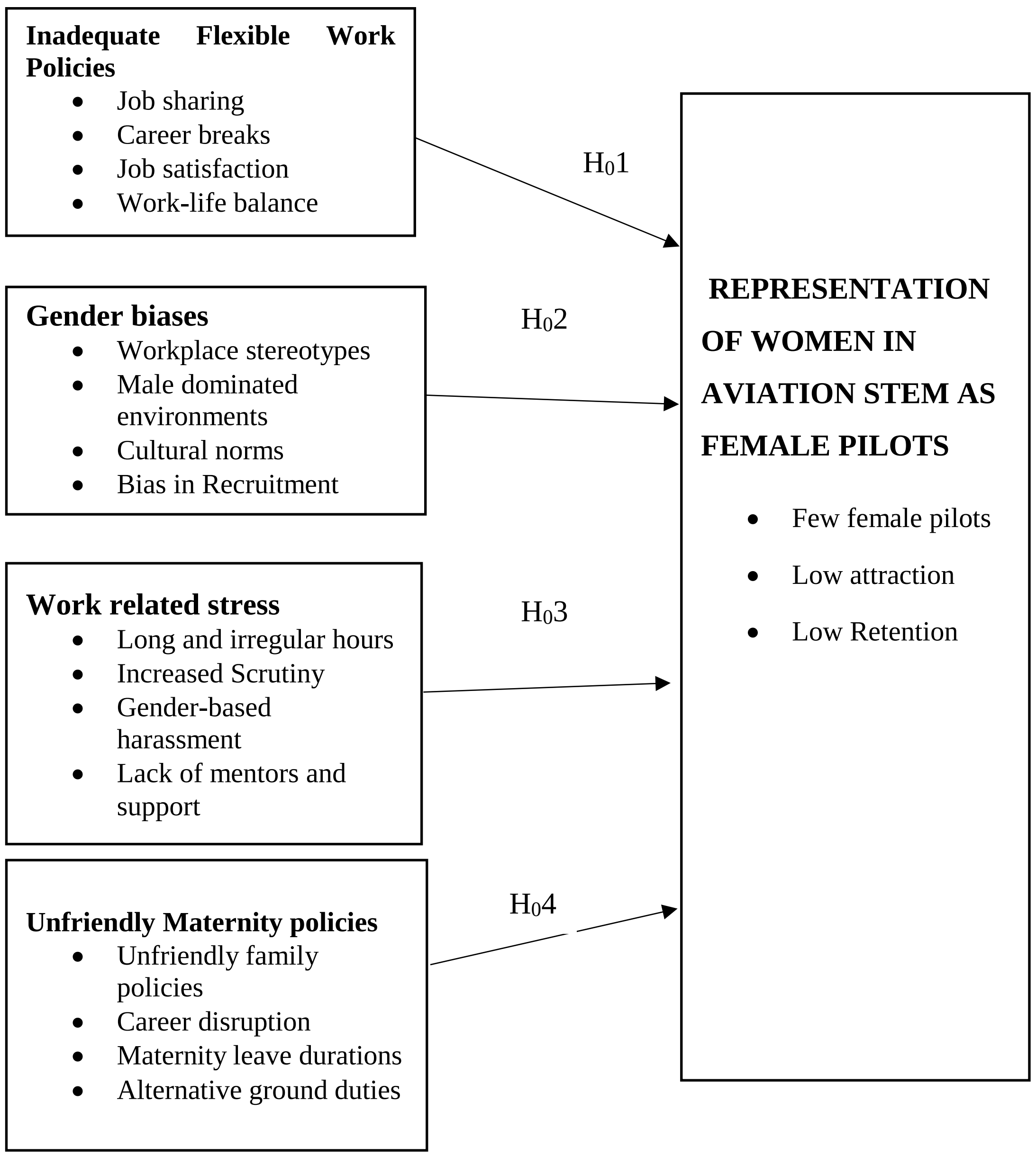


Figure 2.1: Conceptual framework

(Source: Researcher, 2023)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the approach used to effectively gather and analyze data to address the research questions. It discusses the research design, the target population, sample size, sampling strategy, instruments for data collection, and data analysis strategies employed.

3.2 Research Design

The study adopted an explanatory research design because it enables the establishment of cause-and-effect relationships between diverse variables, facilitating a profound comprehension of the multifaceted factors contributing to the representation (Maforah & Leburu-Masigo, 2018). By employing thorough analysis, the study meticulously examined the interplay of contextual elements in aviation such as flexible work policies, gender bias, work related stress and maternity policies that may influence the representation. Hypothesis testing within this design empowered the investigation to discern and validate specific influences on this imbalance, taking advantage of quantitative data. Furthermore, the insights generated provide a robust foundation for the development of evidence-driven policies and interventions, striving towards rectifying the gender imbalance and fostering a more inclusive representation of female pilots in the aviation domain of East Africa.

3.3 Target Population

The term "population" includes the entire group of individuals or components sharing a common trait or characteristic. On the contrary, the target population pertains to a particular subgroup or subset within the broader population, which receives primary attention in a study, intervention, or marketing strategy (Banerjee & Chaudhury, 2020).

The study’s target population consists of the 116 female pilots employed in national carriers within East Africa.

Table 3.1: Target Population

National Carriers	Number
Kenya Airways (Kenya)	28
Ethiopian Airline (Ethiopia)	55
Rwanda Air (Rwanda)	17
Air Tanzania (Tanzania)	11
Uganda Airlines (Uganda)	5
Total	**116**

(Source: Kenya Airways, Ethiopian airlines, Rwanda Air, Air Tanzania, Air Uganda HR 2023)

3.4 Sample Design

Sample size is the number of individuals or observations included in a research study or survey (Shaunders , Lewis, & Thornhill, 2019). It holds immense significance in research design as it directly influences the precision and dependability of the study's findings. Shaunders et al, emphasize that larger sample sizes tend to yield distributions that closely resemble the normal distribution, enhancing their reliability (2019). The study focused on a population of 116 individuals and used a census approach to thoroughly examine each person in this group. This method is well-suited for smaller populations and offers practicality and cost-effectiveness, with minimal differences in labor and time requirements compared to sampling methods (Zikmund, Babin, Carr, & Griffin, 2013). It ensured a high level of accuracy and precision, crucial for understanding the experiences of female pilots at East African national carriers and reduced bias in findings, particularly for underrepresented groups like female pilots.

The decision to employ a census aligned perfectly with the research objectives, promising comprehensive insights. Modern technology tools like digital questionnaires and data analytics make it convenient to collect data from all participants, eliminating sampling bias. Census also reduces the risks associated with non-response from some members of the target population.

3.5 Data Collection Instrument

The primary data collection tool comprised questionnaires containing closed-ended questions. These questionnaires served as the means to collect quantitative data concerning the experiences, challenges, and perceptions of female pilots regarding their representation in the aviation industry. The formulation of these questions was informed by insights gathered from the literature review of previous studies and is closely aligned with the indicators identified in the conceptual framework. The questionnaires were shared electronically with the respondents.

3.6 Pilot Study

Before data collection for the main study, a pilot study was carried out with 12 female plots selected from South African Airways and Jambo Jet to test the questionnaires' effectiveness and clarity. The insights from this pilot study were used to refine the questionnaire and ensure it is valid and reliable.

3.6.1 Validity of the instruments

Validity pertains to the accuracy with which a research instrument measures the intended concept or construct (Özkan, 2023). In the study, content validity was used for assessment of the instrument's validity. To achieve this, experts in the field were involved, including female pilots from South African Airways and Jambo Jet and diversity and inclusion specialists. Their role was to review the instrument and ensure that it adequately covered all relevant aspects of the concept being measured. The Likert scale was employed to quantitatively assess participants' attitudes, perceptions or opinions related to the research subject ranging from 1-"Strongly Disagree" to 5-"Strongly Agree”. The content validity index (CVI) was then calculated to ascertain the agreement level among experts regarding the instrument's item relevance and was found to be 0.92 and the unclear questions were modified in the retest. A higher CVI indicates stronger content validity, meaning that the instrument effectively covers the content domain of interest. Checking content validity is crucial as inaccuracies in the questionnaire items could lead to data lacking validity.

$$CVI = \frac{Number\ of\ Items\ rated\ relevant}{Total\ number\ of\ items}$$

3.6.2 Reliability

Reliability in a research instrument refers to its consistency and stability in producing reliable measurements across different situations and over time (Özkan, 2023) . Put simply, a reliable instrument should yield consistent results when used on the same individuals at separate times or by different evaluators (Shaunders , Lewis, & Thornhill, 2019). To assess the questionnaire's external reliability, a test-retest method was administered to 12 participants at a time, on two separate occasions, with a one-week gap between administrations. External reliability involves assessing whether the technique used to collect data and analyze it would yield consistent results if repeated on a different occasion (Shaunders , Lewis, & Thornhill, 2019). The goal was to examine the correlation between the responses provided by the same individuals at different time points. To mitigate participant fatigue, the researcher ensured that the interaction with each participant is kept brief. To assess internal consistency, Cronbach's alpha α was adopted to check agreement among questionnaire responses, within a subgroup. An alpha coefficient (0 to 1) above 0.7 suggests strong internal consistency (Shaunders , Lewis, & Thornhill, 2019).

3.7 Data Analysis and Presentation

Quantitative data collected from questionnaires was analyzed using the Statistical Package for the Social Sciences (SPSS). This analysis involved deriving descriptive statistics and investigating relationships between variables. The approach encompassed a range of descriptive statistical measures, including means and percentages, to portray the distribution of Likert scale responses and demographic characteristics of participants. Moreover, inferential statistical methods like Analysis of Variance (ANOVA) were applied to discern disparities between groups, while correlation analysis was utilized to explore relationships between variables. The ensuing findings were artfully presented, utilizing charts, tables, and narrative explanations, to effectively communicate the results in a lucid and well-organized manner.

The study also utilized various statistical tests, such as chi-square and regression analysis. A predetermined level of significance α at 0.05 was employed.

The multiple regression model that was used for the research is as follows:

$$Y = \beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\varepsilon$$

Y = Representation of women in aviation STEM roles as pilots (Dependent variable)

β_0 = Constant

X= Independent variable

X_1 = Flexible work policies

X_2 = Gender Bias

X_3 = Work related stress

X_4=Maternity policies

ε = Error term

$\beta_1 \ldots \beta_4$ = represent the coefficients associated with X1, X2, X3 and X4 respectively

Diagnostics tests for Normality, Heteroscedasticity, and Multicollinearity were used to test for regression assumptions as shown in the table below.

Table 3.2: Assumptions of Regression Analysis

Test	Significance	Test to be used	conclusion
Normality	Aid in understanding the distribution's shape hence enabling the prediction of dependent variables scores	Shapiro-Wilk test Quartile-Quartile Plot (Q-Q plot)	P-value>0.05, indicates that data is normally distributed The dependent variable scatter needs to be distributed normally to enable the fit to work.
Heteroscedasticity	Checks whether the dependent variable's variance fluctuates between data points (test the assumption of equal variance)	Breusch-Pagan	p>0.05, data is not heteroskedastic
Multicollinearity	Verify the strength of the correlations between the independent variables.	Variance Inflation Factor (VIF)	Multicollinearity exists when the VIF for one of the variables is closer to or > than 10.

Source: (Kaufman, 2013)

3.8 Ethical Considerations

The study maintained strict ethical standards throughout. Potential participants were issued with comprehensive information on the research, including its goals, purpose, nature, and the expectations for their involvement. Informed consent was obtained to ensure voluntary participation and protect anonymity while upholding confidentiality and data security. The participants' well-being and rights were always of utmost concern. Prior to commencing the study, authorization letters were obtained from the National Commission for Science, Technology, and Innovation (NACOSTI) and Moi University.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF FINDINGS

4.1. Introduction

This chapter presents the findings of the study. It first provides background information on the respondents' demographic information, followed by the display of descriptive statistics regarding the primary outcomes, along with an analysis and discussion of the findings. Descriptive and inferential statistics were employed to analyze the findings vis-à-vis the study objectives of establishing correlation between structural barriers and representation of women in aviation STEM roles. The last section utilizes empirical literature and theoretical models to explore the roles played by the independent variables (flexible work policies, gender biases, work related stress and maternity policies) on the observed trends.

4.2 Response Rate

The completed and returned questionnaires from the participants indicate the response rate for the data collection. Table 4.1 represents the rate of response for this study.

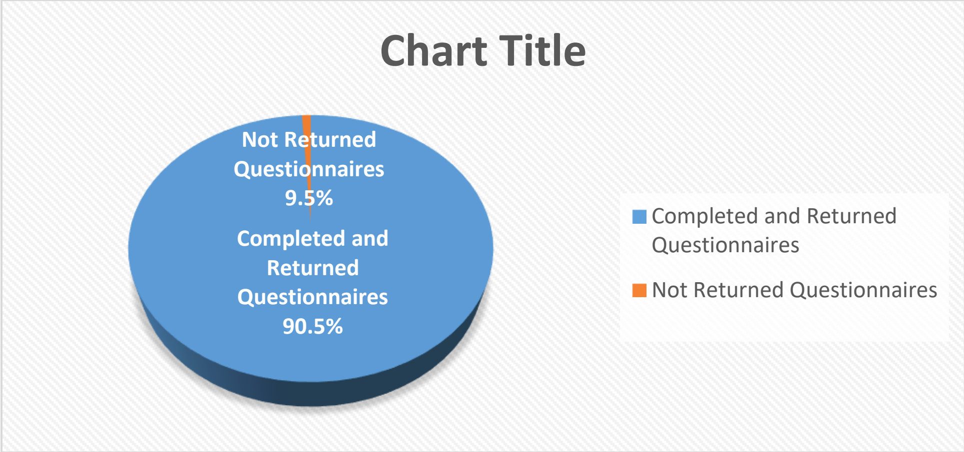
Table 4.1: Response Rate

National Carriers	Targeted Respondents	Response Rate
Kenya Airways (Kenya)	28	26
Ethiopian Airline (Ethiopia)	55	46
Rwanda Air (Rwanda)	17	17
Air Tanzania (Tanzania)	11	10
Uganda Airlines (Uganda)	5	5
Total	**116**	**105**

(Source: Research Data, 2023)

Response rates are crucial for evaluating the representativeness and reliability of the collected data, shedding light on the willingness of participants to engage in the research. The "Targeted Respondents" column indicates the tally of individuals the research aimed to include from every national carrier, representing the researchers' desired participants. In the "Response Rate" column, the actual number of individuals from each national carrier who actively participated in the study is displayed. Notably, response rates vary across the national carriers, with some achieving higher participation rates than others. Ethiopian Airlines had a response rate of 46 out of 55, indicating a significant level of engagement. Similarly, Air Tanzania exhibited a strong response rate of 10 out of 11. Kenya Airways had a response rate of 26 out of 28. Notably, Uganda Airlines achieved a perfect response rate, with all five targeted respondents participating. It is essential to mention that at the time of the study, Ethiopian Airlines and Rwanda Air had recruited more female pilots, but they were under training and were not fully on boarded into the airlines hence were not included in the study.

The total response rate for all national carriers combined is 105 out of 116, signifying an overall response rate of 90.5%. This substantial overall response rate underscores the study's ability to accurately depict the actual structural barriers obstructing equal representation of women in aviation STEM roles in the real world.



Not returned-11 Returned-105

Figure 2: Response Rate

(Source: Research Data 2023)

4.3 Demographic Information

The study collected vital demographic data including age, gender, experience, employer, and the presence of minor dependents. These social factors were then analyzed to gauge their impact on the status of women pilots in the aviation industry. This data is essential in research as it offers a holistic view of the study group, facilitating comparisons, trend identification, intervention customization, ensuring representation, and addressing matters like bias and equity. Demographics provide essential context, enabling researchers to draw informed conclusions and make decisions grounded in the characteristics of the subjects under examination.

4.3.1 Ages of Respondents

The respondents were of various age ranges as summarized in table 4.2. The age distribution of the respondents, as presented in the table, offers important insights into the demographic composition of the study's participants.

Table 4.2: Ages of respondents

Age (years)	Frequency	Percentage
25-34	41	39%
35-44	57	54%
45-54	6	6%
55-64	1	1%
Total	**105**	**100%**

(Source: Research Data 2023)

The largest age group among the respondents falls within the 35-44 years range, comprising 57 individuals, which accounts for 54.29% of the total respondents. The perspectives and behaviors of this age group may hold particular significance in shaping the study's findings.

Following closely, the age group of 25-34 years is the second largest, with 41 individuals, representing 39.05% of the total respondents. This group constitutes a substantial portion of the participants, and their input may be pivotal for understanding the perspectives and behaviors of a younger demographic. The age distribution of respondents reveals a higher presence of younger participants, which may suggest an increase in the number of female pilots over time or lower retention rates among more experienced individuals.

In contrast, the 45-54 years and 55-64 years groups in age have fewer participants, constituting 5.71% and 0.95% of total respondents. This data highlights the significance of considering age as a factor in understanding trends and behaviors related to the study's subject matter. It is important to acknowledge the strengths and limitations of this age-based demographic information to ensure a thorough and well-rounded analysis.

4.3.2 Work experience of the respondents

The effectiveness of any organization's system heavily relies on the experience and expertise of its workforce. In this section, this research examines the distribution of respondents' experience among those who participated in the study.

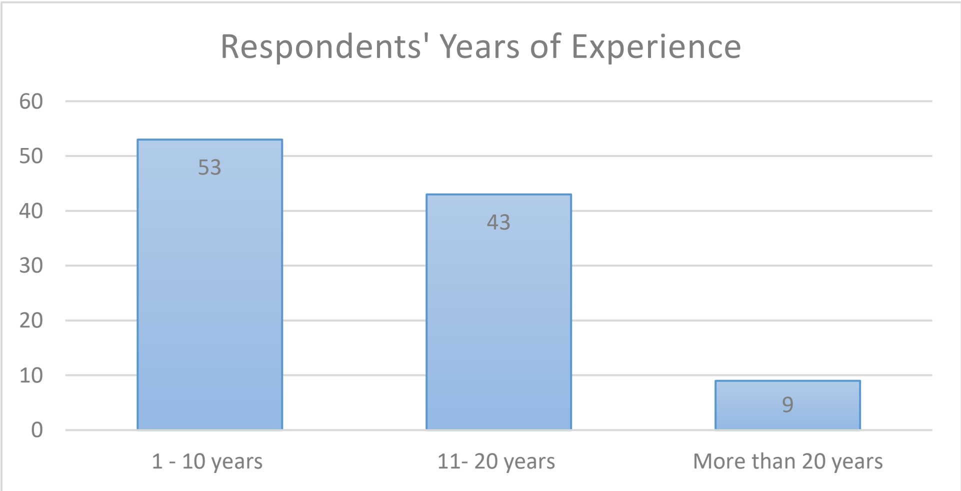


Figure 3: Years of Experience

(Source: Research Data 2023)

Table 4.3: Respondents' work experience

Number of years	Respondents	Percentage
1-10	43	41%
11–20	53	50%
21 and above	9	9%
Total	105	100%

(Source: Research Data 2023)

The table above offers insights into the work experience of the study's respondents, categorizing them according to the number of years they have spent in the workforce. This breakdown is important for gaining a better understanding of the composition of the participants in terms of their professional backgrounds and the duration of their careers.

The most prominent group among the respondents is those with 11-20 years of work experience, accounting for 53 individuals, which represents 50% of the total respondents. This category includes individuals with substantial experience in their respective fields, making their perspectives valuable, especially in research topics tied to industry-specific knowledge or career progression.

The group with 1-10 years of work experience includes 43 individuals, representing 41% of the total respondents. These participants are relatively new in their careers and can provide valuable insights into the initial stages of a professional journey. It is important to acknowledge that the COVID-19 pandemic led many airlines to temporarily suspend pilot recruitment from 2020 onward due to decreased travel demand. This interruption in recruitment may have implications for the number of pilots with experience ranging from 1-10 years, potentially affecting their representation.

A smaller yet significant group of 9 individuals (9% of the total respondents) have accumulated 21 or more years of work experience, making them seasoned professionals with extensive knowledge and expertise. Their insights are particularly valuable for understanding long-term industry trends or changes.

The distribution of respondents across these three work experience groups (1-10 years, 11-20 years, and 21 or more years) is balanced, ensuring a comprehensive representation of perspectives from professionals at various career stages. This distribution is critical for analyzing the study's findings, as insights from respondents with dissimilar experience levels can significantly impact the research's conclusions and recommendations. The diversity in work experience among participants is a valuable perspective for understanding the factors that influence the representation of women in the STEM sector, both those deeply rooted and emerging.

4.3.3 Respondents' Airlines

The study achieved representation of East African major airlines. Most of the participants worked at Ethiopian airlines at 44%. The women pilots at Kenya Airways, Rwanda Air, Air Tanzania, and Uganda Airlines were equally represented in the study at 26%, 16%, 9%, and 5% respectively. Consequently, the outcomes of study can be generalized to the entire population of women in STEM fields across the region's aviation industry.

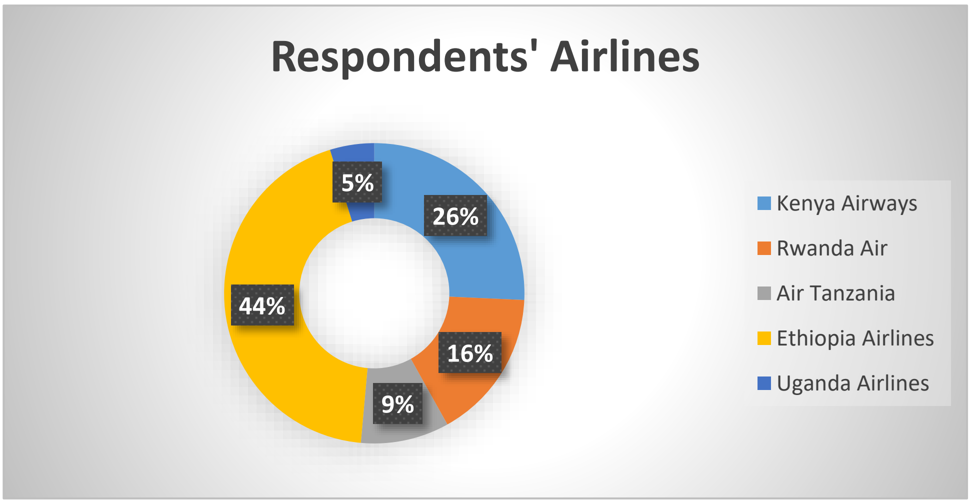


Figure 4: Respondents' Airlines
(Source: Research Data 2023)

4.3.4 Respondents with minor Dependents

The study also examined whether the participants had young children or minors under their care. Figure 3 illustrates that 55% of the respondents had childcare responsibilities, while 45% did not. This data point forms the basis for investigating the potential impact of childcare responsibilities on the gender gap within aviation STEM.

These findings suggest that family and caregiving responsibilities may play a significant role in limiting women's participation and advancement in these fields, as they contend with challenges related to work-life balance. Exploring the link between caregiving duties and women's career opportunities in this sector can enrich our overall understanding of gender disparities and provide guidance for initiatives that promote gender diversity and inclusion in aviation STEM.

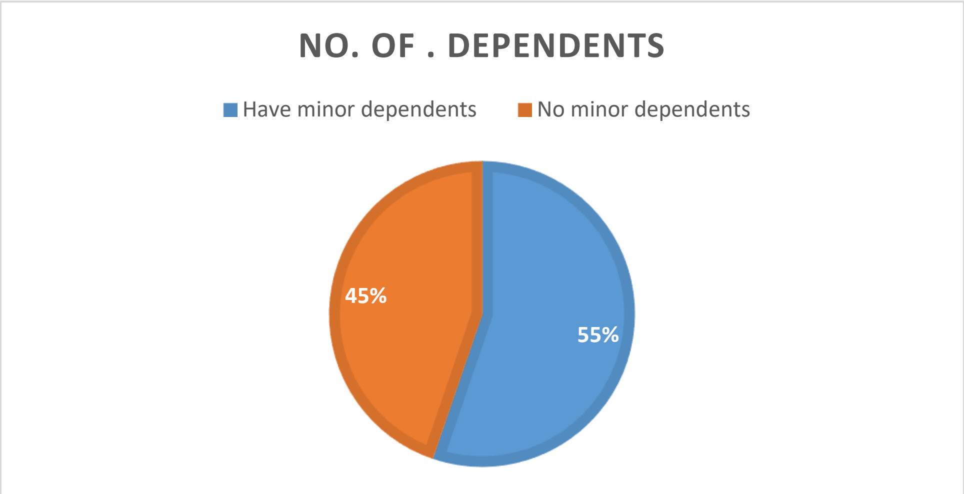


Figure 5: Respondents with minor Dependents

(Source: Research Data 2023)

4.4 Validity and Reliability Tests

4.4.1 Validity

The questionnaire, consisting of 25 items, was assessed by a human resource professional who found 23 of these items to be relevant and identified 2 items that needed adjustments. After this evaluation, the content validity index (CVI) was calculated as:

$$CVI=\frac{\text{Number of Items rated relevant}}{\text{Total number of items}}=23/25$$

The CVI was found to be 0.92

While only two items required minor adjustments, the overall CVI stands at a robust 0.92, underscoring the questionnaire's strong alignment with the intended objectives and its suitability for assessing the targeted constructs. It underscores the questionnaire's thoroughness and effectiveness, confirming its quality and appropriateness to the study.

4.4.2 Reliability test

Table 4.4: Cronchba Alpha Test

Reliability Statistics

Cronbach's Alpha	N of Items
.831	5

(Source: Research Data 2023)

The Cronbach's alpha value of the data was 0.831. As Shaunders et al. (2019) Explain, a Cronbach's alpha coefficient above 0.7 indicates a high reliability. Therefore, the study clearly has internally consistent data and is reliable for analysis, ensuring dependable and consistent results.

4.5 Descriptive Statistics

4.5.1 Representation of women in aviation STEM roles as pilots

The study aimed to investigate the structural barriers influencing representation of women in aviation STEM roles, specifically focusing on female pilots within East African national carriers. Data collection involved the distribution of online questionnaires to the study's participants, who were female pilots. Table 4.5 shows the questionnaire findings, offering insights into these pilots' perceptions regarding women's representation in aviation STEM roles, particularly as pilots.

The data in the table is categorized into five groups, representing diverse levels of agreement with statements about the representation issue. Remarkably, 97.14% of the respondents, totaling 102 individuals, expressed a "Strongly Agree" that women underrepresentation in aviation STEM roles is a significant concern.

Table 4.5 Representation of women in aviation STEM roles as pilots

Ratings on representation women in aviation STEM roles as pilots	Frequency	Percentage
Strongly Agree	102	97.14%
Agree	3	2.86%
Neutral	0	0%
Disagree	0	0%
Strongly disagree	0	0%
Total	**105**	**100%**

(Source: Research Data 2023)

In contrast, a small portion of respondents, just 2.86% (3 individuals), "Agree" that the matter of women's representation in aviation STEM roles as pilots is indeed a problem. While this viewpoint is in the minority, it still reflects a recognition of the gender imbalance within aviation STEM roles. Remarkably, none of the respondents expressed a "Neutral" perspective, indicating a complete lack of indifference among those surveyed. Similarly, there were no "Disagree" or "Strongly Disagree" responses, underlining the broad consensus among the surveyed pilots that addressing gender diversity in aviation STEM, particularly in piloting, is a matter of significant importance.

This overwhelming consensus highlights a common perspective on the pressing need to promote gender diversity in this field. It holds significant implications for policymakers and organizations as they formulate strategies and initiatives to foster gender diversity and inclusivity in aviation STEM roles, especially among pilots.

4.5.2 Role of Flexible work policies on the representation of women in aviation STEM

This was the first objective of the study. It focused on investigating the effect of flexible work policies on the representation of women in aviation STEM roles as pilots. The findings of the questionnaires are presented in Table 4.6. From the table, a significant majority of respondents, 73.33%, strongly agree that flexible work policies would have an affirmative influence on the representation of women in aviation STEM roles. They have strong beliefs that introducing flexible work arrangements would go a long way in the increase in the number of women pursuing careers in the STEM fields, as well as rising up the ladder to fill influential positions in aviation STEM.

Table 4.6 Respondents' views on influence of Flexible work policies

Rating on the effect of flexible work policies	Frequency	Percentage
Strongly Agree	87	73.33%
Agree	17	18.10%
Neutral	1	0.95%
Disagree	0	0%
Strongly disagree	0	0%
Total	**105**	**100%**

(Source: Research Data 2023)

Additionally, 18.10% of respondents "agree," indicating support for the positive influence of flexible work policies. In contrast, 0.95% of respondents expressed a neutral stance, neither strongly agreeing nor disagreeing with the statement. While this represents a minority viewpoint, it signifies that there are individuals who may have reservations or uncertainties regarding the influence of flexible work policies in this context. Importantly, the fact that no respondents disagreed with the notion indicates that flexible work policies are a critical factor in the quest to achieve equality and equity in all STEM sections of the aviation industry.

4.5.3 Role of Gender biases on the representation of women in aviation STEM

This was the second objective of the study. It focused on investigating the effect of gender biases on the representation of women in aviation STEM roles as pilots. The study findings are illustrated in Table 4.7.

Table 4.7 Respondents' views on influence of Gender Biases

Rating on the effect of gender biases	Frequency	Percentage
Strongly Agree	97	84%
Agree	7	12%
Neutral	1	3%
Disagree	0	0%
Strongly disagree	0	0%
Total	105	100%

(Source: Research Data 2023)

An overwhelming 84% of the respondents expressed a "Strongly Agree" stance, signifying a strong consensus regarding the influential role of gender biases in the limited representation of women in aviation STEM roles. This high percentage underscores that persistent negative stereotypes and biases regarding women's capabilities in these prestigious roles continue to be a primary contributing factor to gender imbalance.

An additional 12% of respondents express agreement with this notion, though to a lesser extent, than those who strongly agree. Nevertheless, this percentage still indicates substantial alignment with the idea that gender biases affect the representation of women in aviation STEM roles.

A smaller portion of respondents, accounting for 3% of the total, adopt a neutral stance, neither affirming nor negating the statement. This group may have mixed or uncertain feelings on the issue or may lack sufficient information to form a definitive opinion.

None of the study participants chose the "disagree" or "strongly disagree" options. This response provides compelling evidence that addressing the underrepresentation of women in aviation STEM can be effectively achieved through sensitization on gender bias among other initiatives.

4.5.4 Role of Work-related stress on the representation of women in aviation STEM

This was the third objective of the study. It focused on examining the influence of work-related stress on the representation of women in aviation STEM roles as pilots. The findings are presented in Table 4.8. Notably, a significant 84.8% of respondents "Strongly Agree," and 13.3% "Agree" that work-related stress plays a significant role in the limited presence of women in aviation STEM roles. This high agreement level is indicative of a consensus among nearly all participants regarding the significant influence of work-related stress on the gender gap in aviation STEM fields, especially in piloting positions. In contrast, 1.9% of respondents expressed a neutral stance, neither affirming nor negating the statement. This group may have mixed or uncertain feelings on the issue, indicating a need for further investigation and analysis.

It is noteworthy that no respondents disagreed or strongly disagreed with the assertion that work-related stress affects the representation of women in aviation STEM positions, confirming the consensus among participants.

Table 4.8 Respondents' views on influence of Work-related stress

Rating on the effect of Work-related stress	Frequency	Percentage
Strongly Agree	89	84.8%
Agree	14	13.3%
Neutral	2	1.9%
Disagree	0	0%
Strongly disagree	0	0%
Total	**105**	**100%**

(Source: Research Data 2023)

4.5.5 Maternity policies and the representation of women in aviation STEM roles as pilots

This was the fourth objective to explore the association between maternity policies and the representation of women in aviation STEM roles. The findings are presented in Table 4.9.

Table 4.9 Respondents' views Maternity policies

Rating on the effect of Maternity policies	Frequency	Percentage
Strongly Agree	100	95.24%
Agree	3	2.86%
Neutral	2	1.90%
Disagree	0	0.00%
Strongly disagree	0	0.00%
Total	105	100%

(Source: Research Data 2023)

The data reveals a substantial consensus among respondents, with 95.24% strongly agreeing that maternity policies have a positive effect on women's representation in aviation STEM roles. This overwhelming support underscores the recognition among those surveyed that such policies play a vital role in promoting gender diversity, especially in demanding and traditionally male-dominated positions like piloting. While the majority strongly supports maternity policies, 2.86% “agree” with their positive influence. This minority perspective reflects an acknowledgment of the importance of these policies in fostering inclusivity and gender balance in aviation STEM careers. A small portion, representing 1.90% of respondents, takes a neutral stance on the matter, neither strongly agreeing nor disagreeing with the statement. This suggests a degree of uncertainty or mixed sentiments within a limited portion of the surveyed individuals. However, there are no respondents who disagree or strongly disagree with the idea that maternity policies have a positive influence, indicating a broad consensus in favor of these policies among those surveyed. The data underscores the significance of maternity policies in the aviation STEM sector, with fanatical support from most respondents. It emphasizes the need for policies that provide support and accommodations for women during pregnancy and maternity leave.

Table 4.10 Summary of Mean and Standard deviation

Factors	Mean	SD
Flexible work policy	4.53	0.81
Gender biases	4.89	0.36
Work-related stress	4.84	0.71
Maternity policies	4.95	0.59

(Source: Research Data 2023)

Table 4.10 summarizes the mean and standard deviation values for four critical factors related to gender diversity in aviation STEM roles: flexible work policies, gender biases, work-related stress, and maternity policies. The mean scores indicate a strong consensus among respondents, with all factors receiving mean values above 4, signifying agreement with their positive influence. However, the standard deviations reveal varying degrees of enthusiasm and agreement among respondents, highlighting the need for tailored approaches when implementing policies and initiatives related to these factors. These findings emphasize the importance of these factors in promoting gender diversity and inclusivity within the aviation industry, urging organizations and policymakers to address them effectively to create more equitable and supportive environments for women in STEM roles.

4.6 Diagnostic Tests

Diagnostic tests, like checking for normality, heteroskedasticity, and multicollinearity, were conducted. These tests act as guardians to ensure that the crucial conditions for statistical analysis are met. Meeting these conditions allows researchers to draw valid conclusions and make well-founded decisions based on the data, strengthening the reliability and credibility of their research findings.

4.6.1 Normality

The Shapiro-Wilk test was undertaken to establish whether the data was distributed normally. The results are as indicated in table 4.11. Based on Shapiro-Wilk's results in the table, the p-values for all variables are 0.000 >0.05 after Log transformation, indicating that the variable points are normally distributed.

Table 4.11: Normality Test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LOGRW	.203	105	.058	.909	105	.056
LOGFWP	.160	105	.058	.924	105	.056
LOGGB	.153	105	.058	.920	105	.056
LOGWRS	.153	105	.058	.920	105	.056
LOGMP	.163	105	.058	.932	105	.056

a. Lilliefors Significance Correction

(Source: Research Data 2023)

Q-Q plots are graphical tools used to assess whether a dataset follows a particular distribution, typically the normal distribution.

Q-Q Plot of representation of women in aviation STEM roles

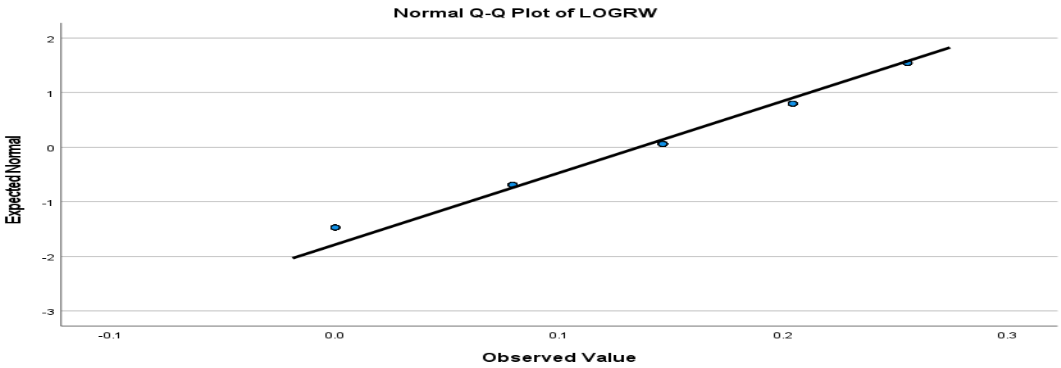


Figure 6: Quartile-Quartile plots (Q-Q Plots)

(Source: Research Data 2023)

Upon examination of the Q-Q plot for the variable "Representation of women in aviation STEM roles," it is observed that the points closely follow the plots diagonal line from the bottom-left to the top-right corner. This pattern indicates that the data is linear and follows the expected quantiles of a theoretical distribution, approximately normally distributed.

Q-Q plot of Flexible work policies

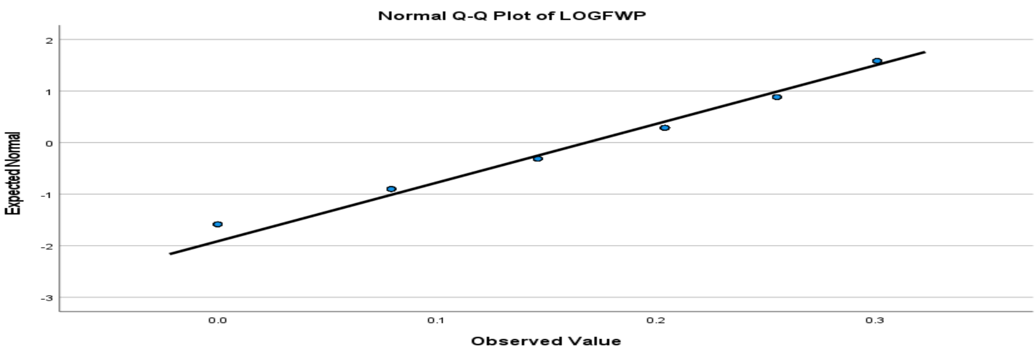
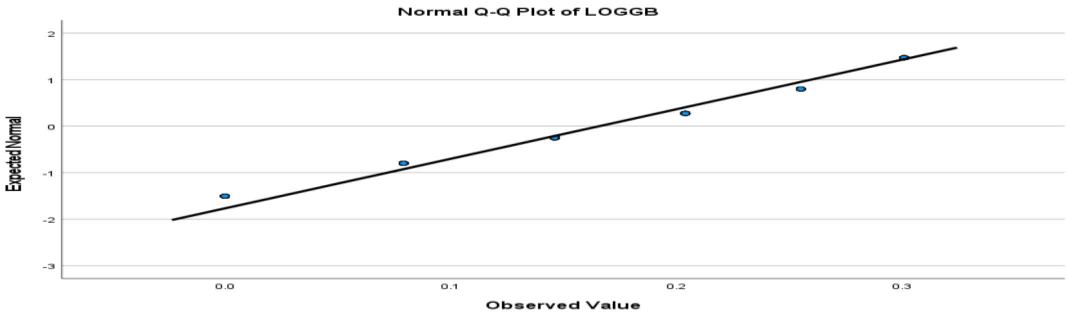


Figure 7: Quartile-Quartile plots (Q-Q Plots)

(Source: Research Data 2023)

Similarly, the Q-Q plot for "Flexible work policies" displays a pattern where the observed quantiles align well with the expected quantiles along the diagonal line. This suggests that the data for flexible work policies also exhibits a linear relationship.

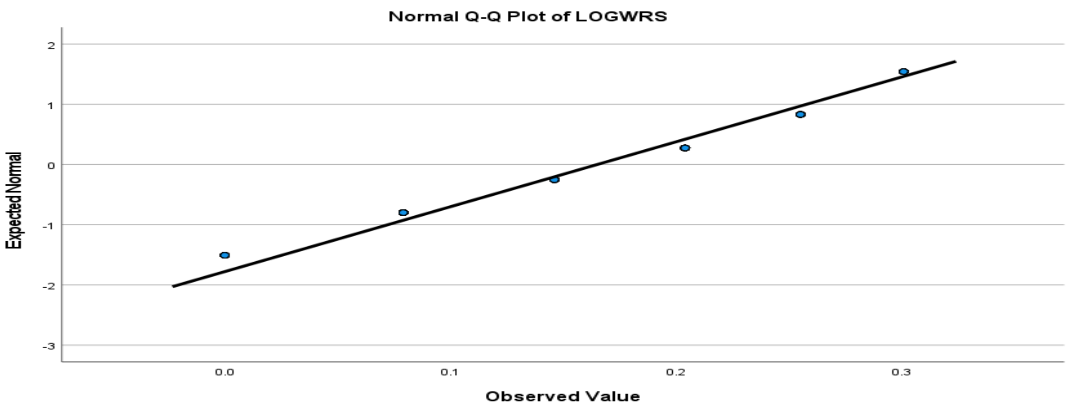
Q-Q Plot of Gender Bias



(Source: Research Data 2023)

The Q-Q plot for "Gender Bias" reveals a linear pattern, with points closely following the diagonal line. This indicates the data on gender bias is linear and approximately normally distributed.

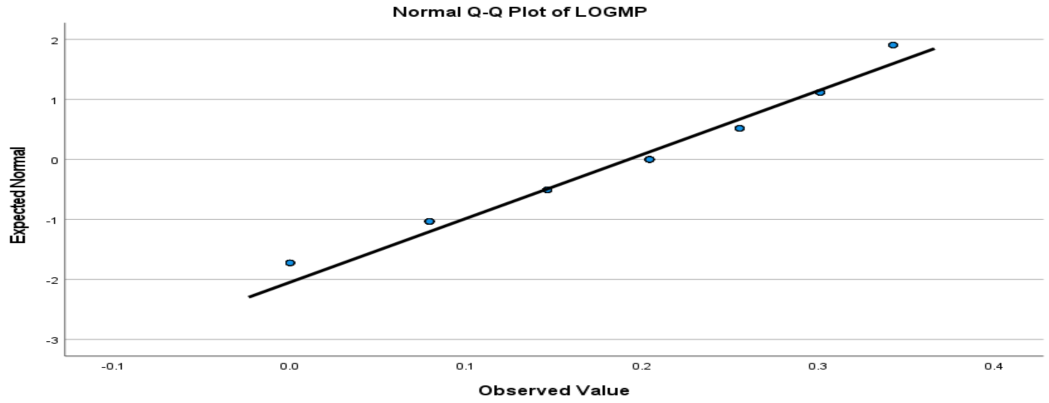
Q-Q Plot of Work-Related Stress



(Source: Research Data 2023)

Examination of the Q-Q plot for "Work-Related Stress" shows that the data points align well with the diagonal line, indicating linearity in the data hence approximately normally distributed.

Q-Q Plot of Maternity Policies



(Source: Research Data 2023)

The Q-Q plot for "Maternity Policies" exhibits a linear pattern, with the observed quantiles following the expected quantiles along the diagonal line with a few outliers but exhibits approximately the normal distribution.

4.6.2 Heteroscedasticity

Heteroskedasticity means that the variation in data points is not consistent across various levels of an independent variable. It often happens in regression analysis when the assumption of having consistent variation (homoscedasticity) is not met. Heteroskedasticity can cause problems like unreliable standard errors, less precise estimates of relationships, and difficulties in understanding the impact of predictors.

Table 4.12: Heteroskedasticity

Modified Breusch-Pagan Test for Heteroskedasticity[a,b,c]

Chi-Square	df	Sig.
.007	1	.933

a. Dependent variable: SQRTRW
b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.

c. Predicted values from design: Intercept + FWP + GB + WRS + MP + FWP * GB + FWP * WRS + FWP * MP + GB * WRS + GB * MP + WRS * MP + FWP * GB * WRS + FWP * GB * MP + FWP * WRS * MP + GB * WRS * MP + FWP * GB * WRS * MP

The null hypothesis of the Modified Breusch-Pagan Test is that the variance of the errors (residuals) is homoskedastic, meaning that it does not depend on the values of the independent variables. If the p-value is less than a chosen significance level (often 0.05), the null hypothesis would be rejected, indicating the presence of heteroskedasticity. Conversely, since the p-value is 0.933, we fail to reject the null hypothesis, suggesting that there is no significant heteroskedasticity.

4.6.4 Multicollinearity

Multicollinearity tests results are as indicated in table 4.12. Multicollinearity refers to a situation in regression analysis where independent variables in a model are significantly correlated with each other, making it hard to separate their individual influence on the dependent variable. It is essential to address multicollinearity because it can lead to unstable regression coefficients and overfitting, decreasing the model's accuracy when applied to new data.

Table 4.13: Multicollinearity Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.192	.263		8.326	.000		
	FWP	.086	.042	.151	2.051	.043	.763	1.310
	GB	-.209	.070	-.292	-2.968	.004	.427	2.345
	WRS	-.079	.036	-.201	-2.224	.028	.508	1.970
	MP	.192	.066	.279	2.897	.005	.446	2.241

a. Dependent Variable: representation of women in aviation STEM roles

(Source: Research Data 2023)

The Variance Inflation Factor (VIF) values for flexible work policies, gender biases, work related stress and maternity policies were 1.310, 2.345, 1.970 and 2.241, indicating low correlation. Ideally, the higher the VIF, the greater the correlation between the independent variables thereby leading to unstable regression coefficients and over-fitting. This means the model's accuracy will decrease significantly when applied to another set of sample data or survey results. According to Kaufman (2013) , Variance Inflation Factor (VIFs (Variance Inflation Factor)) below 3 indicate low correlation and below 5 shows moderate correlation hence may not require corrective action. On the other hand, VIF > 5 lead to poorly estimated coefficients, as well as questionable p-values. Such data contains type II error that reduces the predictive power of the model and the statistical power of the model. As such, the VIF values derived in this study are below the threshold meaning that there was no multicollinearity problem.

4.7 Inferential Statistics

4.7.1. Correlation Analysis

Karl Pearson's coefficient of correlation was used to explore the strength of the relationships between the independent variables in the study. It assesses how one variable changes as the other changes but does not mean that one causes the other. This test assesses the statistical relationships and associations between one or two variables while measuring the strength of the association, denoted as "r," on a scale from -1 to +1. An "r" value close to +1 indicates a strong positive correlation, near -1 signifies a strong negative correlation, and close to 0 implies a weak correlation. Evaluating the magnitude of the relationship allows us to understand the roles played by each variable in addressing the barriers to women's equal representation in the sector.

In Table 4.14, the data reveals significant correlations among all the independent variables, with the strongest negative correlation observed between maternity policies and gender bias (-0.704). As gender bias increases, maternity policies tend to decrease, indicating a relationship where higher gender bias is associated with fewer maternity policies. The second-strongest correlation is between gender bias and work-related stress (0.643), showing that as gender bias increases, work-related stress tends to increase. The third-strongest correlation is between work-related stress and maternity policies (-0.631), suggesting that as maternity policies increase, work-related stress tends to decrease. The weakest relationship is found between flexible work policies and maternity policies (0.408), indicating that as flexible work policies increase, maternity policies tend to increase too. Notably, the two-tailed test produced p-values of 0.000, which is <0.05 for all the variables, confirms a statistically significant relationship between flexible work policies, gender bias, work-related stress, and maternity policies, as well as their influence on the representation of women in aviation STEM.

Table 4.14: Pearson Correlation Results

Correlations

		FWP	GB	WRS	MP
FWP	Pearson Correlation	1	-.442**	-.428**	.408**
	Sig. (2-tailed)		.000	.000	.000
	N	105	105	105	105
GB	Pearson Correlation	-.442**	1	.643**	-.704**
	Sig. (2-tailed)	.000		.000	.000
	N	105	105	105	105
WRS	Pearson Correlation	-.428**	.643**	1	-.631**
	Sig. (2-tailed)	.000	.000		.000
	N	105	105	105	105
MP	Pearson Correlation	.408**	-.704**	-.631**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	105	105	105	105

**. Correlation is significant at the 0.01 level (2-tailed).

FWP= Flexible work policies GB=Gender Bias WRS=Work Related Stress MP=Maternity policies

(Source: Research Data 2023)

4.7.2 Multiple Regression

The results of the flexible work policies, gender biases, work related policies, and maternity policies were regressed against the representation of women in aviation STEM roles Table 4.15 summarizes the findings.

Table 4.15: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.766[a]	.586	.570	.07670

a. Predictors: (Constant), Maternity policies, Flexible work policies, Work related stress, Gender Bias

(Source: Research Data 2023)

Correlation coefficient (R) shows the extent to which the representation of women in STEM is influenced by the studied independent variables. The R values range from -1 to +1. The closer the R moves towards +1, the greater the strength of the relationship. An R-value of 0.50 shows a moderate relationship. In contrast, the R for the study is 0.766 indicating the variables have statistically significant influence on the rates at which women enter and grow in aviation STEM careers. The coefficient of determination R square of 58.6% further indicates that the studied independent variables predict 58.6% of the representation. According to Ozili (2023) , R^2 0% to 40% depicts low causation, 41% to 69% shows moderate causation while 70% to 100% indicates strong causation. As a result, there is sufficient statistical evidence that the structural barriers have significant but moderate effects on the representation of women in aviation STEM roles.

Table 4.16: ANOVA Results

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.834	4	.209	35.452	.000[b]
	Residual	.588	100	.006		
	Total	1.422	104			

a. Dependent Variable: representation of women in aviation STEM roles

b. Predictors: (Constant), Maternity policies, Flexible work policies, Work related stress, Gender bias

(Source: Research Data 2023)

ANOVA (Analysis of Variance) table 4.16 confirms that the model's goodness of fit is adequate to explain the variance between the studied structural barriers and the representation of women in aviation STEM roles in East African National carriers. ANOVA is a statistical technique that analyzes and compares the means of two or more groups or treatments to ascertain if the differences between them are significant. It is commonly used in research to test hypotheses and make inferences about the population from which the samples were drawn.

The F-test shows whether the linear regression model generates better fit than a data lacking the studied independent variables. The p-value of the F test is compared to the identified significance level. A lower p-value indicates a goodness of fit. In this case, $0.000 < 0.05$ thus, there is sufficient evidence that flexible work policies (FWP), gender biases (GB), work related stress (WRS), and maternity policies (MP) explain the trends in the proportion of the women in aviation STEM roles in East African National carriers.

Table 4.17: Beta Coefficients

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	2.192	.263		8.326	.000
	FWP	.086	.042	.151	2.051	.043
	GB	-.209	.070	-.292	-2.968	.004
	WRS	-.079	.036	-.201	-2.224	.028
	MP	.192	.066	.279	2.897	.005

a. Dependent Variable: Representation of women in aviation STEM roles

(Source: Research Data 2023)

The relationship between each independent variable and representation of women in aviation STEM can be described by the beta coefficients depicted in table 4.17. The beta coefficient for the flexible work policies, gender biases, work related stress and maternity policies were 0.086, -0.209, -0.079 and 0.192, respectively.

Based on the model ($Y = \beta_0+\beta_1X_1-\beta_2X_2-\beta_3X_3+\beta_4X_4+\varepsilon$), the equation for the relationship is

$Y= 2.192+ 0.086X_1- 0.209X_2- 0.079X_3 +0.192X_4+\varepsilon$

Y: This represents the predicted or dependent variable, which, in this case, is the "Representation of women in aviation STEM roles." It is what this study is trying to estimate or predict.

β_0: This is the intercept or constant term in the equation. It represents the expected value of Y when all predictor variables (MP, FWP, WRS, GB) are set to zero. In this case, it is estimated to be 2.192.

β_1, β_2, β_3, β_4: These are the measures associated with each predictor variable (FWP, GB, WRS, and MP). They are regarded as the change in the expected Y value for a one-unit change in the corresponding predictor variable while holding all other predictors constant. They show the relationship direction and strength between each independent variable and the dependent variable.

β_1: The coefficient for Flexible work policies (FWP) is 0.086. This suggests that, for a one-unit increase in FWP while holding other variables constant, we expect an increase of 0.086 units in the "Representation of women in aviation STEM roles.”

β_2: The coefficient for Gender bias (GB) is -0.209. For a one-unit increase in GB while keeping other variables constant, we expect a 0.209 unit decrease in "representation of women in aviation STEM roles."

β_3: The coefficient for Work-related stress (WRS) is -0.079. A one-unit increase in WRS, while other variables are held constant, is associated with an expected decrease of 0.079 units in "Representation of women in aviation STEM roles."

β_4: The coefficient for Maternity policies (MP) is 0.192. For a one-unit increase in MP while controlling for other predictors, we anticipate a 0.192 unit increase in "Representation of women in aviation STEM roles."

ε: This represents the error term, that accounts for the variability in Y which cannot be explained by the independent variables. It captures the random or unobserved factors affecting the dependent variable.

The regression equation provides a mathematical representation of how the predictors (Flexible work policies, Gender biases, Work-related stress, and Maternity policies) are related to the "representation of women in aviation STEM roles." The coefficients indicate the strength and direction of these relationships, while the intercept represents the expected value of Y when all predictors are zero. The coefficients also offer insights into which predictors have a more substantial influence on the dependent variable, based on their magnitude and significance (as indicated by the T and Sig. values in the coefficient table). A higher T-value suggests a more significant relationship between the DV and IV.

Based on the B and T-values, the order of significance in predicting RW is as follows:

Gender Bias (GB)

Maternity Policies (MP)

Work Related Stress (WRS)

Flexible Work Policies (FWP)

4.8 Hypotheses Tests and Discussion of findings

The outcome of the hypothesis tests are as presented in table 4.17, which provides a summary of hypothesis tests related to the representation of women in aviation STEM roles, specifically as pilots in East African national carriers. This table consists of four hypotheses (H_01, H_02, H_03, and H_04) and presents information on expected outcomes, p-values, and the verdicts regarding the null hypotheses.

Table 4.18: Summary of Hypothesis Tests

Hypotheses	**What is Expected**	**P -Value**	**Verdict**
H_01	There is no significant relationship between flexible work policies and the representation of women in aviation STEM roles as pilots in East African national carriers.	0.043<0.05	Reject
H_02	There is no significant relationship between gender biases and the representation of women in aviation STEM roles as pilots in airlines in East African national carriers	0.04<0.05	Reject
H_03	There is no significant relationship between Work-related stress and the representation of women in aviation STEM roles as pilots in airlines in East African national carriers	0.028< 0.05	Reject
H_04	There is no significant relationship between Maternity policies and the representation of women in aviation STEM roles as pilots in East African national carriers.	0.005< 0.05	Reject

(Source: Research Data 2023)

4.8.1 H_01-There is no significant relationship between Flexible work policies and the representation of women in aviation STEM roles

The p-value for this hypothesis is 0.043, which falls below the commonly used level of significance of 0.05. As the p-value is less than 0.05, the null hypothesis is rejected. This implies that there is indeed a significant relationship between the existence of flexible work policies and the representation of women in aviation STEM roles. β_2 = 0.086 and T = 2.051. FWP has the smallest β value of the four variables but remains statistically significant with a respectable T-value.

The findings of the study are notably congruent with empirical literature concerning the relationship between Flexible Work Policies (FWP) and representation of women in aviation STEM roles, particularly within pilot positions. Existing empirical studies have established a solid foundation for understanding the implications of FWP in addressing the gender disparity inherent in the aviation industry. The gender gap persisting within aviation STEM roles, as emphasized by the UNDP (2022), highlights the urgency of seeking innovative solutions. The implementation of FWP, as discussed by scholars such as Rau and Hyland (2002) , has emerged as a prominent avenue for fostering gender equity and inclusivity in STEM roles.

Flexible work, as defined by the literature, encompasses a range of arrangements, including part-time work, compressed workweeks, job sharing, and flexible hours (Rawashdeh, Almasarweh, & Jaber, 2016). This concept aligns with the multidimensional nature of FWP and its ability to accommodate employees' diverse needs and life circumstances. It allows individuals to customize their work routines to balance personal commitments, family responsibilities, and career aspirations—a crucial consideration for women aspiring to pursue aviation careers (Marintseva, Mahanecs, Pandey, & Wilson, 2022) .

Moreover, the literature highlights the challenges faced by aviation professionals, including burnout, work-life conflicts, and diminished well-being (Samtharam & Baskaran, 2023). These challenges resonate with our findings, where maintaining work-life boundaries is a significant concern. FWP, as discussed by Rawashdeh et al. (2016) , offers a potential solution by enabling women to manage family commitments while pursuing aviation careers, thereby contributing to a more balanced representation of women in aviation STEM roles. Additionally, the empirical literature underscores that

FWP extends beyond work-life balance; it has broader implications for employee well-being, job satisfaction, and organizational performance (1993). This alignment suggests that FWP can empower employees, particularly women, by accommodating their diverse needs. It fosters job satisfaction, reduces stress levels, and enhances productivity and job performance (2023) .

Briefly, the empirical literature provides substantial support for these research findings, highlighting the pivotal role of FWP in addressing the gender disparity within aviation STEM roles. These findings not only align with existing research but also emphasize the industry's need to explore tailored FWP solutions that accommodate the unique demands of pilot roles and the operational context of airlines.

4.8.2 $H_0$2-There is no significant relationship between Gender biases and the representation of women in aviation STEM roles in East African national carriers.

The p-value for this hypothesis is 0.04, which is lower than 0.05, leading to the rejection of the null hypothesis. This means that gender biases do have a significant relationship on the representation of women in STEM roles. β_1= -0.209 T = -2.968, indicating GB has the largest magnitude of influence on representation of women in STEM.

The study’s findings resonate with a body of empirical research that underscores the pervasive influence of gender biases on the representation of female pilots in airlines, aligning with existing research that have illuminated the multifaceted nature of this issue. Empirical studies, such as the work by Yanıkoğlu, Kılıç, and Küçükönal (2020), have revealed that gender bias in aviation stems from deeply ingrained societal norms and historical stereotypes. Seglison (2019), highlighted that deeply rooted stereotypes are undermining the influence of women in the sector. Young women do not have enough role models for inspiration to join the industry. The results indicate that the women at the studied national carriers are facing consumer bias that may in turn affect their morale to compete favorably with men for the top STEM positions. As a result, the organizations should consider implementing diversity and inclusion initiatives to address these biases and promote the participation of women in STEM roles, including piloting.

Other studies have also raised alarm over the impacts of the hostile workplace policies on the wellbeing of the female engineers and pilots (Marintseva et al. (2022) ; Olivera-Silva and De Lima, (2022). The findings of the previous studies agree that eliminating the stressors such as gender discrimination by both the male peers and the travelers would reduce the gender gap associated with the STEM fields. These biases have persisted within the industry, deterring women from pursuing careers as pilots. These findings align with this perspective, emphasizing the enduring influence of such biases on female pilots' representation.

Schmader and Hall's research (2014) highlighted how gender biases reinforce stereotypes and prejudices about women's capabilities and roles within the aviation industry. This resonates with this study's findings, particularly concerning limited access to leadership positions. These subtle biases, as suggested by Graham and Ferla (2019), accumulate over time, creating an environment where female pilots may feel undervalued and less confident in pursuing their career aspirations, further exacerbating their representation.

Van Veelen, Derks, and Endedijk (2019) shed light on the influence of societal gender role stereotypes on how female pilots are perceived within the industry. Our findings echo this perspective, emphasizing the potential unequal treatment in recruitment and professional development opportunities. The study's findings also align with Reidy, Salazar, Baumler, Wood, and Daigle's (Sexual violence against women in STEM: A test of backlash theory among indergraduate women) assertion that gender-based harassment hinders women's progress in aviation, underscoring the need to address and dismantle these biases to promote gender diversity and equality.

Furthermore, our findings align with the idea presented by Torry (2022) that stereotypes regarding women's competence and commitment to their careers can undermine their opportunities for training and advancement. This challenge in accessing leadership positions within national carrier airlines perpetuates the gender gap in the profession.

The self-reinforcing cycle of underrepresentation described by Casebolt (2023) finds resonance in these findings. The scarcity of women in pilot roles, as observed in our study, further solidifies the perception that piloting is primarily a male occupation, discouraging young women from considering aviation careers. The lack of female role models, as highlighted by Casebolt, contributes to this cycle, making it imperative to implement comprehensive measures to address gender biases and promote diversity within the aviation industry.

In conclusion, the findings of this study align with a wealth of empirical research, collectively emphasizing the need for a multifaceted approach to address gender biases and promote gender diversity within airlines. These findings underscore the urgency of implementing gender-inclusive policies, confidential reporting mechanisms, awareness programs, mentorship initiatives, and educational outreach to challenge stereotypes and dismantle gender biases in aviation STEM roles, fostering a more equitable and diverse industry.

4.8.3 $H_0$3-There is no significant relationship between Work-related stress and representation of women in aviation STEM roles

The p-value for this hypothesis is 0.028, below the significance level, resulting in the rejection of the null hypothesis. This outcome suggests a significant connection between work-related stress and women's representation in aviation STEM roles. $\beta_3 = -0.079$ and $T = -2.224$. WRS has a lower B value compared to GB and MP but still shows statistical significance with a moderately high T-value.

The findings of this study resonate with a body of empirical literature that sheds light on the complex interplay between stressors and gender disparities within the aviation industry. To begin with, the research by Oliveira-Silva and de Lima (2022) highlights that heightened perceptions of barriers among women in aviation STEM, such as work-related stress, correspond to higher instances of anxiety and depression symptoms. Conversely, increased perceptions of support correlate with reduced manifestations of anxiety and depression. This underscores the critical significance of fostering a supportive ecosystem within the aviation industry, which aligns with our findings that highlight the adverse influence of work-related stress on female pilot representation.

Esin and Ornek (2020) underscore the widespread challenge of work-related stress for women in STEM, particularly within the high-stakes environment of aviation. This study similarly emphasizes the demanding nature of pilot roles, including extended working hours, irregular schedules, and the pressure of maintaining peak performance, all of which contribute to work-related stress. Additionally, the research by Van Veelen, Derks, and Endedijk (2019) aligns with our findings by highlighting the extra pressure and challenges faced by women in STEM due to gender biases and stereotypes.

Furthermore, these findings echo the observations of Schmader and Hall (2014) emphasizing that the cumulative influence of work-related stressors can result in fatigue, burnout, and reduced job satisfaction. This aligns with the significance of addressing work-related stress to maintain a healthy and efficient workforce within the aviation industry, particularly for women in STEM roles.

Moreover, the literature emphasizes the influence of the historically male-dominated nature of the aviation industry on work-related stress for women. Stereotypes, biases, unequal opportunities, and discrimination contribute to additional stressors, resonating with our findings. The need for diversity and inclusion initiatives, equal opportunities, and a supportive work culture is in line with the recommendations in the literature.

In conclusion, this research findings align closely with existing empirical research, highlighting the detrimental influence of work-related stress on the representation of women in aviation STEM roles, particularly as pilots. The empirical literature emphasizes the need for a multifaceted approach, including diversity and inclusion initiatives, mentorship programs, flexible scheduling, and addressing gender biases to mitigate work-related stress and create a more inclusive environment for women in the aviation industry.

Managing work-related stress among female pilots is crucial to their retention and well-being within the industry. Airlines can implement practical measures to mitigate stress, such as providing mental health support services, counseling, and stress management programs.

4.8.4 $H_0$4-There is no significant relationship between Maternity policies and representation of women in aviation STEM roles.

The p-value for this hypothesis is 0.005, which is < 0.05. Consequently, the null hypothesis is rejected, indicating that maternity policies indeed have a significant relationship on the representation of women in aviation STEM. $\beta_4 = 0.19$ and $T = 2.897$; MP has the second-highest B value and T-value, suggesting a significant influence on LRW.

This study aligns with several empirical studies which investigated the relationship between maternity policies and the representation of female pilots in airlines. These findings collectively underscore the significance of maternity policies in shaping the aviation industry's gender dynamics.

Zimmermann et al.'s (2023) research on the positive influence of paid maternity leave on the well-being of mothers and their children resonates with our findings. The study highlights the importance of supporting the physical and mental health of female pilots, given the demanding nature of their profession. Furthermore, Low & Marcos (2015) have explored the connection between maternity leave rights and the employment rates of mothers, and our study reinforces the relevance of such policies for both employment rates and the aviation industry’s representation of female pilots. Lastly, Cruz (2012) has examined how maternity policies within airlines can affect female pilots' career decisions, and our study echoes these concerns, emphasizing the critical role of these policies in influencing female pilots' choices and fostering a positive organizational culture.

In conclusion, this study's findings align with these empirical studies, collectively emphasizing the crucial role of maternity policies in shaping the representation of female pilots in airlines. These insights provide valuable context and support for the conclusions, highlighting the multifaceted influence of maternity policies on gender diversity and inclusivity within the aviation industry. To address the influence of maternity policies on female pilot representation, airlines should consider revising and improving their maternity policies.

In summary, the results of these hypothesis tests collectively reveal that progressive flexible work policies, gender biases, work-related stress, and friendly maternity policies all have significant relationships with the representation of women in aviation STEM roles as pilots in East African national carriers. These findings hold significant implications for addressing gender disparities within this industry and may guide the development of relevant policies and initiatives to promote gender equity.

4.9 Theoretical Implications of the Study

This study's theoretical implications are profound, significantly advancing our comprehension of gender diversity, workforce dynamics, and aviation management. Notably, it delves into the interplay of a range of factors, including flexible work policies, gender biases, work-related stress, and maternity policies, and how they collectively influence the representation of women in aviation STEM roles. This approach adds depth to our understanding of gender disparities within male-dominated industries.

Moreover, this study significantly contributes to established theories, notably the "Glass Ceiling Theory," "Stereotype Threat Theory," and "Social Role Theory," which elucidate the challenges women face in male-dominated firms:

Glass Ceiling Theory: This theory asserts that invisible barriers impede certain groups, particularly women, from ascending in their careers and achieving equitable representation within organizations. The study aligns with this theory by revealing the role of gender biases in perpetuating stereotypes and limiting women's progress, highlighting the need to address these biases. Discriminatory attitudes and practices, rooted in deep-seated societal norms, restrict women's access to leadership positions and career-enhancing opportunities. Addressing these biases is crucial to breaking through the glass ceiling, promoting gender diversity, and creating a more inclusive aviation industry.

The research also highlights the effect of work-related stress on job satisfaction and retention among female pilots, further exacerbating the glass ceiling effect. Stress hampers career progression, making it more challenging for women to break through the barriers hindering their representation in the aviation industry. Recognizing and addressing work-related stress is essential for fostering an inclusive and diverse aviation workforce.

Moreover, the study emphasizes how maternity policies can significantly influence the career trajectories of female pilots, either facilitating or hindering their advancement in the workplace. The adequacy of maternity policies becomes pivotal, and the study underscores the importance of supportive policies in addressing the Glass Ceiling Theory and promoting gender diversity within aviation.

Stereotype Threat Theory: This theory explores how individuals from negatively stereotyped groups may internalize these stereotypes, leading to reduced performance, heightened anxiety, and lower career aspirations.

This study aligns with Stereotype Threat Theory by highlighting how the prevailing gender norms and stereotypes in the aviation industry can affect the confidence and beliefs of female pilots. The perception of aviation as a male-dominated profession may lead to doubts about their suitability for the role, potentially hindering their career aspirations and progression. Also, theoretical implications extend to diversity management, emphasizing the importance of tailored strategies for promoting gender diversity. The theory also recognizes how societal norms and stereotypes influence career choices and the impact of gender biases in shaping these choices. The study shows that unconscious gender biases can influence the perception and assessment of female pilots, potentially hindering their career aspirations and progression.

The study underlines the necessity for organizations, including national carriers, to adopt comprehensive diversity and inclusion initiatives addressing gender biases, offering flexible work policies, managing work-related stress, and enhancing maternity policies. These findings enrich the theoretical foundations of diversity management in complex, safety-critical industries such as aviation.

Social Role Theory: This theory advocates that the behavior of a person is affected by their roles in society and the expectations that come with these roles. The study aligns with Social Role Theory by illustrating how structural barriers and societal norms affect the roles that female pilots occupy both professionally and personally. The study emphasizes how maternity policies and work-related stress influence women's career decisions, highlighting the interplay between social and cultural factors and individual choices. These findings contribute to discussions on how societal expectations and support systems shape women's decisions regarding careers in aviation.

It underscores the imbalance in caregiving responsibilities due to unequal domestic duties and the need for more accommodating work policies. Moreover, the study demonstrates the link between stringent maternity policies and female pilot representation within the aviation industry. The demands of reproductive roles and inflexible policies can lead to career sacrifices, including leaving the workforce during critical phases of their careers. Addressing these issues, the study suggests that proactive and flexible maternity policies can create an inclusive environment that fosters work-life balance and gender diversity, ultimately contributing to a thriving and equitable aviation STEM domain. The research also addresses how societal norms and gender biases shape career choices and recommends strategies to dismantle these biases.

It provides empirical support for existing theoretical frameworks that argue how deeply ingrained societal norms and stereotypes have the ability to impose limits to women's access to certain professions and leadership roles, emphasizing the significance of tailored strategies to enhance inclusion and gender diversity in the aviation industry.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter offers an overview of the research, capturing a combination of key findings, policy recommendations, and avenues for further scholarly investigation. The central purpose of this fact finding was to assess the influence of structural barriers on representation of women in aviation STEM roles. These barriers are inadequate flexible work policies tailored to unique challenges of aviation, gender biases, work related stress and unfriendly maternity policies.

5.2 Summary of Findings

The study specifically engaged female pilots in East African national carriers, and yielded noteworthy findings. The overall response rate was 90.5%, with 105 out of 116 participants providing responses. The coefficient of determination (R-squared) is 58.6%, revealing that the studied independent variables can predict 58.6% of the observed representation. Within East African national carriers, the percentage of female pilots varies, with Ethiopian Airlines at 5%, Kenya Airways at 7%, Rwandair at 10%, Air Tanzania at 15.8%, and Uganda Airlines at 8%. Overall, the representation of female pilots in these airlines is low, accounting for just 6.5% of the total pilot workforce.

5.2.1 Flexible work policies and representation of women in aviation STEM roles as pilots

The mean of the responses on flexible work policy on the representation of women in aviation STEM roles as pilots was 4.53, and the standard deviation was 0.81. The P value in testing for the hypothesis was 0.043, less than 0.05. Consequently, there is indeed a significant relationship between flexible work policies and representation of women in aviation STEM roles. In the regression analysis, the coefficient for "Flexible work policies" (FWP) is 0.086. This suggests that, for a one-unit increase in FWP while holding other variables constant, an increase of 0.086 units in the representation of women in aviation STEM roles is expected.

5.2.2 Gender biases and representation of women in aviation STEM roles as pilots

The mean of the responses on gender biases on the representation of women in aviation STEM roles as pilots was 4.89, and the standard deviation was 0.36. The P value in testing for the hypothesis was 0.04, less than 0.05. Consequently, there is indeed a significant relationship between gender biases and representation of women in aviation STEM. In the regression analysis, the coefficient for "Gender bias" (GB) is -0.209. For a one-unit increase in GB while keeping other variables constant, a 0.209 unit decrease in representation of women in aviation STEM roles is expected.

5.2.3 Work-related stress and representation of women in aviation STEM roles as pilots

The mean of the responses on work-related stress on the representation of women in aviation STEM roles as pilots was 4.84, and the standard deviation was 0.71. The P value in testing for the hypothesis was 0.028, less than 0.05. Therefore, there is a significant relationship between work-related stress and representation of women in aviation STEM. In the regression analysis, the coefficient for "Work-related stress" (WRS) is -0.079. A one-unit increase in WRS, while other variables are held constant, is associated with an expected decrease of 0.079 units in representation of women in aviation STEM roles.

5.2.4 Maternity policies and representation of women in aviation STEM roles as pilots

The mean of the responses on maternity policies on the representation of women in aviation STEM roles as pilots was 4.95, and the standard deviation was 0.59. The P value in testing for the hypothesis was 0.005, less than 0.05. Hence, there is a significant relationship between maternity policies and representation of women in aviation STEM. In the regression analysis, the coefficient for "Maternity policies" (MP) is 0.192. For a one-unit increase in MP while controlling for other predictors, we anticipate a 0.192 unit increase in representation of women in aviation STEM roles.

5.3 Conclusion

Findings reveal connections between flexible work policies, gender bias, maternity policies, and work-related stress, and their influence on women's representation in aviation STEM roles. As gender bias increases, maternity policies tend to decrease, and a similar pattern is observed with work-related stress, which rises with higher gender bias. Conversely, a positive association exists between maternity policies and decreased work-related stress. The study emphasizes the importance of flexible work policies such as job-sharing, compressed work-week and part-time work in addressing the gender disparity in aviation STEM roles. The findings underscore the need for a multifaceted approach to combat gender biases, advocating for gender-inclusive policies, confidential reporting systems, awareness programs, mentorship initiatives, and educational outreach. The research highlights the urgency of implementing these measures to foster a more equitable and diverse aviation industry. Additionally, managing work-related stress for female pilots is crucial, requiring a comprehensive strategy that includes diversity and inclusion initiatives, mentorship programs, flexible scheduling, and addressing gender biases to create a more inclusive environment for women in aviation. Likewise, Friendly Maternity policies play a pivotal role, supporting female pilots with provisions like alternative ground duties, flexible return-to-work options, and extended maternity leave. Integrating these policies into airline practices fosters a gender-inclusive industry, enhancing women's representation in STEM roles, particularly as pilots. This holistic approach aims to cultivate a supportive environment, promoting gender diversity and inclusion in aviation.

5.4 Recommendations for Policy and Practice

Flexible Work Policies

The study's findings regarding the positive influence of Flexible Work Policies (FWP) on addressing gender disparities within aviation STEM roles have significant practical implications for the aviation industry. FWPs should be considered by airlines to grant employees, particularly women, greater control over their work schedules. To put these findings into practice, airlines should consider implementing FWPs tailored to the unique demands of pilot roles. This might involve offering flexible scheduling options, such as part-time work and compressed workweeks, to accommodate women's diverse needs and life circumstances. Airlines can also explore job-sharing arrangements to provide pilots with more flexibility while maintaining operational efficiency.

Management should actively promote and communicate the availability of these FWPs to female pilots and encourage their utilization. Additionally, fostering a culture of support and understanding around FWP is crucial, as it can contribute to job satisfaction, reduced stress levels, and enhanced productivity, as suggested by existing research (Samtharam & Baskaran, 2023). Airlines must view FWP not only as a means of promoting gender diversity but also as a strategy for improving overall organizational performance and employee well-being.

For ICAO and IATA, collaboration is key to establishing global standards and guidelines for FWP within the aviation industry. By working together, these international bodies can create a unified framework that promotes FWP adoption among airlines and aviation organizations. They should also create a resource center offering best practices and case studies on FWP implementation, providing airlines with the tools to reduce gender disparities in the workplace.

Regulators and governments can contribute by integrating FWP considerations into aviation regulations and policies, emphasizing their role in addressing gender inequality. Additionally, they can incentivize FWP adoption by offering benefits such as tax breaks or grants to airlines that implement these policies for aviation professionals. Supporting research on the impact of FWP in aviation is crucial for evidence-based policymaking.

Gender Biases

To effectively combat gender biases in the aviation industry, a comprehensive and multifaceted approach is needed. Airlines should proactively establish diversity and inclusion initiatives with the goal of nurturing a workplace that is inviting and supportive for women in aviation STEM roles. These initiatives encompass several critical components, including challenging prevailing stereotypes, biases, and discriminatory practices. This involves the implementation of programs, including unconscious bias training for employees at all organizational levels, with a strong emphasis on the principles of gender equality and respect. Furthermore, these initiatives must ensure equal opportunities for career progression and address gender stereotypes and biases within training programs. They should also actively celebrate the accomplishments of female pilots, contributing to an environment that motivates more women to engage in and excel in aviation careers.

Airlines should introduce awareness and training programs for their entire workforce, placing a particular focus on employees engaged in recruitment and selection processes. These programs are intended to raise awareness of unconscious biases, stereotypes, and prejudices and actively work to challenge and overcome them. The overarching goal is to promote gender equality and diversity and to foster a culture marked by respect and equitable opportunities for both men and women in all aviation STEM roles. Effective management is essential in the implementation of these strategies. Management should proactively oversee and address instances of gender-based harassment or discrimination, nurturing a work culture in which such behaviors are unacceptable. Establishing clear and accessible mechanisms for reporting incidents is indispensable to ensure that female pilots feel adequately supported and secure in their workplace.

Moreover, it is imperative for airlines to actively promote female role models and celebrate the achievements of women in aviation STEM roles. This approach serves as an inspiration for other women interested in pursuing careers in this field. Management should consistently seek opportunities to highlight the successes of female pilots and highlight their substantial contributions to the aviation industry. Additionally, airlines should embark on educational outreach initiatives, targeting young girls and students to present aviation as a viable and inclusive career choice. Encouraging girls to explore aviation interests and providing them access to educational resources can effectively challenge stereotypes and biases from an early age, facilitating a more diverse and gender-inclusive future for the industry.

Regulators and governments can incorporate diversity and inclusion standards into aviation regulations, emphasizing respect and gender equality. They should actively monitor and enforce compliance with these initiatives within airlines. Furthermore, financial support for research evaluating the effectiveness of diversity and inclusion measures in aviation is essential for driving evidence-based policy.

Work-Related Stress

Recognizing the demanding and high-stress nature of aviation careers, airlines should provide support mechanisms to help employees, especially female pilots, maintain a healthy work-life balance. This can involve offering mentorship and sponsorship programs, creating support networks, and exploring flexible scheduling options. Such support measures can contribute to job satisfaction, reduced stress levels, and enhanced overall job performance among aviation professionals. Managing work-related stress among female pilots is crucial to their retention and well-being within the industry. Airlines can implement practical measures to mitigate stress, such as providing mental health support services, counseling, and stress management programs.

Effective management involves recognizing the unique challenges faced by female pilots and addressing them proactively. This may include offering mentorship programs and support networks to connect female pilots with experienced colleagues who can provide guidance and assistance throughout their careers. Additionally, flexible scheduling options, as identified in the study, can help female pilots balance their work and personal lives more effectively, reducing the stress associated with maintaining work-life boundaries.

ICAO and IATA's joint effort should focus on developing international standards for managing and reducing work-related stress in aviation roles. Collaboration also allows them to create a platform for sharing resources and best practices to help aviation professionals cope with stress. Hosting a global aviation well-being conference can facilitate discussions on mental health and stress management.

Maternity Policies

Maternity and family policies should be developed and implemented by airlines to support female pilots during pregnancy and maternity leave. These policies should encompass elements like dedicated ground duties related to flight operations during pregnancy, flexible return-to-work options, extended maternity leave, and access to necessary accommodations for breastfeeding and childcare. Addressing the challenges associated with family responsibilities can help airlines retain and support female pilots in their careers. Management should create an organizational culture that supports the physical and mental well-being of female pilots during and after maternity leave. This includes ensuring a smooth transition back to work, and addressing potential biases or discrimination related to motherhood.

For ICAO and IATA, it is crucial to advocate for the development of comprehensive maternity and family policies within the aviation sector. Collaboration between these international bodies can lead to the establishment of global standards for airlines to follow, ensuring female pilots receive necessary support during pregnancy and maternity leave. By creating a repository of best practices and success stories in implementing such policies, ICAO and IATA can guide airlines toward gender-inclusive practices.

Regulators and governments should incorporate maternity policies into aviation regulations, highlighting their significance in supporting female pilots. They should mandate airlines to provide dedicated ground duties during pregnancy, flexible return-to-work options, extended maternity leave, and accommodations for breastfeeding and childcare. Monitoring and enforcing compliance is essential to guarantee that female pilots receive the support they need.

Theoretical Contributions

This study advances theoretical discussions related to gender diversity, organizational behavior, diversity management, career progression, and industry transformation within the context of aviation STEM roles. Its multifaceted approach and empirical findings contribute valuable insights that can inform further theoretical development in these domains and guide future research endeavors in the realm of gender diversity and workforce dynamics. The study underscores the intricate relationship between organizational behavior and employee well-being, particularly in high-stress fields like aviation. By highlighting how gender biases and work-related stress influence women's representation in aviation STEM roles, this research enriches the theoretical frameworks surrounding organizational behavior, job satisfaction, and employee well-being. It emphasizes that workplace environments can either hinder or promote gender diversity and inclusivity.

5.5 Limitations of the study and Suggestions for further research

Future research could explore the interplay of numerous other factors within the aviation industry, examining how gender representation interacts with elements such as race, ethnicity, and socioeconomic status. Investigating these interconnected identities could provide a more comprehensive understanding of the experiences and representation of women in aviation STEM roles, shedding light on whether individuals from diverse backgrounds face unique challenges or opportunities within the industry.

Furthermore, conducting longitudinal analyses is crucial to track changes in women's representation in aviation STEM roles over time. It allows us to assess the effectiveness of diversity initiatives, policies, and interventions aimed at addressing gender disparities. This will enable the examination of recruitment trends, retention rates, and career progression among women in aviation STEM. In addition, comparative studies across different regions or countries could offer valuable insights into how cultural, legal, and societal factors influence the representation of women. By comparing the experiences of female aviation professionals in diverse contexts, researchers can identify best practices and shared challenges, informing global strategies for promoting gender diversity within the aviation industry.

Qualitative research methods, such as interviews and surveys, could complement quantitative studies by providing further understanding of the experiences of women in aviation STEM roles. Qualitative data can capture nuanced insights into the specific barriers, challenges, and motivations that female pilots and aviation professionals encounter, uncovering hidden factors that quantitative analyses may not fully capture. Additionally, broadening the focus beyond female pilots to include other aviation STEM roles can enhance the scope of future investigations.

These areas of further study could significantly influence our understanding of gender diversity within the aviation industry and inform targeted strategies and policies aimed at enhancing inclusivity and increase women representation in aviation STEM roles.

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APPENDICES

Appendix I: University Introduction Letter

MOI UNIVERSITY
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MU/SBE/ML/PG/33

26th September, 2023

TO WHOM IT MAY CONCERN

Dear Sir/Madam

RE: VIVIAN ALUOCH OKOTH - EASA/EMBA/0234/22

The above-named is a student of Moi University, School of Business and Economics. She is undertaking Executive Master of Business Administration (Aviation Option).

Ms. Aluoch has successfully completed her coursework, defended her proposal, and is proceeding to the field to collect her research titled ***"Influence of Structural Barriers on Low Representation of Women in Aviation STEM Roles-A Case of Female Pilots at East African National Carriers"***

Any assistance accorded to her will be highly appreciated.

Yours faithfully,

MOI UNIVERSITY
DEAN SCHOOL OF BUSINESS & ECONOMICS

DR. RONALD BONUKE
POSTGRADUATE CHAIR, SBE
RB/cj

Appendix II: Questionnaire

Dear Participant,

It is my hope that you are doing well. I invite you to be a participant in a research project focused on understanding the influence of structural barriers on the representation of women in aviation Science, Technology, Engineering, and Mathematics (STEM) roles, particularly as female pilots.

This initiative represents a significant step toward the academic insights urgently needed in this field. Together, we can uncover fresh perspectives and inspire positive change within the aviation industry. Your involvement in this study is not just about gathering data; it is an opportunity to be a part of meaningful change. Your unique perspective will significantly enrich our understanding of the aviation industry, shedding light on the challenges women face in aviation STEM roles and guiding the way toward gender equality and equity.

Participating in this study is designed to be quick and convenient. Completing the enclosed questionnaire, which typically takes around 10 to 15 minutes, allows you to contribute without disrupting your daily routine. Please rest assured that your responses will be treated with the utmost care, ensuring complete anonymity, confidentiality, and respect for your privacy.

Thank you for considering this invitation. Your participation is immensely valuable, and I eagerly anticipate your contribution.

Warm regards,

Vivian Okoth

SECTION A: Demographic Information

1. What is your age range?

a. 18-24 years old b. 25-34 years old c.35-44 years old

d. 45-54 Years old e. 55-64 years old

2. How many years of experience do you have as an airline pilot?

a. 1-10 years b. 11-20 years c. 21 or more years

3. Which airline do you work for?

a. Ethiopian Airlines b. Kenya Airways c. Rwandair

d. Air Tanzania e. Uganda Airlines

4. Do you have any young children or dependents who are minors?

a. Yes

b. No

SECTION B: Representation of women in aviation STEM

Please indicate your level of agreement with the following statements about the Representation of women in aviation STEM at your institution by marking (√) the appropriate scale:

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

Representation of Female pilots	1	2	3	4	5
Women are significantly underrepresented in aviation STEM roles, such as piloting and engineering.					
Current efforts by airlines to attract and retain women in aviation STEM roles are insufficient.					
Airlines should implement customized programs and policies to actively attract and retain women in aviation STEM roles.					
Stereotypes and preconceived notions about women's abilities negatively affect the representation of women in aviation STEM roles.					
Increasing the representation of women in aviation STEM roles is crucial for fostering a more diverse and inclusive industry.					

SECTION C: Flexible work policies

Please use a tick (√) to indicate your level of agreement with the following statements regarding the influence of flexible work policies within your organization. Scale:

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

Flexible work policies	1	2	3	4	5
There are inadequate Flexible work arrangement options such as part-time work and job sharing for women in aviation STEM roles.					
I struggle to achieve adequate work-life balance as a woman in aviation STEM.					
Implementation of flexible work arrangements in the aviation industry would enhance my job satisfaction and overall well-being.					
If my airline introduced flexible work initiatives, i would consider taking them up, even if they involved a reduction in pay.					
The predominance of men in managerial positions makes it challenging to create flexible work arrangements to foster equity, particularly for women in					

SECTION D: Gender Biases

Please use a tick (√) to indicate your agreement with the following statements regarding gender biases in your organization. Scale:

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

Gender bias	1	2	3	4	5
From my perspective as a woman in aviation STEM, i think stereotypes and gender biases influence the selection process of female candidates in the field.					
Stereotypes portraying aviation STEM as predominantly masculine roles and the scarcity of visible female role models discourage women from considering careers in aviation STEM.					
Female pilots face increased scrutiny and skepticism compared to their male counterparts at work and during training.					
Gender biases and perceptions noticeably affect the chances of female pilots advancing into managerial positions.					
Cultural norms and expectations significantly affect the retention and attraction of women in aviation STEM roles.					

SECTION E: Work related stress

Please indicate with a tick √ the extent to which you agree with the following statements concerning Work related stress in your institution. Scale:

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

Work related stress	1	2	3	4	5
The perception that pilot roles involve handling demanding work schedules and managing challenging and high-pressure situations negatively affects the representation of					
Work-related stress, such as long/irregular hours, extended periods away from home, and rigorous training, significantly contribute to the challenges women face in retaining their positions within the industry. This can be particularly significant for women who have domestic responsibilities, limiting their ability to pursue career advancement opportunities					
Prejudice against women in aviation STEM, which includes having preconceived notions about their abilities, contributes to increased stress levels experienced by female					
As a woman in aviation STEM, I have faced work-related stress related to my gender, particularly due to gender-related biases. Implementing suitable measures to address these gender-related stressors can foster a more supportive and fulfilling work environment.					
Measures to cope with work-related stress tailored to women such as mentorship & networking opportunities, can positively impact the representation of women in aviation STEM.					

F: Maternity policies

Please use a tick (√) to indicate your agreement with the following statements regarding maternity policies in your institution. Scale:

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

Maternity policy	1	2	3	4	5
Fellow female pilots leave or have considered leaving the industry due to the challenge of balancing work responsibilities and family life effectively.					
I believe my company should extend the official maternity leave duration to better support female pilots, acknowledging the unique challenges they face in their roles. This extension would allow them to return to work with improved overall well-being and effectively manage the demands of their profession while caring for their inf					
Based on my experience and observations, implementing maternity policies like extended maternity leave can effectively make aviation STEM more appealing to women.					
Airlines should create specific ground-based tasks and responsibilities for female pilots during pregnancy, extended maternity leave, or when they temporarily step away from flying. These roles should align with their expertise and contribute to flight operations such as tasks related to flight safety, quality, and flight simulator training					
Maternity policies that support work-life balance can play a significant role in retaining female pilots already in the industry.					

Thanks for your cooperation.

Appendix III: NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **686606**

Date of Issue: **06/October/2023**

RESEARCH LICENSE

This is to Certify that Ms.. vivian Aluoch okoth of Moi University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: INFLUENCE OF STRUCTURAL BARRIERS ON THE LOW REPRESENTATION OF WOMEN IN AVIATION STEM ROLES: A CASE OF FEMALE PILOTS AT EAST AFRICAN NATIONAL CARRIERS for the period ending : 06/October/2024.

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Appendix IV: CERMESA Similarity Index Report

SR370

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THESIS WRITING COURSE

PLAGIARISM AWARENESS CERTIFICATE

This certificate is awarded to

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In recognition for passing the University's plagiarism

Awareness test for Thesis **entitled: THE INFLUENCE OF STRUCTURAL BARRIERS ON REPRESENTATION OF WOMEN IN AVIATION SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) ROLES: A CASE OF FEMALE PILOTS AT EAST AFRICAN NATIONAL CARRIERS** with a similarity index of 2% and striving to maintain academic integrity.

Word count: 21861

Awarded by

Prof. Anne Syomwene Kisilu
CERM-ESA Project Leader Date: 8/11/2023