

**THE EFFECT OF CULTURAL DIVERSITY ON FLIGHT DECK CREW
PERFORMANCE IN RWANDAIR LIMITED**

BY

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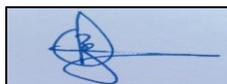
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DECLARATION

Declaration by Candidate

I attest that this thesis is indeed my original research and has not once been submitted to any other university for the award of any academic award.

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DEDICATION

I want to sincerely thank my family; my wife Clara, for her unwavering encouragement and, our daughters Aleesha, Talia and Tasha for support and prayers. To God be all the glory.

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ABBREVIATIONS AND ACRONYMS

CRM -	Crew Resource Management
FAA -	Federal Aviation Administration
FDM -	Flight Data Monitoring
GPS -	Global Positioning System
ICAO -	International Civil Aviation Organization
IATA -	International Air Transport Association
NGO -	Non-Governmental Organization
RCAA -	Rwanda Civil Aviation Authority
RDC -	Rwanda Development Corporation
SPSS -	The Statistical Package for the Social Science
TCAS -	Traffic Collision Avoidance System
TLP -	Teamwork and Leadership Program
US -	United States
VSM -	Values Survey Module

OPERATIONAL DEFINITION OF TERMS

Crew Resource Management- this is “the effective use of all available resources: human resources, hardware, and information” (MacLeod, 2021).

Collectivism vs. individualism –this is the cultural dimension referencing the two categories of societies: a collectivist society where individuals demonstrate concern for other people’s interests over self and an individualistic society in which individuals prioritize their interests.

Masculinity versus Femininity –this is the cultural dimension referencing the two categories of societies: a masculine society comprising individuals that are more competitive, wealth-oriented, assertive, and reward-oriented, and a feminine society comprising individuals obsessed with attributes such as caring, modesty, and other things considered “feminine.”

Power Distance –this is the cultural dimension measuring society’s hierarchal degrees. It is “extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally,” (Hofstede, 2011).

Uncertainty avoidance- is the cultural dimension measuring the “extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations,” (Hofstede, 2011).

Proxemics- This is the “study of non-verbal approach and avoidance,” (McCall & Singer, 2020).

Flight Deck Crew Performance (DV) – This refers to the ability of flight deck crew members to work efficiently, communicate effectively, and maintain safety during operations. It is reflected through Crew Resource Management practices, decision-making, situational awareness, and teamwork among culturally diverse crew members (Kanki, Helmreich, & Anca, 2021).

ABSTRACT

The aviation industry relies heavily on effective crew coordination and performance in the flight deck, where cultural diversity increasingly shapes operational outcomes. This study investigated the effect of cultural diversity on flight deck crew performance in RwandAir Limited. The research focused on four cultural dimensions: power distance, masculinity, uncertainty avoidance, and proxemics. The study was underpinned by Hofstede's Cultural Dimensions Theory, Hall's Proxemics Theory, and Mayo's Human Relations Theory. A quantitative explanatory research design was employed for the study. The target population consisted of 105 flight deck crew members, with 62 respondents participating in the survey. A census sampling approach was used due to the relatively small population size. To ensure the quality of research instruments, a pilot study was conducted with a small group of respondents. Content validity was established through expert review, resulting in a content validity index (CVI) of 0.84. Reliability was tested using Cronbach's alpha, which yielded coefficients ranging from 0.753 to 0.831, indicating acceptable internal consistency. Data were collected using structured questionnaires and analyzed using descriptive and inferential statistics. Descriptive results showed strong agreement that power distance influences coordination (mean = 4.581), masculinity drives motivation through competitiveness (mean = 4.677), uncertainty avoidance strengthens reliance on detailed procedures (mean = 4.613), and proxemics enhances teamwork and stress management (mean = 4.613). Factor analysis confirmed that cultural dimensions were significantly correlated, with a Kaiser-Meyer-Olkin (KMO) value of 0.721 and Bartlett's test of sphericity being significant ($\chi^2 = 362.947$, $p < 0.001$). Regression analysis revealed that cultural dimensions collectively predicted flight deck crew performance, with the model being significant ($R^2 = 0.553$, $F = 30.002$, $p < 0.001$). Among the predictors, masculinity ($\beta = 0.200$, $p = 0.034$) and proxemics ($\beta = 0.481$, $p < 0.001$) demonstrated the strongest influence on crew performance, leading to rejection of the null hypotheses. The findings highlight that cultural diversity exerts a substantial influence on operational safety, communication, and decision-making in the cockpit. In conclusion, the study underscores the need for culturally adaptive Crew Resource Management (CRM) training, structured leadership development, and policies that foster intercultural collaboration. Based on these findings, the study recommends the integration of cultural awareness modules in CRM programs, adoption of training interventions targeting proxemics and masculinity influences, and the implementation of organizational practices that promote psychological safety and inclusivity in the cockpit. These measures will enhance synergy, minimize miscommunication, and strengthen operational efficiency in RwandAir and similar culturally diverse airline settings.

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

This chapter comprises of the background of the study, problem statement, research objectives, research hypotheses, significance of study and scope of the study.

1.2 Background of the study

Flight deck crew performance measures include the effectiveness of communication, decision-making, managing workloads and maintaining situation awareness, which are the main areas in Crew Resource Management (CRM) training in aviation industry. CRM, formerly referred Cockpit Resource Management, now covers a wider scope of aircrew, but has sections particularly targeted to flight deck crew (previously referred to as cockpit crew). CRM plays an imperative role in improving situational awareness and problem-solving (Al-Hadabi, 2021). The airline industry relies on CRM to achieve higher profits and competitive advantage (Wagener & Ison, 2020). In literature, CRM was developed in the 1980s in the US to address American pilots' authoritarian attitudes in the diverse American airlines. In the aviation industry, CRM refers to the cohesion between the two pilots in the flight deck. Hence, good CRM in flight deck means good teamwork and optimum performance.

Cultural diversity, in the context of global talent sourcing, needs to be effectively defined. Cultural diversity is the “representation of individuals with distinctly different group

affiliation of cultural significance based on racio-ethnicity and nationality (Cox, 1993). Hofstede's theory (1980) distinguish cultures in reference to dimensions such as collectivism, uncertainty avoidance, masculinity and power distance, which may supersede individuals' countries of origin. Syed & Kamar (2021) propose a cultural diversity framework to optimize on benefits and minimize on disadvantages of a diverse work force on performance. Managing cultural diversity should therefore be emphasized within organization in order to ensure optimum performance.

Thanks to globalization, airlines now globally outsource crew to bridge flight deck crew scarcity and enhance cultural diversity (Peksatici, 2022), Cultural diversity within and organization when handled well could lead to enhanced performance. However, culture remains pertinent especially in CRM due to its complexities (Chua, Sun & Sinha, 2023). Diversity stemming from cultural differences such as distinct psychological and demographic characteristics can adversely affect flight deck crew performance since crew (interactions may attract overt operational challenges, threatening passengers' safety Chua, Sun and Sinha, 2023, Peksatici, 2022).

For most commercial flight operations, flight deck crew comprise two pilots; the lead pilot, who is the captain (Pilot in Command) and the first officer, who assists the captain. The flight deck crew are paired randomly using airline crew scheduling applications. RwandAir outsources diverse crew globally and this can affect crew performance and safety. Due to cultural diversity, sharing of tasks is challenging yet it requires teamwork and trust for good performance (, 2020).

Currently, aviation accidents have been reduced since CRM training increases teamwork in the flight deck, thus ensuring safer flight operations (Al-Hadabi, 2021). However, besides teamwork, situation awareness, communication, workload management, leadership, planning and decision-making remain crucial in the flight deck (Al-Hadabi, 2021). Whereas every pilot may have the required aptitude and technical proficiency to operate an aircraft, deficiency in people skills may incapacitate the crew's ability to synergize (Nebhwani, 2021). This implies the need for an awareness of cultural diversity and its implications within CRM training in order to promote proper functionality.

Currently, CRM serves as a mainstream training tool. Before CRM, scant communication was associated with teamwork breakdown and situational awareness loss, leading to poor bad decisions that resulted in fatal accidents (MacLeod, 2021 & Al-Hadabi, 2021). Nebhwani (2021) and Song (2021) believe that major plane crashes were orchestrated by poor communication [an element of CRM that must be elaborated on] or particular cultural impositions that prevented flight deck crew members from acting appropriately. This divulges a loophole in CRM training.

Existing literature indicates that culture is a complex concept that involves knowledge, morals, beliefs, and specific capabilities an individual acquires as a member of a specific society (Nebhwani, 2021; Gopalkrishnan, 2021). It shapes the perception of individuals and is affected by an individual's customs, language, religion, and education which can positively or negatively impact CRM (Metscher et. al., 2021). As a result of globalization, cultural diversity, and the complexities it introduces have been fronted for deliberations

with hope that some ways could be devised to enhance performance for the different airline organizations (Chua, Sun, & Sinha, 2023).

In the Hofstede model, the power dimensions of culture noted variances in the national cultures that may be reflected through the following dimensions: Masculinity, uncertainty avoidance, power distance, and collectivism (Peksatici, 2022; Zurman et.al. 2021). In cultures where the *power distance* is high, the subordinates elude direct confrontations with superiors, are reluctant to make or participate in decision-making. In contrast, in cultures where power distance is low, individuals may be open to decision-making, consultations, and subordinates are usually willing to question their superiors, are more individualistic (Peksatici, 2022; Nebhwani, 2021). In cultures where power distance is high [and collectivism is ok] individuals express their preference for rules and procedures, preferred teamwork and avoid challenging the authority—this is common in Eastern than in Western cultures (Song, 2022).

Uncertainty avoidance in Hofstede's model is a cultural dimension that measures the extent society demonstrates tolerance to ambiguity, surprising and unknown situations (Peksatici, 2022). Peksatici (2022) reports that in society with heightened uncertainty avoidance, individuals tend to look for order, certainty, and formalized laws and procedures to reduce the chances of unpredictable future events that may impact their activities in a more significant way. On the contrary, individuals in societies with little uncertainty avoidance, individuals are unlikely to depend on written rules and are likely to tolerate risks.

Masculinity according to Hofstede is the extent to which individuals in a given society express their obsession with nurture or achievement. In societies with high masculinity, emphasis is on wealth acquisition, distinguished gender roles [femininity vs. masculinity], and ambition (Peksatici, 2022). However, in societies with low masculinity, emphasis is on environmental awareness, sexual equality, fluid gender roles, nurturing and caring.

Collectivism, according to Peksatici (2022) implies the extent to which individuals in a given society are assimilated in groups. In societies with elevated degree of collectivism, individuals put others' needs before theirs. On the contrary, individuals in low collectivism culture prioritize individualism (Peksatici, 2022) & (Metscher, Smith & Alghamadi, 2021). Among individualistic people, personal interests/goals precede entire group's interests/goals.

Besides Hofstede's cultural dimensions, issues like *proxemics and gender* also affect crew performance. According to Joosse, Lohse, & Evers (2020) social norms influence interactions with others, including people of opposite gender, and emphasize that personal space depends on culture depending on whether they hail from "contact" or "non-contact" cultures. Proxemics too is critical crew who spend much time in a confined shared space. Edward Hall, through theory of proxemics, analyzes how distance affects human relations. According to Hall, proxemics encompasses four interpersonal distance zones, namely: Social distance, personal distance, intimate distance, and public distance (Kang & Kim, 2023). *Social distance* [2M– 4M] is the distance where communication between individuals is by voice, whereas *personal distance* is the reachable maintained by associates or friends [50CM to 120CM]; *intimate distance*, conversely is the distance

between close family members where individuals can feel each other's breath (50 cm); and lastly, *public distance*, which allows communication when speaking in a loud voice, involves a distance of separation of at 4M or more (Kang & Kim, 2023).

Those from non-contact cultures such as Japan, Northern American and Northern European countries tend to maintain more significant personal spaces when paralleled with those from contact cultures like the Arab, Southern American and Southern European countries. Metscher, Smith & Alghamdi (2021) implies that miscommunication may arise from national culture and gender stereotypes. Any airline, including RwandAir, may be affected by these factors, when the pilots have different gender and/or cultural background. The gender and proxemics variables, are yet to be examined as part of the cultural influences to performance by any study in Africa, and specifically, in East Africa. This would serve as a valuable scholarly contribution since it also investigates relatively new variables that impact performance.

Within the context of culture, social interactions are at the core of CRM (Song, 2022, Peksatici, 2022). Social interactions and the nature and level of communication among crew members are strongly affected by the national culture particular cultural beliefs and traits that influence the attitudes and behaviors of pilots which may pose a challenge and the weakening of CRM skills due to heterogeneity of the combinations of nationalities (Song, 2022). Proxemics, gender and the other dimensions of culture, may potentially affect the performance of flight deck crew in RwandAir, therefore, they are of interest to this research since none has been conducted in East Africa.

1.3 Problem Statement

Globalization has made the outsourcing of crew from any part of the world easy, but they experience challenges that are associated with differences in cultures. These differences shape how individuals behave and react during their interactions with colleagues at work and also their performance (Metscher et.al. 2021). Diversity stemming from cultural differences such as distinct psychological and demographic characteristics can adversely affect flight deck crew performance since crew interactions may attract overt operational challenges, threatening passengers' safety (Chua, Sun and Sinha, 2023, Peksatici, 2022).

Communication challenges, for example, can arise from cultural diversity. According to Al-Hadabi, (2021) teamwork, situational awareness, communication, workload management, leadership, planning and decision-making are critical for performance in the flight deck. Song (2021) suggests that poor communication has been a major cause of airplane accidents and therefore CRM training must focus on cultural aspects that affect teamwork in the flight deck. Any void in communication divulges a loophole in CRM training. Despite pilots' aptitude and technical proficiency in flight operations, deficiency in people-skills may incapacitate the crew's ability to synergize (Nebhwani, 2021). This highlights the need for an awareness of cultural diversity of flight deck crew and its implications within CRM training in order to improve performance

Cultural diversity could negatively impact performance such as integration challenges that could affect cabin and flight deck safety and effectiveness (Metscher et.al. 2021, Nebhwani 2022). A study established a void created by culture that can adequately be addressed using

customized CRM training and suggested the appraisal of similar issues on a different airline with keen focus on how culture influences flight deck crew performance and how to effectively address the issue for the good of the organization (Peksatici, 2022). Diversity stemming from cultural differences could negatively affect the effectiveness of CRM training and create operational challenges in performance among the flight deck crew, posing a challenge to the operations of flights (Chua, Sun & Sinha, 2023; Peksatici, 2022).

Within the flight deck, several factors related to cultural diversity influence performance. These include distribution of power due to factors such as age, (power-distance), peoples' perceptions on the importance of structures (uncertainty-avoidance), orientation towards competitive achievement and assertiveness (Masculinity) and occupation of space (proxemics) (Gladwell, 2008, McCall & Singer, 2021, Song, 2022). Due to the cultural differences in CRM outputs, this study aimed to assess the effect of cultural diversity on flight deck crew performance in RwandAir.

1.4 Objectives

1.4.1 General Objectives

To assess the effect of cultural diversity on flight deck crew performance in RwandAir,

1.4.2 Specific Objectives

The objectives of this study were;

1. To assess the effect of power distance on flight deck crew performance in RwandAir

2. To determine the effect of masculinity on flight deck crew performance in RwandAir
3. To establish the effect of proxemics on flight deck crew performance in RwandAir
4. Assess the effect of uncertainty avoidance on flight deck crew performance in RwandAir

1.5 Research Hypothesis

H₀₁: Power Distance has no significant effect on and flight deck crew Performance in RwandAir Limited.

H₀₂: Masculinity has no significant effect on and flight deck crew Performance in RwandAir Limited.

H₀₃: Uncertainty Avoidance has no significant effect on flight deck crew Performance in RwandAir Limited.

H₀₄: Proxemics has no significant effect on flight deck crew Performance in RwandAir Limited.

1.6 Purpose of the Study

Research revealed that culture plays an important role in the way organizations and businesses perform. Cordial work relationships impact the way the work is carried out and ultimately the performance of an organization. These work relationships are impacted by the different cultures of the personnel. In the aviation industry, and specifically with regard to flight deck crew, the performance of the pilots in the flight deck is influenced by their

cultures. RwandAir Ltd, has a rich cultural mix with pilots drawn from different countries worldwide. Using different cultural dimensions the purpose of this study is to determine the levels of influence the different cultures may have on the performance using cultural dimensions of Hofstede's model with the aim of proposing areas of emphasis within CRM training for flight deck crew in RwandAir.

1.7 Scope of the Study

This study focused on the effect of cultural differences among flight deck crew on their performance in RwandAir. It assessed the dimensions of Hofstede's model including Masculinity, Uncertainty avoidance, Collectivism and Power distance. While there may be other international airlines that may require such a review, the current study only addresses a single airline that has culturally diverse crew that potentially struggles with cultural differences. In general, the diverse cultures represented in the airline are Eastern, Western and African. The study was conducted within the study period.

1.8 Significance of the Study

Rwanda Civil Aviation (RCAA) will benefit from this research by gaining valuable insights into how cultural diversity can enhance the safety, efficiency, and professionalism of the aviation sector. Understanding how diverse cultures interact in high-stress environments like the flight deck will allow policymakers to craft regulations and guidelines that promote effective teamwork and communication. This research could influence national policies regarding the hiring, training, and integration of flight crew members from different cultural backgrounds, ensuring that diversity contributes positively to the nation's aviation industry.

In addition, this study will serve as evidence to support efforts in promoting Rwanda as an international aviation hub. By demonstrating that RwandAir and its flight deck crew effectively manage cultural diversity, Rwanda's reputation on the global stage can be enhanced. This could attract international partnerships, investments, and tourism, which would benefit the country economically and help position Rwanda as a leader in safe and inclusive aviation practices in Africa.

Moreover, if the research reveals areas for improvement, the RCAA will use these findings to address potential gaps in the training and development of aviation personnel. This can lead to the creation of specialized programs or funding opportunities aimed at improving cultural competence within the aviation sector. By supporting this kind of research, RCAA would be taking proactive steps to ensure that Rwanda's aviation industry remains at the forefront of best practices in diversity and safety.

For the management at RwandAir, the research will provide actionable insights on how cultural diversity affects flight deck crew dynamics. This will help the airline's leadership understand the importance of fostering a multicultural environment where communication, trust, and teamwork thrive. Managers can use the findings to refine leadership strategies, and in particular CRM, to ensure that flight deck crews are effectively trained to collaborate despite cultural differences. By promoting an inclusive atmosphere, managers can help prevent misunderstandings and conflicts that could potentially compromise safety and operational efficiency.

Additionally, managers will use the research to shape their hiring practices. Understanding how cultural diversity influences team dynamics will allow RwandAir's leadership to recruit individuals who can successfully work within a diverse environment. This could also help in designing recruitment campaigns that attract a broad range of applicants, ensuring that the airline continues to benefit from a wide array of experiences and perspectives. A balanced and well-managed team will likely have enhanced problem-solving abilities and improved performance.

Lastly, the research will help RwandAir's management team identify any existing challenges that may be hindering the full potential of their flight deck crew. If the research uncovers specific cultural barriers, such as communication issues or decision-making discrepancies, managers can implement targeted CRM training programs and workshops to address these concerns. By equipping their teams with the skills to work across cultural lines, RwandAir's managers can enhance overall crew performance, reduce operational errors, and improve service quality, ultimately contributing to the airline's continued growth.

This research will offer an invaluable opportunity for subsequent research scholars to engage with a growing area of study on cultural diversity in aviation. The findings will provide them with a real-world case study of how diverse teams perform in high-stakes environments, offering insights into areas such as intercultural communication, teamwork, and leadership. For scholars in the fields of business, aviation, and sociology, this research could open doors for further academic exploration, allowing them to contribute to an evolving body of knowledge about the dynamics of multicultural teams in professional

settings. Additionally, the study will present a unique opportunity for research scholars to get involved in research that has practical implications. They can contribute to data collection, analysis, and policy recommendations, giving them hands-on experience in applied research. By engaging with the findings, scholars will also learn how to design their own studies and explore other sectors that could benefit from understanding cultural diversity, such as healthcare, education, or multinational corporations. This could lead to future academic papers, conferences, or collaborations with industry professionals.

Finally, the research will inspire upcoming research scholars to pursue careers in aviation, management, or international relations, fields where understanding cultural diversity is becoming increasingly critical. By learning from this research, scholars can better equip themselves to become leaders in these fields, influencing how industries and organizations manage and embrace cultural differences. This research not only enhances their academic growth but also positions them as future contributors to global conversations about diversity and inclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the available literature on crew resource management in relation to cultural dimensions. The chapter first expounds on the concepts of crew resource management and cultural dimensions before delving into the theoretical underpinnings, where a review of Hofstede's, Edward Hall's and Elton Mayo's theories, respectively, are made. Thereafter, the chapter officially reviews the empirical studies

2.2 Study concept definitions and perspectives

This section clarifies the study's core concepts by defining and situating them within aviation and cross-cultural research. Flight deck crew performance is examined as the dependent variable, while cultural dimensions such as power distance, masculinity, proxemics, and uncertainty avoidance are explored as independent variables shaping cockpit dynamics. These definitions provide a theoretical and practical foundation for analyzing how cultural diversity influences crew coordination and operational safety at RwandAir.

2.2.1 Flight Deck Crew Performance

The concept of flight deck crew performance represents one of the most critical aspects of aviation operations, as it directly relates to the safe, efficient, and reliable execution of flights in both normal and abnormal conditions. Flight deck crews are not only responsible

for the technical operation of the aircraft but also for managing the cognitive, emotional, and cultural dynamics that emerge within the cockpit environment. The global aviation industry has recognized that effective crew performance depends on a blend of technical proficiency, communication effectiveness, decision-making skills, and the ability to adapt to complex and dynamic environments (Thomas, Jenkins, & Smith, 2021). Within this framework, performance cannot be reduced to adherence to checklists or compliance with standard operating procedures alone; rather, it must be understood holistically as a system of human, organizational, and technological interactions. In the case of airlines such as RwandAir, crew performance takes on even greater importance due to the cultural diversity of pilots, first officers, and other operational staff, which can influence how decisions are interpreted, communicated, and acted upon in the cockpit (Nyamu & Abate, 2022).

Another important perspective in understanding flight deck crew performance is the way in which cultural dimensions intersect with technical skills and situational awareness. Since the cockpit is a microcosm of cultural interaction, pilots from different backgrounds bring unique approaches to authority, teamwork, and information-sharing. Research after 2020 has shown that cross-cultural dynamics in aviation are increasingly relevant as airlines expand their recruitment pools to include personnel from multiple regions (Lee, Choi, & Park, 2021). This diversity enriches the talent base but can also create challenges when crew members interpret authority, communication style, or conflict resolution differently. Performance, therefore, becomes more than a measure of operational efficiency; it becomes a test of intercultural competency, the ability to align personal behavior with collective cockpit norms, and the skill to integrate cultural values into standardized aviation protocols

(Kim & Murthy, 2022). Such dynamics emphasize why examining flight deck crew performance through the lens of cultural diversity offers deeper insights than a purely technical evaluation.

Flight deck performance has also been redefined by the evolution of Crew Resource Management (CRM), which continues to serve as the backbone of aviation human factors. Contemporary CRM literature emphasizes not only teamwork and communication but also adaptability to rapidly changing scenarios such as pandemics, geopolitical disruptions, and technological transformations. Studies conducted after the onset of the COVID-19 pandemic show that crews who demonstrated resilience, situational adaptability, and shared decision-making achieved higher safety and operational outcomes than those who relied solely on traditional command structures (Alghamdi & Santos, 2021). This finding underscores the interrelationship between crew cohesion and performance in crisis environments. Within airlines in Africa, including RwandAir, such adaptability has been especially critical given the limited resources and the necessity of maintaining operational continuity in the face of global disruptions. As a result, performance is now conceptualized not only as adherence to standard operating procedures but also as the capacity for resilience under systemic stressors (Nduta, 2021).

Technological integration has added another layer to the performance of flight deck crews, particularly as cockpits increasingly incorporate automation, artificial intelligence, and data-driven systems. While automation reduces pilot workload in many respects, it simultaneously demands new competencies, such as system monitoring, critical thinking, and timely intervention when automated systems fail or produce ambiguous outputs

(Chowdhury, 2022). Performance in this context requires a balance between trust in technology and the preservation of human oversight. Recent research highlights cases in which overreliance on automation led to decreased vigilance, delayed reaction times, and, in some instances, catastrophic errors (Müller, 2020). In culturally diverse crews, these challenges are compounded when different attitudes toward technology exist, shaped by training experiences, cultural norms, or institutional values. For instance, a crew member trained in an environment emphasizing high trust in technology may act differently from one whose training underscored manual flying proficiency. Thus, effective performance is not only a matter of technical competence but also of harmonizing divergent orientations toward automation in culturally mixed flight decks.

Another dimension that has received increasing attention in recent years is psychological well-being and its impact on flight deck performance. Mental health, stress management, and fatigue have long been recognized as risk factors in aviation, but recent studies highlight the way cultural factors shape how crew members manage and disclose these issues. According to Akinyemi and Kamau (2021), in cultures where discussing mental health remains stigmatized, pilots may be less likely to seek help or admit vulnerability, potentially compromising performance. Conversely, in organizational cultures where well-being is openly discussed, crew members are more likely to engage in proactive self-care and team support. Airlines such as RwandAir, which recruit from multiple cultural contexts, must navigate these differences carefully to ensure that all crew members feel empowered to prioritize their psychological resilience. Crew performance, therefore,

cannot be fully evaluated without considering the role of well-being, organizational support systems, and the influence of cultural attitudes toward mental health and stress.

Performance measurement has also shifted in recent literature, with emphasis placed on a combination of objective and subjective indicators. While traditional metrics such as on-time departures, compliance with flight plans, and adherence to fuel management policies remain essential, more holistic evaluations include peer assessments, simulator performance, and even biometric monitoring during flights (Graham & Li, 2022). The challenge, however, lies in integrating these diverse metrics into a meaningful framework that acknowledges both technical precision and human variability. Cultural diversity complicates this process because evaluators must avoid biases that emerge when assessing crew members against standards that may inadvertently favor one cultural orientation over another. For example, assertive communication may be interpreted as competence in one cultural setting but as aggressiveness in another. Thus, performance assessment must evolve to include intercultural sensitivity and awareness in order to produce fair, accurate, and constructive evaluations (Tanaka & Roberts, 2021).

The interplay between safety culture and crew performance has become even more pronounced in post-2020 aviation literature. Safety culture, which reflects the shared values, norms, and attitudes within an organization toward risk and safety, directly influences how crews operate in the flight deck. A strong safety culture encourages open reporting, continuous learning, and non-punitive approaches to error management. Studies show that when cultural diversity is present, safety culture either acts as a unifying force that bridges differences or as a point of tension when organizational messages conflict with

individual cultural values (Bello & Otieno, 2022). For RwandAir, ensuring that safety culture is consistently communicated and internalized by a culturally diverse crew is essential to enhancing performance. This requires leadership commitment, training, and mechanisms that recognize cultural nuances without compromising universal safety standards.

2.2.2 Power Distance in the Flight Deck

Power distance, as conceptualized in cross-cultural theory, refers to the extent to which less powerful members of organizations or institutions accept and expect unequal distributions of authority and power. In the flight deck context, power distance becomes a critical cultural dimension because cockpit operations inherently operate within a structured hierarchy, typically with the captain occupying the highest authority and the first officer (FO) or other supporting crew functioning within a subordinate but highly interdependent role. Modern aviation practice has increasingly emphasized the importance of flattening unnecessary hierarchies to improve communication, yet cultural expectations around power distance still shape how pilots interact, make decisions, and resolve conflicts in high-stakes environments (Park & Lee, 2021).

Within the cockpit, power distance manifests in how crew members perceive authority and how willing they are to challenge or support the decisions of their superiors. For example, in cultures with high power distance, first officers may hesitate to question or contradict the captain's judgments even when errors are suspected, valuing respect for hierarchy over assertive communication. This reluctance can become problematic in dynamic scenarios

such as approach and landing, where rapid clarification or challenge is vital for safety. Conversely, in low power distance contexts, the culture encourages open dialogue and empowers junior crew to express concerns, contributing to collaborative decision-making (O'Connor, 2022). The application of Crew Resource Management (CRM) training across global airlines reflects the industry's attempt to harmonize cockpit communication by reducing the negative implications of high power distance while still maintaining a functional command structure.

The operational impact of power distance in the cockpit is often reflected in decision-making dynamics. Captains in high power distance settings may adopt an authoritarian approach, making unilateral decisions with minimal consultation. While this can expedite decision-making in emergencies, it risks overlooking alternative solutions offered by junior crew. By contrast, in low power distance settings, captains may encourage a participative style, integrating input from first officers and sometimes even cabin crew. Although this inclusivity promotes broader situational awareness, it can slow response times if consensus-seeking becomes prolonged. The balance between these approaches depends heavily on cultural conditioning, organizational norms, and training interventions designed to mitigate extremes (Mavin & Murray, 2021).

Power distance also influences the psychological safety of crew interactions. Psychological safety refers to the shared belief that individuals can voice opinions or concerns without fear of ridicule or retribution. In a cockpit with low psychological safety—common in high power distance cultures—first officers may avoid raising red flags even when they recognize potential risks, leading to communication breakdowns. In contrast, low power

distance fosters environments where crew members can speak openly, enhancing error detection and resolution. Airlines have recognized the centrality of this issue by embedding non-punitive communication standards into training modules, aiming to cultivate assertiveness across hierarchical lines (Young et al., 2022).

Another important dimension is the interplay between power distance and multicultural crews, which are increasingly common in global aviation. Pilots often operate in multiethnic and multinational teams where differing expectations around authority coexist. For instance, a captain trained in a low power distance context such as Northern Europe may encourage open dialogue, while a first officer from a high-power distance culture such as East Asia might find this approach uncomfortable or even inappropriate. Such cultural dissonance requires adaptive strategies, often guided by standardized operating procedures (SOPs) that provide a neutral framework for communication, thereby minimizing misunderstandings rooted in cultural expectations (Jeon & Kim, 2020).

Training interventions have been central in addressing the challenges of power distance. Modern CRM emphasizes strategies such as “advocacy with inquiry,” where first officers are taught to challenge decisions respectfully by framing concerns as clarifying questions. This approach reduces the risk of confrontation while still surfacing critical safety information. Captains, on the other hand, are trained to actively invite input from subordinates, signaling openness to feedback despite their formal authority. Airlines with diverse workforce compositions have increasingly invested in tailored CRM programs that explicitly account for cultural dimensions of power distance, reinforcing behaviors that balance authority with inclusiveness (Li & Harris, 2023).

The technological environment of the cockpit also interacts with power distance. Automation has shifted some traditional hierarchies by redistributing cognitive workloads. However, captains often retain final authority over automation management decisions. In high power distance settings, first officers may defer to the captain's preferences even if automation best practices suggest alternative strategies. This highlights how cultural dimensions continue to shape human-automation interaction despite advances in cockpit technology. Low power distance cultures, conversely, promote shared oversight of automation, where crew members feel more empowered to intervene if they perceive mismanagement of automated systems (Stewart et al., 2021).

In conclusion, power distance remains a defining feature of cockpit culture, shaping authority relations, communication patterns, decision-making, and safety outcomes. While aviation has made significant strides in standardizing training to reduce negative outcomes associated with high power distance, the deeply ingrained cultural perceptions of authority continue to influence how captains and first officers engage with one another. The contemporary cockpit requires a balance: authority structures must remain intact to ensure decisive command, yet channels of communication must be open enough to foster safety and collaboration. Recognizing and managing the nuances of power distance is therefore central to modern flight deck operations.

2.2.3 Masculinity in Flight Deck Crew

Masculinity, as a cultural dimension, refers to the extent to which a society or organizational culture emphasizes traditionally "masculine" traits such as competitiveness,

assertiveness, ambition, and material success, in contrast to “feminine” traits like care, collaboration, and quality of life (Hofstede, 2020). Within the context of flight deck operations, masculinity can influence how pilots interact with one another, make decisions, and manage both routine and high-pressure situations. It shapes attitudes toward authority, risk, communication, and conflict resolution, all of which are critical in the tightly controlled environment of an aircraft cockpit. Unlike general workplace settings, the flight deck requires a delicate balance between assertiveness and collaboration, making masculinity an essential factor for understanding crew dynamics.

High masculinity cultures typically emphasize achievement, assertiveness, and performance orientation. In aviation, this may manifest in cockpit behaviors such as decisiveness, proactive problem-solving, and a focus on task completion over interpersonal harmony (Nguyen & Park, 2021). Pilots from high masculinity backgrounds may prioritize operational efficiency, goal achievement, and technical proficiency, often striving to demonstrate competence in front of colleagues. While such traits can drive high operational standards, they can also exacerbate authority gradients or reduce openness to feedback, particularly in hierarchical flight deck settings. In multicultural airlines like RwandAir, where pilots may come from diverse cultural backgrounds, differences in masculinity levels can create subtle tensions if not properly managed.

Conversely, low masculinity cultures emphasize collaboration, consensus-building, and quality of life, which translates into flight deck behaviors that value team cohesion, shared decision-making, and mutual support (Zhang et al., 2022). Pilots from low masculinity backgrounds may focus on building interpersonal trust, encouraging dialogue, and

prioritizing crew well-being alongside operational objectives. While this collaborative approach enhances communication and reduces conflict, it may sometimes slow decision-making in time-critical situations. Airlines must therefore carefully calibrate CRM training to balance assertiveness and collaboration, ensuring that high-masculinity tendencies do not dominate, nor that low-masculinity tendencies compromise operational responsiveness.

Masculinity also intersects with risk perception in aviation. High masculinity cultures often view risk-taking as a demonstration of competence or courage, which can influence pilots' willingness to make assertive decisions under uncertain conditions (Wang & Fan, 2023). In contrast, low masculinity cultures tend to prioritize safety and consensus over aggressive risk-taking, favoring caution and procedural adherence. This distinction has practical implications for flight deck operations, particularly during abnormal or emergency scenarios, where differing risk orientations can affect how pilots interpret data, initiate maneuvers, or challenge decisions. Understanding these cultural nuances is critical for training crews to manage both personal inclinations and team dynamics effectively.

Training and organizational culture play a pivotal role in moderating the effects of masculinity. Research by Kim and Lee (2021) suggests that structured CRM programs can mitigate extreme masculinity traits by emphasizing shared leadership, assertive communication balanced with active listening, and joint decision-making. Simulation exercises, scenario-based learning, and debriefings allow pilots to experience the benefits of collaboration while maintaining high standards of performance. In multicultural flight decks, this becomes even more crucial, as pilots with differing masculinity orientations must find common ground to maintain operational efficiency and safety.

Communication styles in high- versus low-masculinity contexts also differ significantly. High masculinity environments often favor direct, assertive language, where challenges are expressed openly but may be framed competitively. In low masculinity environments, communication is typically indirect, diplomatic, and oriented toward maintaining harmony (Zhou & Li, 2021). For flight deck crews, these differences can influence how concerns are raised, how instructions are given and received, and how conflicts are resolved. Training programs that integrate awareness of cultural masculinity can therefore reduce miscommunication and ensure that all crew members feel empowered to contribute to operational decision-making.

Recent technological changes in aviation further highlight masculinity's relevance. With increasingly automated cockpits, pilots must balance assertive engagement with monitoring automated systems and interpreting data. High-masculinity tendencies may encourage overconfidence in manual interventions, whereas low-masculinity tendencies may result in over-reliance on automation. Understanding these tendencies allows airlines to tailor CRM and human factors training, ensuring that pilots adopt a measured approach that combines assertiveness, collaboration, and technological compliance (Wu et al., 2020).

In conclusion, masculinity in flight deck crews shapes behaviors, decision-making, communication, and risk orientation. High masculinity emphasizes assertiveness, competition, and achievement, whereas low masculinity promotes collaboration, consensus, and care. Both orientations have strengths and potential drawbacks in aviation operations. By recognizing and integrating masculinity as a cultural factor into CRM training, simulation exercises, and organizational culture, airlines like RwandAir can

enhance intercultural understanding, reduce conflict, and optimize flight deck interactions, ultimately promoting operational efficiency and safety.

2.2.4 Proxemics in Flight Deck Crew

Proxemics, a concept originally introduced by Hall (1966), refers to the study of how people use and perceive physical space in interpersonal interactions. In aviation, particularly within the flight deck, proxemics plays a crucial role because of the unique environment in which pilots and other crew members work. The flight deck is a confined space with high operational demands, requiring efficient coordination, minimal miscommunication, and seamless teamwork. Unlike ordinary workplace settings, proxemics in the flight deck does not merely involve personal space preferences but extends to how physical distance, body orientation, and spatial awareness influence crew collaboration, communication, and safety outcomes (Hirsh, 2020). Understanding proxemics in this context is essential for interpreting how cultural backgrounds, organizational norms, and training protocols shape crew interactions and, ultimately, flight safety.

The confined layout of the cockpit imposes inherent spatial constraints that require pilots to adapt their personal space preferences. In cultures where larger personal distances are valued, such as in Northern Europe, cockpit proximity may initially feel intrusive. Conversely, in collectivist societies where closeness is normalized, tight cockpit arrangements may pose fewer challenges (Waller et al., 2021). The necessity for physical closeness during operations can create psychological discomfort if crew members are not

accustomed to such levels of proximity. This discomfort can influence communication styles, body language interpretation, and decision-making effectiveness. In multicultural airlines such as RwandAir, where pilots from different cultural backgrounds interact, proxemic differences can create subtle barriers to effective crew resource management (CRM) if not adequately addressed (Steiner et al., 2022).

Proxemics in the flight deck is also tied to body orientation and eye contact. Studies in aviation human factors highlight that mutual gaze and body alignment significantly enhance situational awareness and joint decision-making (Lu et al., 2021). When pilots orient their bodies toward each other while discussing operational issues, it fosters trust and reduces ambiguity in communication. Conversely, when proxemic discomfort leads to avoidance of eye contact or indirect body orientation, critical messages may be downplayed or misunderstood. This becomes particularly important during high-stress phases of flight such as takeoff and landing, where spatial harmony within the cockpit directly affects coordination and workload distribution (McDonald & Carter, 2023).

Furthermore, proxemics influences authority gradients in the cockpit. Pilots from high power-distance cultures may interpret proximity with senior colleagues differently than those from low power-distance cultures. In some contexts, sitting close to a captain may heighten hierarchical awareness, reinforcing deference and reduced assertiveness. In other cases, proximity may foster camaraderie and open communication. These variations suggest that proxemics cannot be understood in isolation but must be contextualized within broader cultural dynamics (Reed & Mason, 2020). For instance, in training sessions, cadets may be less willing to speak up when seated near senior captains, perceiving proximity as

symbolic of authority. This dynamic, if left unmanaged, can compromise the effectiveness of CRM principles that emphasize open dialogue and mutual respect.

Technological advancements in cockpit design have also altered proxemic interactions. The introduction of glass cockpits and digital avionics has reshaped how space is used within the flight deck (Miller et al., 2021). Modern aircraft designs place greater emphasis on shared displays and interactive touchscreens, requiring pilots to coordinate more closely in terms of body orientation and gesture. Unlike earlier cockpits with more physically separated controls, today's configurations demand higher levels of proxemic cooperation. This has made the cultural adaptability of proxemics even more crucial, as pilots must learn to negotiate physical and cognitive space effectively, regardless of personal preferences.

Another dimension of proxemics in flight decks relates to stress and workload. Under high workload conditions, proxemic sensitivity tends to decrease, as pilots focus more on tasks than on spatial awareness. However, prolonged exposure to stressful flights without adequate cultural or proxemic adjustment can heighten fatigue and interpersonal tension (Santos & Amaral, 2022). Fatigue further reduces tolerance for close proximity, leading to irritability and reduced cooperation. Airlines that operate with culturally diverse crews therefore need to integrate proxemics into both CRM training and fatigue risk management systems to sustain effective cockpit operations.

Training programs that explicitly incorporate proxemics awareness are increasingly advocated in modern aviation management. CRM modules now emphasize not only verbal communication and leadership but also non-verbal cues, body orientation, and spatial

negotiation (ICAO, 2022). These interventions recognize that misunderstandings in proxemics can escalate into broader miscommunications, which in aviation can have severe consequences. For example, a first officer misinterpreting the body language of a captain as disapproval may hesitate to challenge an unsafe decision, undermining safety culture. By training crews to be more self-aware and culturally sensitive to proxemic norms, airlines can enhance both interpersonal harmony and operational safety (Zohar & Huang, 2021).

Importantly, proxemics in flight decks must also be analyzed in the light of post-COVID-19 operational changes. Health protocols emphasized physical distancing in most workplaces, but in aviation, distancing is impossible inside the cockpit. This paradox forced crew members to renegotiate proxemic comfort levels under heightened anxiety about infection risk (Lopez & Grant, 2021). Pilots had to balance operational efficiency with personal safety concerns, creating new dynamics of trust, vulnerability, and adaptation. Post-pandemic, this has reshaped how proxemics is perceived, with many crew members more aware of hygiene and spatial considerations than before.

In summary, proxemics in the flight deck encompasses much more than physical distance. It is a multidimensional construct shaped by culture, cockpit design, authority gradients, non-verbal communication, and situational stressors. As airlines like RwandAir operate with increasingly diverse crews, proxemic awareness has become critical for reducing miscommunication and enhancing CRM effectiveness. Training programs must therefore embed proxemics as a core element of cultural diversity management, ensuring that crew members understand, respect, and adapt to each other's spatial expectations. Doing so not

only promotes smoother interpersonal relations but also strengthens operational safety, which remains the central objective of aviation practice.

2.2.5 Uncertainty Avoidance in Flight Deck Crew

Uncertainty avoidance refers to the extent to which individuals in a culture feel uncomfortable with ambiguity, unpredictability, and risk, leading them to rely on rules, procedures, and established structures to minimize uncertainty (Hofstede, 2020). Within the aviation context, uncertainty avoidance plays a central role in how flight deck crew members perceive, interpret, and react to complex operational environments where safety, regulation, and decision-making are paramount. Unlike other cultural dimensions that may emphasize hierarchy, gender roles, or interpersonal spacing, uncertainty avoidance is primarily concerned with the psychological and operational mechanisms that crews adopt to manage unknowns, potential errors, and unforeseen events. Aviation, by its very nature, involves high levels of uncertainty due to changing weather patterns, dynamic air traffic conditions, technical malfunctions, and human limitations, making this dimension particularly relevant to flight deck crews (Gudykunst, 2021).

High uncertainty avoidance cultures tend to establish detailed rules, checklists, and standard operating procedures (SOPs) to reduce unpredictability in operations. For flight deck crews, this translates into strict adherence to aviation protocols, reliance on checklists, and a preference for established routines in both normal and emergency scenarios (Javidan & House, 2021). Crews operating under strong uncertainty avoidance cultures often value predictability, which aligns with the aviation industry's reliance on standardization and

procedural compliance. This emphasis on rule-based approaches helps in minimizing operational risks, but it may also reduce flexibility and adaptive decision-making in novel situations. For instance, in unexpected scenarios where existing procedures do not provide direct guidance, highly uncertainty-avoidant crews may experience hesitation or stress in improvising solutions (Li, 2022).

In contrast, low uncertainty avoidance cultures are more tolerant of ambiguity and exhibit greater adaptability in situations where outcomes are unpredictable. Flight deck crews from such cultures may demonstrate higher comfort with improvisation, flexible decision-making, and dynamic adjustments to non-standard conditions (Nguyen, 2021). While this can foster innovation and quick responses, it can also increase risks if crews deviate excessively from established SOPs or misinterpret the extent of acceptable improvisation. Balancing the benefits of adaptability with the safeguards of structured procedures is a key challenge for aviation organizations that operate across diverse cultural contexts.

The relationship between uncertainty avoidance and crew training is also significant. Training programs in high uncertainty avoidance settings emphasize thorough coverage of rules, detailed simulations, and rigid scenario-based drills to prepare crews for a wide variety of contingencies (Stolzer et al., 2021). Pilots are expected to internalize procedures and rely on them during every phase of flight. In contrast, training in lower uncertainty avoidance contexts may prioritize problem-solving skills, adaptive thinking, and scenario flexibility. This difference highlights the importance of cultural awareness in multinational aviation organizations, where standardized global procedures must coexist with diverse cultural interpretations of uncertainty and risk (Wang & Fan, 2023).

Moreover, uncertainty avoidance influences crew communication and interaction patterns in the cockpit. High uncertainty avoidance can foster structured communication, where every instruction, confirmation, and acknowledgment follows strict phrasing conventions. This reduces misunderstandings and aligns with aviation communication protocols designed to minimize ambiguity (ICAO, 2022). However, excessive reliance on rigid communication styles may sometimes suppress spontaneous dialogue, limiting the crew's ability to discuss alternative strategies during unanticipated events. Conversely, crews from low uncertainty avoidance backgrounds may use more flexible communication styles, fostering open dialogue but occasionally risking ambiguity or misinterpretation in high-stakes environments (Zhang & Zhou, 2022).

The cultural dimension of uncertainty avoidance is further evident in risk perception among flight deck crews. In high uncertainty avoidance settings, risk is often viewed as something to be minimized through preventative measures, leaving little tolerance for deviation. This aligns with strict enforcement of safety protocols and regular compliance monitoring (O'Connor, 2021). In lower uncertainty avoidance contexts, crews may perceive risk as manageable through adaptive strategies, situational awareness, and collaborative problem-solving. While this can enable rapid responses to unexpected events, it may also create tension with international regulatory requirements that prioritize uniformity over individual interpretation (ICAO, 2022).

Technological integration in the cockpit also interacts with cultural attitudes toward uncertainty. Advanced automation and decision-support systems can reduce uncertainty by providing structured data, predictive analytics, and standardized alerts. High uncertainty

avoidance crews may welcome these technologies as tools that reinforce procedural stability, while low uncertainty avoidance crews may use them more flexibly, integrating personal judgment alongside automated recommendations (Molesworth & Estival, 2021). The balance between human decision-making and technological reliance therefore becomes culturally nuanced, with implications for crew coordination, trust in automation, and adherence to international best practices.

Uncertainty avoidance also has implications for organizational management within airlines. Companies operating in culturally diverse environments must design policies that accommodate varying levels of comfort with ambiguity among crew members. This includes customizing training, communication strategies, and even leadership styles to balance the need for procedural compliance with the benefits of adaptive decision-making (Gelfand & Jackson, 2021). For instance, while ICAO and IATA set global standards for flight deck operations, cultural attitudes toward uncertainty can influence how these standards are internalized and practiced at the organizational level.

In summary, uncertainty avoidance in the flight deck crew context represents a fundamental cultural dimension shaping how individuals and teams manage ambiguity, risk, and unpredictability in aviation. High uncertainty avoidance fosters strict procedural adherence and predictability, aligning well with aviation's safety-first approach but potentially limiting flexibility in novel situations. Low uncertainty avoidance encourages adaptability and improvisation but may challenge compliance with global standardization. Understanding this dimension is crucial for airlines such as RwandAir, which operate in multicultural environments and must harmonize global aviation standards with culturally

diverse approaches to uncertainty. By integrating cultural awareness into training, communication, and risk management, airlines can optimize crew effectiveness while ensuring alignment with international safety requirements.

2.3 Theoretical Perspectives/Underpinnings

To adequately address cultural differences, it is critical to also draw from theoretical perspectives. One such perspective, crucial in the current study, is Hofstede's cultural dimensions theory that attempts to explain the concept of culture, and Edward Hall's Proxemics theory that explains the significance of personal space based on one's social relations and culture.

2.3.1 Hofstede's Cultural Dimensions Theory

Geert Hofstede's theory of cultural dimensions provides a critical lens for understanding the influence of culture on human behavior, decision-making, and social interactions. According to Gerlach and Eriksson (2021), Hofstede viewed culture as a collective set of values and beliefs that shape individuals' perceptions and behaviors, shaped by their continuous interactions with society. These shared values create a collective understanding of what is considered just, fair, or morally acceptable within a community. Hofstede argued that understanding a culture's core values makes it easier to understand its people, as their behaviors and thought patterns are deeply rooted in these cultural principles. His work was groundbreaking, as it allowed researchers to systematically categorize cultural variations and assess their impact on workplace dynamics, leadership, and teamwork. The cultural

dimensions he proposed have become foundational for cross-cultural research, offering a structured way to compare and contrast diverse societal norms and expectations.

Hofstede identified several cultural dimensions that illustrate how societies navigate key aspects of life, such as power, uncertainty, and identity. According to Hofstede (2011), these dimensions include power distance, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance, and long-term versus short-term orientation. Power distance reflects the extent to which less powerful members of a society accept unequal power distribution, influencing communication and decision-making in hierarchical settings. Individualism versus collectivism explores the degree to which individuals prioritize personal goals over group cohesion, which can affect team dynamics and conflict resolution. Masculinity versus femininity examines whether societies value competitiveness and assertiveness (masculine traits) or nurturing and cooperation (feminine traits). Each of these dimensions offers valuable insights into how cultural values shape individual and collective behaviors, especially in high-stakes environments like aviation.

Empirical research has validated the applicability of Hofstede's dimensions in real-world settings, particularly in understanding performance in multicultural teams. For instance, Liu et al. (2022) conducted a study on airline crews and found that teams from high power distance cultures struggled with upward communication, with junior crew members hesitating to challenge authority even when safety was at risk. Similarly, Kim and Park (2023) found that crews from collectivist cultures exhibited stronger teamwork but sometimes suppressed dissenting opinions to maintain group harmony. These findings

align with Hofstede's predictions and demonstrate the practical significance of his theory in aviation, where safety and performance rely on seamless communication and mutual respect. However, these studies also highlight the need for more research exploring how crews from mixed-cultural backgrounds adapt and negotiate these differences, as current literature focuses primarily on homogenous cultural groups.

Despite its extensive contributions, Hofstede's theory is not without limitations. Some researchers argue that the dimensions, while useful, may oversimplify the complexities of culture and overlook within-culture variations (Jackson & Singh, 2021). Additionally, cultural values are dynamic and evolve over time, meaning that Hofstede's original findings may not fully capture the cultural shifts occurring in modern societies. This gap presents an opportunity for future research to refine and expand the cultural dimensions framework, integrating contemporary cultural shifts and exploring new dimensions relevant to today's globalized workforce. Addressing these gaps could enhance the theory's applicability to evolving industries like aviation, where diverse, multicultural crews must work collaboratively under pressure.

2.3.2 Edward T. Hall's Proxemics' Theory

Edward T. Hall's proxemics theory provides valuable insights into how spatial dynamics influence human interactions, especially in confined environments like flight decks. According to Kang and Kim (2023), Hall developed the concept of proxemics to explain how individuals use space as a form of nonverbal communication, signaling trust, authority, or discomfort. Hall identified four primary distance zones: intimate, personal,

social, and public, each corresponding to different levels of relational closeness. For instance, intimate distance is reserved for close personal relationships, while social distance is more suitable for formal interactions. In aviation, where crew members must balance professionalism with teamwork, understanding these spatial dynamics is essential for fostering effective communication and collaboration. Mismanagement of these zones could lead to misunderstandings, tension, or impaired decision-making, ultimately affecting performance.

Research has demonstrated that spatial dynamics can directly influence team performance and psychological safety. A study by Martinez and Lee (2022) found that flight crews who unconsciously maintained excessive social distance exhibited lower levels of trust and collaboration, as the physical space acted as a barrier to spontaneous communication. Conversely, crews who maintained excessively close proximity experienced higher stress levels, as constant physical closeness heightened emotional intensity during critical situations. These findings illustrate the importance of consciously managing spatial dynamics in aviation, where the physical environment is inherently restrictive. Kang and Kim (2023) suggest that CRM training should incorporate proxemics awareness, helping crew members navigate spatial interactions to optimize teamwork and minimize conflict.

Gender and cultural background can further complicate proxemic behaviors, influencing how individuals perceive and respond to physical space. Adams and Cheng (2021) found that male pilots were more likely to encroach on personal space during high-pressure situations, sometimes unintentionally reinforcing hierarchical dynamics. Meanwhile, crews from collectivist cultures tended to prefer closer interpersonal distances, which

improved teamwork but occasionally led to groupthink. These findings highlight the multifaceted nature of proxemics and the need for culturally sensitive training that helps crews navigate diverse spatial norms. Without such training, crews may inadvertently misinterpret each other's spatial behaviors, leading to unnecessary friction or impaired coordination.

Despite the growing body of research, there remains a gap in understanding how proxemics interacts with other variables, such as stress and fatigue, in aviation settings. Most studies focus on static spatial behaviors, overlooking how proxemic preferences may shift during different flight phases or under varying levels of cognitive load (Martinez & Lee, 2022). Addressing this gap could enhance CRM programs, equipping crews with the skills to adapt their spatial behaviors dynamically as operational contexts change. By integrating proxemics more deeply into aviation research and training, organizations can cultivate more cohesive, adaptive, and high-performing teams, ultimately enhancing safety and operational efficiency.

2.3.3 Elton Mayo's Human Relations Theory

Elton Mayo made significant contributions to the study of workers productivity. According to him, Employee performance is greatly influenced by social and relational forces. Elton Mayo's theory is part of the human relation school of thought. According to his theory employee's productivity, efficiency and effectiveness rely heavily on group relationships in the workplace. When the social and relational atmosphere in an organization are positive, employees develop job satisfaction. According to Mayo, job satisfaction leads to greater

work motivation than financial reward. Mayo's theory underscores the importance of pursuing the best possible levels of cohesion among flight deck crew in an effort to optimize performance (Ojo, 2021). Thus, understanding the diverse cultures among the flight deck crew may be crucial in enhancing performance at RwandAir. Mayo's theory underpins the variables in this study.

2.4 Empirical literature

2.4.1 Uncertainty Avoidance and Crew Performance

Uncertainty avoidance significantly influences crew performance, as individuals from different cultural backgrounds respond uniquely to unfamiliar or ambiguous situations. Empirical research by Davis and Taylor (2021) explored the impact of uncertainty avoidance on airline crew coordination, finding that crew members from high-uncertainty-avoidance cultures exhibited elevated stress levels during unexpected events, which reduced their situational awareness and slowed response times. The study involved 120 commercial pilots from diverse nationalities, revealing that those with high uncertainty avoidance were more likely to rigidly adhere to procedures, even when adaptive decision-making was necessary. Similarly, Miller (2022) conducted research on flight crew teams across three international airlines, discovering that crew members with low tolerance for uncertainty were less likely to question authority or suggest alternative solutions during critical incidents. These findings highlight the complex relationship between uncertainty avoidance and crew performance, where excessive adherence to rules may compromise the team's ability to respond flexibly to dynamic conditions. Despite these insights, both studies primarily focused on pilots, leaving a gap in understanding how uncertainty

avoidance affects cabin crew or ground control teams, which are equally integral to overall flight safety.

Uncertainty avoidance can also shape interpersonal dynamics within the flight deck, influencing how team members collaborate under stress. Roberts and Williams (2022) examined cross-cultural crew interactions, finding that teams with mixed levels of uncertainty avoidance often struggled with communication breakdowns, as high-avoidance members hesitated to voice concerns while low-avoidance members pushed for swift decisions. Their research, based on flight simulator exercises, demonstrated that communication delays in high-avoidance crews increased the likelihood of misinterpreting critical information, sometimes escalating minor issues into full-blown emergencies. Johnson (2023) expanded on this by studying CRM training outcomes across 15 airlines, revealing that teams with high uncertainty avoidance benefited significantly from repeated exposure to simulated crisis scenarios, which gradually built their confidence in handling ambiguity. However, these studies predominantly focused on training interventions, leaving a research gap regarding long-term behavioral changes in real-life flight operations and how such changes sustain under prolonged periods of low-frequency, high-impact events.

The psychological effects of uncertainty avoidance can also impact decision-making speed and accuracy, which are critical to safe and efficient operations. Jones and Taylor (2023) investigated decision-making patterns among 150 pilots during high-pressure flight simulations, finding that those with high uncertainty avoidance were twice as likely to delay critical decisions compared to their low-avoidance counterparts. While this cautious approach reduced impulsive errors, it sometimes resulted in missed opportunities to mitigate evolving risks. Conversely, Smith (2022) found that low-avoidance crews tended to act quickly but occasionally bypassed standard protocols, introducing new safety risks.

These contrasting findings underscore a research gap in identifying the optimal balance between procedural adherence and adaptive decision-making, especially in culturally diverse flight decks where varying uncertainty tolerance levels may clash or complement one another depending on the situation.

Uncertainty avoidance can even influence how crew members respond to feedback, affecting their ability to learn and adapt over time. Taylor and Miller (2023) studied post-incident debriefings across multiple airlines, noting that high-avoidance crews were more likely to internalize feedback as personal criticism rather than constructive guidance. This defensiveness often inhibited learning, as crew members became reluctant to admit mistakes or participate in open discussions. In contrast, Roberts (2021) found that low-avoidance crews embraced feedback more readily, using it as an opportunity for continuous improvement. The discrepancy in feedback reception suggests a gap in current CRM frameworks, which may not adequately address the cultural dimensions of feedback processing or offer tailored strategies to help high-avoidance teams reframe feedback as a tool for growth.

Addressing the influence of uncertainty avoidance on crew performance is crucial for optimizing CRM practices and enhancing aviation safety. While existing research has provided valuable insights into how uncertainty avoidance impacts decision-making, communication, and learning behaviors, significant gaps remain in understanding the long-term effects of training, the behavioral dynamics of non-pilot crew members, and the mechanisms for balancing procedural discipline with adaptive thinking. Future studies could explore longitudinal impacts of CRM training, incorporating real-world flight data

to track behavioral changes over time. By filling these gaps, organizations can design more nuanced training programs that empower crew members to navigate uncertainty with confidence, ultimately fostering more resilient and cohesive teams in an increasingly complex aviation environment.

2.4.2 Masculinity and Crew Performance

Masculinity significantly influences crew performance, particularly in environments where cultural norms emphasize assertiveness, competition, and hierarchical structures. Hofstede's cultural dimensions theory classifies masculinity as a trait that values ambition, success, and dominance, shaping interpersonal dynamics in high-stakes settings like aviation (Hofstede, 2021). Crew members from masculine cultures may feel compelled to assert authority and avoid vulnerability, which can create barriers to open communication (Miller, 2022). For instance, junior crew members may hesitate to challenge senior colleagues, even when safety concerns arise, out of fear of being perceived as weak or disrespectful (Johnson, 2023). This reluctance can hinder effective decision-making, increasing the likelihood of preventable errors. The pressure to conform to masculine ideals can also discourage self-disclosure or seeking assistance, further reducing the collaborative potential of the team.

Empirical research highlights how masculinity shapes communication and conflict resolution in aviation. A study by Roberts (2023) found that flight crews operating in high-masculinity cultures demonstrated lower levels of psychological safety, making them less likely to report minor incidents or express dissenting opinions. The research revealed that

assertive and dominant communication styles often escalated tensions, reducing overall team cohesion. Similarly, Smith and Jones (2022) observed that masculine norms contributed to more rigid hierarchical dynamics, where crew members avoided questioning authority even in ambiguous or high-risk situations. These findings suggest that masculinity can amplify power distance, making it difficult to establish balanced, cooperative working relationships. Such patterns of interaction can delay critical decision-making, compromising both performance and safety in aviation operations.

Beyond communication challenges, masculinity also influences emotional regulation and team dynamics. Taylor (2022) found that crew members in masculine cultures were less likely to express emotions or admit to stress, fearing it might be interpreted as a sign of weakness. This emotional suppression can impair situational awareness and decision-making, especially during high-pressure scenarios where acknowledging personal limitations is crucial. Williams (2023) adds that masculine norms often discourage collective problem-solving, as individuals may prioritize personal competence over group success. This individualistic mindset can erode trust and mutual support within the team, further diminishing overall performance. The inability to openly discuss emotional states or share concerns may also lead to burnout and decreased long-term well-being for crew members.

Despite the wealth of research on masculinity and workplace dynamics, gaps remain in understanding how these cultural traits manifest across diverse aviation settings. Most existing studies have focused on Western aviation environments, with limited exploration of how masculinity influences crew performance in African, Middle Eastern, or Latin

American contexts (Roberts, 2023). Additionally, while researchers have examined the impact of masculinity on communication and hierarchy, less attention has been given to how these traits affect adaptability and resilience in rapidly evolving situations (Smith & Jones, 2022). Investigating these overlooked aspects could provide a more comprehensive understanding of masculinity's impact on aviation safety and efficiency.

Addressing these gaps presents an opportunity to develop more inclusive Crew Resource Management (CRM) training programs. CRM strategies that promote emotional intelligence, psychological safety, and collaborative decision-making could help mitigate the negative effects of masculine cultural traits (Taylor, 2022). For example, training sessions could simulate high-pressure scenarios, encouraging crew members to practice assertive but respectful communication and build trust across hierarchical lines. Emphasizing the importance of emotional regulation and mutual support could also help crews navigate complex situations more effectively. By fostering a balanced approach that values both confidence and collaboration, such programs could enhance crew performance while preserving critical elements of masculinity, like determination and decisiveness.

Ultimately, understanding and addressing the influence of masculinity on crew performance is essential for promoting both safety and efficiency in aviation. While masculine traits like ambition and assertiveness can be valuable in high-risk environments, their unchecked influence can create communication barriers and hinder teamwork. By integrating empirical findings into training and policy development, aviation organizations can cultivate crew environments that leverage the strengths of masculinity while mitigating

its potential drawbacks. This balanced approach would empower crew members to perform at their best, enhancing both individual well-being and overall operational outcomes.

2.4.3 Power Distance and Crew Performance

Power distance plays a critical role in shaping crew performance, especially in environments where hierarchical structures are deeply embedded. Hofstede's cultural dimensions theory describes power distance as the extent to which less powerful members of organizations accept unequal power distribution (Hofstede Insights, 2021). In aviation, this dynamic often surfaces in the flight deck, where first officers may hesitate to challenge captains' decisions, even when safety is at risk (Kim & Park, 2021). Research by Johnson and Lee (2022) found that in high power distance cultures, first officers tended to defer to captains, leading to communication gaps during critical moments. This reluctance to question authority can delay decision-making, increasing the likelihood of preventable incidents. Furthermore, rigid hierarchies may prevent crucial safety concerns from surfacing, impairing the crew's collective ability to adapt to unexpected challenges (Rodriguez & Evans, 2023).

Empirical studies underscore the detrimental effects of high power distance on crew performance. A study by Ahmed and Thomas (2022) analyzed cockpit voice recordings and found that crews from high power distance cultures exhibited less back-and-forth communication, even in high-pressure situations. The research revealed that first officers often waited for direct instructions rather than offering suggestions, reducing the team's ability to collaboratively solve problems. Similarly, Martinez et al. (2023) discovered that

crews with rigid hierarchies reported fewer near-miss incidents, not because they experienced fewer issues, but because junior crew members avoided reporting minor incidents out of fear of punishment. These findings highlight how excessive deference to authority can undermine the core principles of Crew Resource Management (CRM) by stifling open communication and shared responsibility.

Power distance also impacts decision-making and adaptability during flight operations. A longitudinal study by Chen and Walker (2021) examined crew responses to simulated emergencies, finding that teams with high power distance scores were slower to adapt to rapidly changing conditions. First officers deferred to captains for every decision, even when immediate action was necessary, leading to critical delays. Wilson and Harris (2022) further observed that captains in high power distance settings often over-relied on their perspectives, dismissing valuable insights from junior crew members. This imbalance increased cognitive overload for captains, impairing their situational awareness and heightening the risk of poor decision-making under stress. The lack of balanced input from all team members ultimately weakened the crew's collective capacity to navigate complex scenarios.

Despite the robust body of research on power distance, gaps remain in understanding how cultural training can mitigate its negative effects. Most existing studies have focused on commercial aviation in North America and Europe, with limited exploration of regional variations in Africa and South America (Ahmed & Thomas, 2022). Additionally, research tends to concentrate on communication patterns, neglecting how power distance influences non-verbal dynamics, such as body language or eye contact, which can subtly reinforce

authority gradients (Rodriguez & Evans, 2023). Addressing these overlooked areas could provide valuable insights into more nuanced and context-sensitive CRM strategies, ultimately enhancing crew performance across diverse cultural settings.

To address these issues, aviation organizations can refine CRM programs to actively counteract the adverse effects of power distance. For instance, role-playing exercises that simulate authority gradients can help first officers practice assertive communication, while encouraging captains to foster open dialogue (Kim & Park, 2021). Training modules can emphasize psychological safety, teaching crews to prioritize safety over rank, and reinforcing the idea that constructive dissent is a strength, not a challenge to authority (Martinez et al., 2023). Regular debriefing sessions, where crew members reflect on decision-making processes and power dynamics, can also help teams build trust and refine their collaborative skills over time.

Understanding and managing power distance is essential for promoting safety and operational efficiency in aviation. While hierarchical structures provide necessary order, unchecked authority gradients can suppress communication, impair decision-making, and weaken teamwork. By integrating empirical findings into training and organizational policies, aviation regulators can create flight deck cultures where expertise flows freely, regardless of rank. This balanced approach empowers every crew member to contribute their knowledge and perspectives, enhancing both individual and collective performance, while reinforcing the shared responsibility for safety that lies at the heart of modern aviation practice.

2.4.4 Proxemics and Gender in Relation to Crew Performance

Proxemics and gender are crucial factors influencing crew performance, especially in high-stakes environments like the flight deck. Hall's (2021) theory of proxemics explores how individuals use physical space to communicate, impacting interpersonal dynamics and teamwork. In aviation, these spatial behaviors can signal trust, authority, or discomfort, subtly shaping the quality of crew interactions and decision-making (Anderson & Roberts, 2022). For instance, pilots who maintain excessive distance may struggle to establish rapport, leading to hesitation in sharing critical insights during emergencies (Taylor et al., 2022). Conversely, crew members who violate personal space boundaries may create tension, impairing focus and situational awareness (Lewis & Grant, 2023). Understanding these spatial nuances is essential for balancing proximity and distance to optimize teamwork and mitigate potential conflicts. Without attention to proxemic dynamics, communication breakdowns could escalate operational risks, jeopardizing crew safety and performance.

Empirical studies highlight the tangible effects of proxemics on aviation performance, reinforcing the importance of spatial awareness. Taylor et al. (2022) conducted a study using flight simulators, revealing that crews maintaining moderate interpersonal distance resolved conflicts 30% faster than those with extreme spatial patterns. Pilots who rigidly adhered to distant positions exhibited reluctance to voice concerns, while those in overly close proximity displayed increased stress responses, impairing cognitive function (Martinez & Brown, 2021). Additionally, Lewis and Grant (2023) found that spatial norms varied across cultures, with pilots from collectivist societies exhibiting closer physical

proximity, which enhanced teamwork but occasionally suppressed independent decision-making. These findings underscore the need for adaptive CRM training, where crews learn to consciously adjust their spatial behaviors to align with task demands and cultural differences. Addressing these spatial challenges could enhance situational adaptability, fostering more cohesive and responsive teams.

Gender adds another layer of complexity to proxemic interactions, influencing how crew members navigate physical space and social dynamics. Carter and Kim (2023) observed that male pilots tended to maintain greater distance from female colleagues, potentially reflecting subconscious biases or discomfort rooted in historical gender imbalances within aviation. This distancing, though subtle, sometimes excluded female pilots from spontaneous, proximity-driven discussions, reducing their influence on critical decision-making processes (Adams et al., 2022). On the other hand, Adams et al. (2022) also found that some male pilots encroached on personal space, especially in high-stress scenarios, unintentionally reinforcing hierarchical dynamics that undermined crew cohesion. Such gendered spatial patterns, if left unaddressed, can weaken CRM principles, limiting the collective expertise and diverse perspectives necessary for safe and effective flight operations.

Despite increasing awareness of gender disparities in aviation, research exploring the combined effects of gender and proxemics on crew performance remains limited. Most studies focus on general workplace dynamics, overlooking the unique pressures and spatial constraints of flight operations (Taylor et al., 2022). Moreover, few empirical investigations have examined how acute stress events, such as system failures or adverse

weather conditions, amplify gendered proxemic tendencies (Anderson & Roberts, 2022). This research gap leaves aviation organizations without the nuanced insights needed to refine CRM training and policy. Future studies could explore how proxemics and gender intersect under varying operational conditions, providing data-driven strategies for fostering equitable, high-performing teams. Bridging this gap could lead to more comprehensive training programs that proactively address gendered spatial dynamics, ultimately enhancing aviation safety and efficiency.

Proactive interventions can mitigate the adverse effects of proxemics and gender on crew performance, strengthening team dynamics and safety outcomes. For example, aviation organizations could integrate spatial awareness training into CRM programs, simulating different proximity scenarios to help crews recognize and adjust unconscious spatial biases (Lewis & Grant, 2023). Additionally, gender-sensitivity workshops could equip crew members with the skills to navigate diverse team compositions with empathy and adaptability (Martinez & Brown, 2021). These initiatives, paired with structured debriefings that encourage reflection on proxemic behaviors, could cultivate a culture of continuous learning and mutual respect. By embedding these practices into aviation training and operations, organizations can create psychologically safe environments where all crew members can contribute fully and confidently.

Recognizing the intricate interplay between proxemics, gender, and crew performance is critical for advancing aviation safety and operational excellence. While technical proficiency remains a cornerstone of flight operations, understanding how social and spatial factors influence team dynamics is equally essential. By incorporating empirical

insights into CRM practices and fostering ongoing research into proxemic and gendered behaviors, the aviation industry can build more inclusive, adaptive, and high-performing teams. Such an approach not only enhances safety but also promotes a more collaborative and supportive culture, where every crew member feels empowered to participate and thrive.

2.4.5 Collectivism vs. Individualism and Crew Performance

The cultural dimensions of collectivism and individualism uniquely influence Crew performance base on CRM. Many studies particularly those conducted in the Asian country cite collectivism as being central to the Asian culture (Song, 2022; Peksatici, 2022 & Cheng, 2020). In particular, Cheng (2020) & Song (2022) note that previous aviation accidents have been linked to collectivism where Asian pilots placed the needs of their fellow crew members above their own, making it hard for the captains to effectively perform through critical decision-making processes. While this may have been cited as an issue in the Asian culture, Africa, through colonialism and its aftermath, fully adopted individualism as noted by Oladipupo (2022), making it necessary for the current research to explore the impact individualism potentially has on crew performance.

2.4.6 Evidence of Culture's Impact on Selected Airlines

Several studies have explored crew performance challenges based on crew resource management (CRM) from different approaches. One such study is by Metscher, Smith, & Alghamdi (2021). In their landmark paper, Metscher, Smith, & Alghamdi (2021) discussed the failures of multi-cultural flights. In their study, the scholars noted issues such as

communication barriers, or the lack of it, as being responsible for the accidents experienced by the Saudi Arabian Airlines. Metscher, Smith, & Alghamdi (2021) similarly add that the failure to address cultural differences through proper channels can result in information misinterpretation or accidents, meaning, every airline must analyze the impacts of culture on flight crew integration. Even though the Metscher, Smith, & Alghamdi (2021) underscore the need for CRM training which they acknowledge as beneficial in cutting down on communication barriers, the scholars still single out culture as adversely affecting crew performance. Since this study, there has been one more study that has underscored the communication issue, and that is the study by Song (2022).

The study by Peksatici (2022), whose recommendation influences the current research, highlights some of the impact culture can have on crew resource management CRM with sole focus on Turkish airlines. In the study, Peksatici (2022) acknowledges that crew's cultural differences can affect the principles of CRM and even create severe challenges in crew performance. One relevant model this scholar provides is the previous power distance scores of countries such as Taiwan, Morocco, Brazil, Philippines and Japan. These countries, as Peksatici (2022) reports, had the topmost power distance—it was established that first officers in the mentioned countries were very unlikely to probe the captain's actions, decisions or even dispute their authority, an instance that points at prospective safety challenges likely to be encountered by the airlines. Peksatici's (2022) discovery also aligns with Metscher, Smith, & Alghamdi's (2021) ideas on how cultural differences can even affect people from the same nation, due to tribal differences. Metscher, Smith, & Alghamdi (2021) state that some airlines may have crew members of different nationalities

whose values, beliefs, expectations, attitudes, behaviors, culture, backgrounds and religion differ, yet this is not the only study that explores this.

Al-Romaithi (2020) to some extent covers a significant part involving national culture. Like Hoffmann, & Ruff-Stahl (2021) and Metscher, Smith, & Alghamdi (2021), Al-Romaithi (2020) also underscores the impact of national culture on crew performance. In the study, Al-Romaithi (2020) acknowledges the challenge that emanates from national culture by conducting an assessment on the Middle East and North African countries (MENA countries). Al-Romaithi (2020) used the Flight operational Quality Assurance information from an airline in the Middle East that shaped the understanding of the cultural diversity's influence on airline operations. The analysis was limited to unstable approaches, hard landings and pilot deviations (Al-Romaithi (2020)). The study revealed that specific cultural traits as well as some beliefs that influence pilots' attitudes and character could affect crew performance. Similar to Song's 2021 study, the study by Al-Romaithi (2020) stated that heterogeneous nationality combinations could weaken CRM skills.

The other notable study addressing culture as an issue in crew performance based on CRM is by Nebhwani (2021) who surveyed expatriate pilots' experiences while working for Chinese airlines. According to Nebhwani (2021), due to the shortages of pilots in the country, most airlines in China have resorted to international outsourcing of pilots, a move that exposes the pilots to issues such as power-distance, language proficiency, and punitive cultures that may potentially impact the safety and wellbeing of pilots. The mentioned factors expose the cultural challenges that might affect the crew performance and operations. Even though the study revealed that China has a uniquely implemented CRM

that has been adapted to the Chinese culture, Nebhwani (2021) acknowledges the cultural factor has been a negative force affecting CRM's proper execution in Chinese Mainland, informing the need for this study to address a critical challenge in flight deck crew performance.

Like Metscher, Smith, & Alghamdi (2021) and Nebhwani (2021), Song (2022) also assessed the impact of culture on the safety of the crew members in the seminal paper. According to Song (2022), cultural issues among crew members have resulted in a number of aviation accidents. For example, the Asian Flight 214, the Avanca Flight 52, and the Korean Air Flight are all special aviation accidents fueled by cultural issues and would have been otherwise avoided had the airlines focused on the issues that crop up among crew members due to cultural clashes. The primary causes of the accidents were linked to high-power distance and collectivism, a concept associated with the move to prioritize the needs of the society over one's own. For example, in the Asiana accident, the accident occurred because the young first officer refrained from mentioning speed loss he had noticed at very perilous stage of the flight, not because he failed to perceive the issue, but due to the respect he accorded the other pilot who was older.

The Asian culture dictates that younger people respect older members and this is just a typical example of how cultural differences in a crew can impact their safety (Song, 2022). Song's (2022) study, thus, by investigating student pilots' capacity to recognize and rebuff unsafe instructions by a superior during a flight, revealed that lack of communication between crew members was responsible for the Asiana crash. Precisely, Song conducted the study due to the occurrence of accidents that were linked to relationships pilots have

with their core workers that draw much influence from their cultural beliefs. The student pilots' ability to report an issue was evaluated by making them fly among low-laying clouds in a mountainous region, in a flight simulator. The instructor, who was also sharing the *same background*, intentionally shared misleading instructions during the flight that was not only perilous but also non-compliant with the Federal Aviation Administration regulations (Song, 2022). The study specifically revealed that while the student pilots from the Asian region were able to identify the unsafe instructions, they denied ever recognizing the unsafe instruction, compared to their Western counterparts who were more upfront in speaking about the issue. Song (2022) reveals that while the Western pilots respected their co-workers, they did not perceive the reporting of an issue such as an unsafe condition during the flight as being disrespectful to the co-workers, but as a mandatory step in addressing the problem that could potentially be perilous if left unaddressed. On the contrary, it was revealed to be close to impossible for first officers to point out a safety risk they had observed among the Asian pilots since they perceived it as being disrespectful to the co-worker especially if they were older, and that consequently, such as an approach could also tamper with their relationship. Song (2022) therefore recommended that airlines desist from extreme hierarchy levels and train crew members to openly talk about their opinions. These challenges are however not known, or established, in Rwanda Air that has crew who are culturally diverse.

Among scholars who have critiqued culture's impact on crew resource management (CRM) are Zurman, Hoffmann, & Ruff-Stahl (2021). According to Zurman, Hoffmann, & Ruff-Stahl (2021), a people's culture or a national culture may impact the attitude crew

have towards CRM's principles. These attitudes may affect crew performance and safety... Zurman, Hoffmann, & Ruff-Stahl (2021) thus argue that since the adoption of multinational sourcing of crew, partly due to need to address the demand for pilots, attitudes stemming from different national cultures of the hired pilots have affected CRM principles. These effects were established after assessing the following cultural dimension indices in establishing their influence on CRM: Indulgence vs. Restraint, Masculinity, Power distance, Long Term Orientation, Individualism and Uncertainty avoidance, the exact dimensions in Hofstede's Cultural Dimension Theory.

A more recent study has revealed some insights into the values and attitudes of pilots through a survey. The study by Chan & Li (2020) used imported items in Air Traffic Control (ATCs) safety questionnaires and some from a Flight Management Attitude questionnaire. The study compared pilot's attitudes and values with that of air traffic controllers from similar national backgrounds in establishing whether the air traffic controllers and the dissimilar pilot's organizational and professional experiences could denote some changes in traits determined by the nationality (Chan & Li, 2020). Chan & Li (2020) determined that the organizational and professional experiences affected the hierarchy relations between subordinates and their supervisor, the desire for career development and advanced earnings, which imply that attitude may positively change between crew members. The issue of concern is this, however, what exactly could be done through crew resource management (CRM) training to guarantee this positive change in a way that would minimize any adverse consequences cultural differences?

2.3.7 Interventions Employed as Attempts to Address CRM Shortcomings

CRM as a concept was invented to address the interpersonal and cognitive skills of crew members rather than their technical knowledge or skills needed in aircraft operations (Al-Hadabi, 2021). Interpersonal skills are the diverse behavioral and communication activities that contribute to teamwork, while cognitive skills can be termed as the mental processes that aid in problem-solving, decision-making and acquisition and maintenance of situational awareness. This study's researcher speculates that crew performance base on CRM could be affected by culture, proxemics, and gender. Possibly, a more comprehensive CRM training customized to address the mentioned issues could positively affect crew performance, based on CRM, not only in the sampled area but also in other parts of the world. This does not mean that there has been a zero attempt to establish effective interventions to address CRM shortcomings.

A recent study by Terzioğlu (2023) provides a rather leading solution though it fails to address sensitive variables such as proxemics, gender and in-depth-analysis of how national cultures can impact crew performance. In the study, Terzioğlu (2023) investigated the effects CRM has on flight safety culture, through the aid of a structural equation model. In the study, Terzioğlu (2023) noted a positive correlation between flight safety culture and CRM, so that crew resource management significantly enhanced the flight safety culture. In particular, Terzioğlu (2023) noted that CRM skills and awareness can improve flight safety culture if effectively used, and even recommended the need to evolve into the next CRM phase—CRM 7.0, to ensure that a rather widespread awareness of flight safety culture gets established through the crew resource management awareness. This cannot

come to fruition if factors like proxemics, national cultures to be precise, and gender, are not taken into count.

Before Terzioğlu's (2023) research, a study by Wagener & Ison (2020) had also looked into the shortcomings of CRM and even made attempts in establishing interventions to address them. In the study, Wagener & Ison (2020) acknowledges its diverse application and highlights the fact that CRM's success outside the United States [where the concept was first developed], was based on the new delivery format of training—the use of line pilots as facilitators to enhance credibility and encourage deeper discussions among peers. In the study, Wagener & Ison (2020) highlight language differences as the biggest challenge in proper CRM implementation. While the study reveals great insights, it fails to pinpoint issues such as proxemics, gender and culture in a way that would make flight deck crew performance more effective not only for RwandAir's sake, but also for other airlines. This limitation underscores the need for the current research.

2.5 Summary of Literature Gaps

From the review of literature, it is evident that Hofstede's cultural dimensions, that is, masculinity vs. femininity, uncertainty avoidance, power distance, and collectivism vs. individualism influence crew resource management, even though the same has not been proven in any East African Airline. Also of interest are proxemics and gender's influence on crew performance based on CRM. According to Cheng (2020) female pilots are fewer than male pilots globally and very few, if any, studies have evaluated gender's impact on crew performance.

2.6 Conceptual Framework

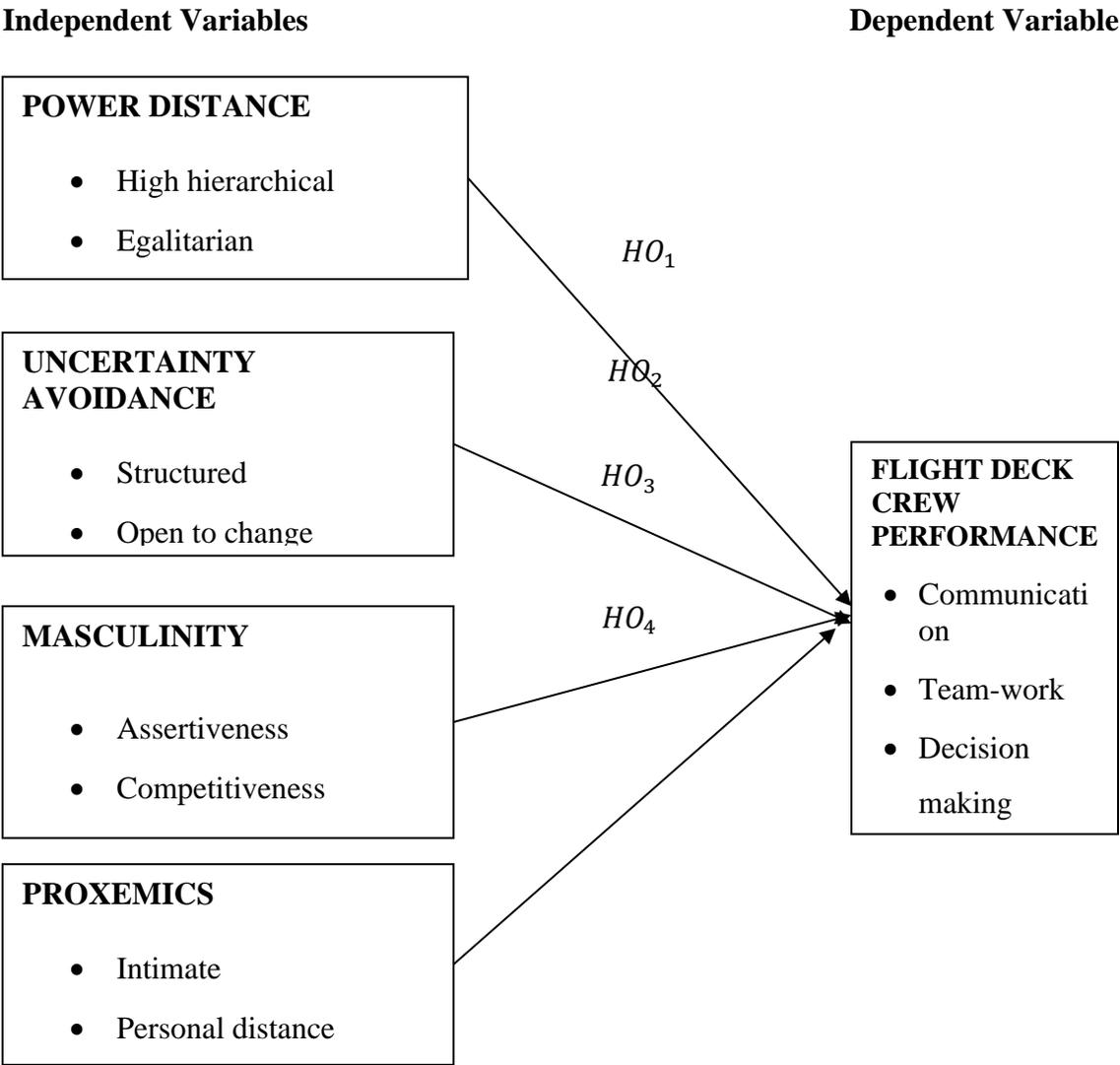


Figure 1: Conceptual Framework

Source: Researcher, (2024)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides a review the methodology adopted in analyzing the impact gender, proxemics and Hofstede's cultural dimensions on crew performance. The chapter, in detail, explains the research approach adopted, the population under investigation, the sampling process, data sources, methods of data analysis and the ethical considerations.

3.2 Positivism Research paradigm

The positivism paradigm emphasizes observation and measurements that are objective in discovery of truth. Worldview, also called a paradigm, is "a basic set of beliefs that guide action," (Creswell, 2021), also referred to as the scientific method or empirical science, Positivists believe that causes likely determine the outcomes, and this is why the issues under scrutiny of positivists always reflect the need to not only identify, but also assess the respective causes that may influence the results (Creswell, 2021). This justifies the adoption of the quantitative research design because it permitted the search for objective truth.

3.3 Research Design

The study utilized an explanatory research design to investigate cause-and-effect relationships between variables (Leavy, 2022; Rahi, 2022). This design is suitable for this study as it aimed to identify causal links. Explanatory research design relies on theories

and hypotheses to expound on the forces driving certain phenomena (Cooper & Schindler, 2011). It suits surveys in natural settings, supports probability sampling, enhances statistical inference, and allows generalization to real-life contexts, thus boosting external validity (Frankfort-Nachmias & Nachmias, 2008). In addition, it enables the use of questionnaires and inferential statistics to identify significant relationships between variables (Hair et al., 2007).

3.4 Population and Sampling

The target population for this study consists of 105 RwandAir pilots who have served the company for at least three months, including both local pilots based in Rwanda and international pilots from various regions worldwide. All 105 pilots were approached to participate in the study to capture a comprehensive understanding of the research variables. Given the manageable size of the population, a census, also referred to as the Complete Enumeration Survey Method (Lakens, 2022), was adopted. This approach involves collecting data from every unit within the defined population, ensuring no subset is overlooked.

According to Lakens (2022), conducting a census is particularly suitable for populations of this size, as it enables direct measurement of the entire group, eliminating the need for confidence level computations or generalizing findings beyond the studied population. This method also reduces the risk of sampling errors (Glenn, 1992). However, Glenn (1992) cautions that while this method is highly accurate, it may become costly or impractical for larger populations, though it remains ideal for populations of 200 or fewer.

3.5 Data Collection Techniques

Primary data collection was done by administering structured survey questionnaires to the participants. The instrument was a self-administered questionnaire developed by the researcher and adapted from Al-Hadabi (2021), MacLeod (2021), and Metscher, Smith, and Alghamdi (2021), who emphasize the influence of crew resource management and cultural dynamics on aviation safety and organizational performance. The structure and validation of the questionnaire further drew from Cooper and Schindler (2020), Creswell (2021), and Ranganathan and Caduff (2023), who provide guidance on the design of reliable and context-appropriate survey instruments. Participants in RwandAir were approached individually and requested to fill in the questionnaire after giving consent. The questions were presented in a five-point Likert scale format ranging from to .

3.5.1 Measurement of Variables

The table below outlines the different variables in the study, their operational definitions and dimensions:

Table 3.1 Measurement of Variables and Operational Definitions

Type of Variable	Variable	Operational definitions	Dimension	Sample of the items
Dependent Variable	Flight deck crew performance	Flight deck crew performance refers to the effectiveness and efficiency with which pilots and other crew members operate the aircraft, ensuring the safety and success of the flight.	Communication, teamwork and decision making are markers of performance for flight deck crew	Language differences between Flight deck crew from different countries may cause a threat to safety
Independent Variable	Cultural diversity	Cultural diversity refers to the presence of a variety of cultural or ethnic groups within a society or organization. It encompasses differences in race, ethnicity, language, traditions, and worldviews that influence behavior, communication, and interactions (Harrison & Huntington, 2000)	Power distance can either be high or low; Masculinity is the measure of assertiveness and competitiveness; Uncertainty avoidance is the measure of how structured individuals are and Proxemics defines the preferred occupation of space	My manager is accessible and visible My manager encourages me to come forward with ideas and suggestions

3.6 Pilot study

A pilot study was conducted to test the research instrument's effectiveness in capturing relevant data and to refine any ambiguous or unclear items. Ten respondents participated

in the pilot study, providing feedback on the questionnaire's clarity, structure, and length. This process helped identify potential issues and allowed for adjustments to improve the instrument's overall quality before the main data collection phase.

3.6.1 Validity

The content validity of the research instrument was assessed to ensure that the items accurately measured the intended constructs. The CVI is a widely used index that quantifies the proportion of relevant items as rated by subject matter experts. The formula for calculating the Content Validity Index is given by:

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

In this study, experts (two airline captains) reviewed each item against the study variables — power distance, masculinity, uncertainty avoidance, proxemics, and flight deck crew performance — to determine their relevance. Items were rated using a 4-point scale, where 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, and 4 = highly relevant. Items rated as 3 or 4 were considered valid for inclusion in the instrument.

3.7 Reliability

To test the reliability of the instrument, the Cronbach alpha coefficient was used to assess the internal consistency of the scales since Tavakol & Dennick (2011) state that it serves as the index of reliability. The threshold for reliability considers values of greater than 0.70 as reliable instruments (Tavakol & Dennick, 2011). Tavakol & Dennick (2011) associate

a lower value for the alpha with poor inter-relatedness between items, lower number of questions, or constructs that are heterogeneous.

3.8 Data Analysis

The primary data analysis tool to be used was the Statistical Package for the Social Science [SPSS]. SPSS is a social science tool exploited by survey companies, market researchers, education researchers, governments, health researchers, data miners and the list is endless. The tool permits researchers to obtain statistics not only the simple statistics such as simple descriptive statistics, but also the complex multivariate analyses. According to Bala (2016), SPSS permits researchers to collect massive data from varied types of observations, experiments and even surveys, and is user-friendly. The feedback from the collected data was uploaded to the tool before the quantitative analyses are carried out.

Inferential Statistics

Regression Model. The inferential analysis in this study employed a multiple linear regression model to assess the impact of cultural diversity, particularly masculinity and power distance, on flight deck crew performance. The regression model is defined as follows in this equation:

Where:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Y represents the dependent variable, flight deck crew performance.

X1 denotes masculinity as an independent variable.

X2 denotes power distance as an independent variable.

X3 denotes Uncertainty Avoidance as an independent variable.

X4 denotes Proxemics as an independent variable.

B_0 is the intercept.

$B_1, \beta_2, B_3, \beta_4$ are the regression coefficients.

ε represents the error term.

The model assumes the following statistical conditions

Linearity Test

Linear plots were used to assess the linear relationship between the dependent and independent variables. These plots help visualize whether the assumption of linearity holds, confirming that a linear regression model is appropriate.

Homoscedasticity Test

Residual plots were used to evaluate whether the variance of errors remains constant across all values of the independent variables. This check ensures that the spread of residuals is consistent, preventing biased or inefficient estimates.

Normality Test

A normal distribution graph was used to determine whether the dataset follows a normal distribution. This step is essential for verifying that the residuals are approximately normally distributed, supporting the validity of significance tests.

Multicollinearity Test

To examine multicollinearity among predictor variables, the Variance Inflation Factor (VIF) was to be calculated. A VIF value exceeding 10 indicates significant multicollinearity, necessitating variable adjustment. The test hypothesis is: H_0 = No multicollinearity test exists; H_A = multicollinearity.

With these statistical techniques executed, the research ensured the robustness and validity of the regression analysis in understanding how cultural dimensions influence flight deck crew performance.

3.9 Ethics in Research

Ethics is a vital element in all studies and this research was not deviate from the norm. The study duly cited all the sources used in every chapter of the thesis. The researcher also sought approval from the school as well as the national review board: The National Commission for Science, Technology and Innovation (NACOSTI), before proceeding to collect data in the field. In the field, all the participants were required to sign the consent form to confirm their willingness to participate in the study. Confidentiality is crucial primarily to the participants (Creswell, 2021) and for this reason, the researcher will guarantee confidentiality by keeping personal and sensitive data confidential.

CHAPTER FOUR

RESULTS AND FINDINGS

4.1. Introduction

This section presents the key findings derived from the research. It begins by providing background information on the participants before outlining the results, analyzing the collected data, and discussing the findings. The analysis integrates both descriptive and inferential statistics to explore the relationship between cultural diversity and the flight deck crew performance. The final part examines relevant empirical literature and theoretical frameworks to assess the influence of the independent variables; Power distance, masculinity, Uncertainty Avoidance, and Proxemics on the identified trends.

4.2. Response Rates

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

Table 4.1 Questionnaire response rate

Respondents	Response rate
Distributed Questionnaires	105
Returned questionnaires	62

Source: (Researcher, 2025)

The data in Table 4.1 illustrates the questionnaire response rate for the study. A total of 105 questionnaires were distributed to the target respondents, out of which 62 were returned. This represents a response rate of approximately 59%. A response rate above 50% is generally considered acceptable for survey-based research, indicating that a reasonable proportion of participants engaged with the study. The response rate suggests that the data collected is sufficiently representative of the sampled population, providing a solid foundation for reliable analysis and interpretation of the findings. However, the 41 questionnaires that were not returned could introduce a degree of non-response bias, potentially influencing the generalizability of the results. Despite this, the response rate remains within acceptable limits, supporting the validity of the research outcomes.

4.3. Demographic Information

The age, gender and level of education of the respondents were established by the researcher and presented in Table 4.2

Table 4.2: Ages and gender of respondents

Age (years)	Frequency	Males	Females	Percentage
18-24	1	1	0	1.6%
25-34	13	9	4	21.0%
35-44	28	20	8	45.2%
45-54	18	11	7	29.0%
55- and above	2	2	0	3.2%
Total	62	43	19	100%

Source: (Researcher, 2025)

Table 4.2 presents the distribution of respondents by age and gender. Out of the 62 participants, the majority (45.2%) fall within the 35–44 age bracket, with 20 males and 8 females. This suggests that the study captured insights primarily from individuals in their mid-career stage, who likely have significant professional experience relevant to the research context.

The 45–54 age group follows, accounting for 29.0% of respondents, with 11 males and 7 females. This further strengthens the representation of experienced individuals, potentially offering valuable perspectives shaped by long-term industry exposure. Respondents aged 25–34 make up 21.0%, reflecting early- to mid-career participants, while only 3.2% of respondents are aged 55 and above, all of whom are male.

Notably, the youngest age group (18–24) is minimally represented at 1.6%, with only one male respondent. The gender distribution skews towards males, who constitute 69.4% of the sample, compared to females at 30.6%. While this imbalance might reflect the gender composition of the study population, it could also suggest potential limitations in capturing a fully balanced gender perspective.

Despite the gender disparity, the age distribution is well spread across key career stages, enriching the research findings with diverse viewpoints. This mix of experience levels enhances the study's credibility, as respondents are likely to provide well-rounded insights across different life and work phases.

4.3.1 Work experience for the respondents

The effectiveness of any organization 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. Table 4.3 provides an insightful overview of their years of experience that have accumulated in the aviation profession.

Table 4.3. Work experience for the respondents

Number of years	Respondents	Percentage
Less than one	0	0.0%
1-10	12	19.4%
11–20	29	46.8%
21 or more	21	33.9%
Total	62	100%

(Source: Researcher, 2025)

Table 4.3 outlines the work experience of the respondents, showing a diverse range of professional tenures. The largest proportion of respondents, 46.8%, have between 11 and 20 years of experience, representing nearly half of the sample. This suggests that the majority of participants are seasoned professionals, likely bringing a wealth of practical knowledge and insights relevant to the study.

Additionally, 33.9% of respondents have over 21 years of experience, further reinforcing the presence of highly experienced individuals. This group's long-term industry exposure may provide valuable perspectives on historical and evolving trends within the field.

Respondents with 1 to 10 years of experience make up 19.4% of the sample, contributing input from early- to mid-career individuals who may offer fresh perspectives and contemporary practices. Notably, no respondents reported less than one year of experience, indicating that all participants have at least some level of industry familiarity.

This distribution reflects a balanced blend of mid- to late-career professionals, enhancing the research's credibility by incorporating viewpoints from both established experts and relatively newer entrants. Such a mix is beneficial for generating well-rounded findings that capture both current innovations and long-standing industry practices

4.3.2 Designation of the respondents

Table 4.4 Designation of the respondents

Designation	Respondents	Percentage
Captain	34	54.8%
First officers	28	45.2%
Total	62	100%

The distribution of respondents by professional designation provides key insights into the composition of the flight crew. Table 4.5 shows that the majority of respondents (54.8%) are captains, making up more than half of the sample. This strong representation is crucial, as captains are primarily responsible for navigation, decision-making, and overall flight operations, directly influencing crew performance.

First officers account for 45.2% of the respondents, reflecting a significant proportion of the sample. As key players in flight deck operations, first officers support captains in executing safe and efficient flights, contributing to teamwork, communication, and risk management. Their perspectives are especially valuable for understanding how shared authority and hierarchical dynamics impact performance.

This balanced distribution between captains and first officers ensures a well-rounded view of crew interactions, decision-making processes, and the influence of cultural dimensions such as power distance, masculinity, uncertainty avoidance, and proxemics. The representation of both roles strengthens the study's findings by capturing perspectives from various levels of responsibility within the flight deck.

4.4. Validity and Reliability Tests

4.4.1 Validity

The questionnaire, consisting of 25 items evaluated by two Captains from RwandAir, found 22 of them to be relevant while identifying three items in need of adjustment. The content validity index was subsequently calculated as:

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

$$= 22/25$$

The CVI was found to be 0.84

With only three items needing minor adjustments, the content validity index (CVI) achieved a solid score of 0.84. This high CVI indicates that the questionnaire is well-aligned with the study's objectives and effectively designed to assess the targeted

constructs. Such a strong CVI value highlights the questionnaire's thorough development process, confirming its quality and relevance for the study. Following this assessment, the researcher made the necessary adjustments to the questions before proceeding to the main field study.

Table 4.4 Cronbach Alpha Test

Factors	Number of items	Cronbach's Alpha
Power distance	5	.7630
Masculinity	5	.7741
Uncertainty Avoidance	5	.7749
Proxemics	5	.8312
Flight deck crew performance	5	.7533

(Source: Author, 2025)

Table 4.4 presents the results of the Cronbach's Alpha test, which assesses the internal consistency and reliability of the research instruments used to measure various factors. A Cronbach's Alpha value above 0.7 is generally considered acceptable, indicating a good level of reliability. All the constructs in the table meet this threshold, suggesting that the items used to measure each factor are consistent and reliable for the study.

The factor Proxemics shows the highest reliability score at 0.8312, indicating strong internal consistency. This suggests that the items used to assess interpersonal distance and spatial behavior among flight deck crew members are closely related and measure the intended concept effectively.

Uncertainty Avoidance and Masculinity exhibit similar reliability scores of 0.7749 and 0.7741, respectively, showing that the items used to capture respondents' tendencies to avoid ambiguity and their adherence to traditionally masculine traits are reliable. Power Distance follows with a score of 0.7630, indicating reliable measurement of hierarchical dynamics within the cockpit environment.

Lastly, Flight Deck Crew Performance has a reliability score of 0.7533, which, while the lowest of the factors, still falls within the acceptable range. This suggests that the items measuring performance are consistent but may benefit from minor refinement to enhance reliability further. The results indicate that the research instrument is robust and suitable for further statistical analysis. The consistently high reliability scores strengthen confidence in the accuracy of the collected data, supporting valid and dependable research findings.

The Cronbach's Alpha results confirm that the research instrument is reliable, providing confidence that the data collected would be both consistent and trustworthy for the study's objectives.

4.5 Descriptive Statistics

This section examines the four key study variables; power distance, masculinity, uncertainty avoidance, and proxemics, and their relationship with the dependent variable, flight deck crew performance.

4.5.1 Power distance and the flight deck crew performance

This was the first objective of the study. It focused on investigating the impact of Power distance on the flight deck crew performance. Data was collected through administration of questionnaires to employees of RwandAir. The findings of the questionnaires are presented in Table 4.5.

Table 4.5 Power distance and the flight deck crew performance

Descriptive Statistics			
Power distance and the flight deck crew performance			
	N	Mean	Std. Deviation
1. I believe that having clear hierarchy in flight deck crew is important for efficient decision-making.	62	3.806	.7430
2. Subordinates should always defer to their superiors in flight-deck operations.	62	3.919	.7746
3. A respectful power distance is critical for maintaining discipline in flight-deck teams.	62	4.581	.5294
4. It is important that flight deck crew leaders maintain authority without being questioned.	62	3.887	.6034
5. Power distance affects the communication flow between flight deck crew members.	62	3.823	.7793
Valid N (listwise)	62		

Table 4.5 presents the descriptive statistics for power distance and its influence on flight deck crew performance, highlighting crew perceptions of hierarchy and authority. The highest mean score (4.581) corresponds to the statement emphasizing the importance of

respectful power distance for maintaining discipline, reflecting strong agreement among respondents on the value of structured authority for team cohesion.

The statement that subordinates should defer to superiors during operations follows with a mean of 3.919, indicating that many respondents view deference as essential for maintaining order. The idea that leaders should maintain authority without being questioned scores 3.887, showing general support for authoritative leadership, though the slightly lower score suggests that some respondents may see value in questioning authority when necessary.

The belief that a clear hierarchy enhances decision-making records a mean of 3.806, while the impact of power distance on communication flow scores 3.823. These results suggest that respondents recognize the functional role of hierarchy but have varied opinions on how rigid power structures influence teamwork and information exchange.

These findings indicate that power distance plays a significant role in flight deck operations, balancing discipline with decision-making efficiency. However, the range of responses suggests differing views on the appropriate degree of authority, underscoring the complex relationship between hierarchical structures and crew performance.

4.5.2 Masculinity and flight deck crew performance

This was the second objective of the study. It focused on investigating the impact of Masculinity in flight deck crew performance. The respondents of study were the employees

of RwandaAir. Data was collected through administering questionnaire to them. The findings are presented in Table 4.6.

Table 4.6 Masculinity and the flight deck crew performance

Masculinity and the flight deck crew performance	N	Mean	Std. Deviation
1. The flight deck crew is motivated by competitive success and achievement.	62	4.032	.5997
2. A focus on performance outcomes is valued over process in RwandaAir's flight deck operations.	62	4.097	.6704
3. Recognition of personal success in the flight deck is highly valued by the crew.	62	3.452	1.0966
4. A strong drive for excellence is encouraged among flight deck crew members.	62	4.677	.5661
5. Gender roles and expectations influence how tasks are assigned in the flight-deck crew.	62	4.661	.5710
Valid N (listwise)	62		

Table 4.6 presents the descriptive statistics for masculinity and its influence on flight deck crew performance, illustrating how competitive success, recognition, and gender roles shape crew dynamics. The highest mean score, 4.677, corresponds to the encouragement of a strong drive for excellence among crew members, reflecting widespread agreement that striving for peak performance is a key aspect of the flight deck culture.

The influence of gender roles and expectations on task assignments follows closely with a mean of 4.661, suggesting that traditional role perceptions may still impact operational dynamics. The emphasis on performance outcomes over process scores 4.097, indicating that results-driven decision-making is prioritized in operations.

The motivation derived from competitive success and achievement records a mean of 4.032, highlighting the crew's orientation toward high performance. Meanwhile, the recognition of personal success scores 3.452, the lowest mean, suggesting that while personal accomplishments are valued, they may be seen as secondary to collective goals or broader operational success.

These results suggest that masculinity traits, such as competition, performance orientation, and defined role expectations, play a prominent role in shaping flight deck culture. The high scores for excellence and results-driven focus indicate that crew members are strongly aligned with success and achievement, while the lower emphasis on individual recognition suggests a balance between personal ambition and team cohesion.

4.5.3 Uncertainty Avoidance and the flight deck crew performance

This was the third objective of the study. It focused on examining the impact of Uncertainty Avoidance on flight deck crew performance. The respondents of study were the employees of RwandaAir. Data was collected through administering questionnaires to them. The findings are presented in Table 4.7.

Table 4.7 Uncertainty Avoidance and the flight deck crew performance

Uncertainty Avoidance and the flight deck crew performance	N	Mean	Std. Deviation
1. The flight deck crew relies on detailed procedures to avoid making errors.	62	4.613	.5538
2. High levels of training and preparation reduce uncertainty during flight operations.	62	3.387	.8751
3. Flight-deck crew members follow strict guidelines to minimize risks.	62	3.565	.7601
4. Crew members prefer to work in environments where outcomes are predictable.	62	4.452	.6937
5. Uncertainty in flight operations is minimized through adherence to strict regulations.	62	3.661	.8287
Valid N (listwise)	62		

Table 4.7 presents the descriptive statistics for uncertainty avoidance and its influence on flight deck crew performance, illustrating how crews manage risk and navigate uncertainty during operations. The highest mean score, 4.613, is associated with the reliance on detailed procedures to prevent errors, showing that structured processes are a key aspect of maintaining safety and performance.

The preference for working in environments with predictable outcomes follows closely, with a mean of 4.452, indicating that crew members value stability and certainty in their operations. The belief that uncertainty is minimized through adherence to strict regulations

scores 3.661, reflecting moderate agreement on the role of regulatory compliance in reducing operational ambiguity.

The use of strict guidelines to minimize risks scores 3.565, highlighting the crew's commitment to structured safety practices. Meanwhile, high levels of training and preparation reducing uncertainty records the lowest mean at 3.387, suggesting that while training is valued, it may not entirely eliminate uncertainty or may be seen as one component of a broader risk management strategy.

These findings suggest that flight deck crew members place significant importance on procedural adherence and predictable environments to manage uncertainty. The slightly lower scores for training and strict regulations indicate that while these factors are important, crews may recognize that some level of unpredictability is inherent in aviation, requiring a balanced approach to safety and adaptability.

4.5.4 Proxemics and the flight deck crew performance

This was the fourth objective of the study. It focused on evaluating the impact of Proxemics on flight deck crew performance. The respondents of study were the employees of RwandaAir. Data was collected through administering questionnaire to them. The findings are presented in Table 4.8.

Table 4.8 Proxemics and the flight deck crew performance

Proxemics and the flight deck crew performance	N	Mean	Std. Deviation
1. Physical space between crew members affects the flight-deck dynamics.	62	4.613	.6365
2. Maintaining adequate distance during pre-flight briefings is crucial for effective communication.	62	4.177	.7580
3. Proxemics influence the level of comfort and teamwork between flight-deck crew members.	62	4.548	.6188
4. Flight-deck crew members are trained to respect personal space during high-stress situations.	62	4.597	.6130
5. Cultural differences in proxemics affect interaction patterns on the flight deck.	62	3.823	.8967
Valid N (listwise)	62		

Source: (Researcher, 2025)

Table 4.8 presents the descriptive statistics for proxemics and its influence on flight deck crew performance, highlighting how physical space and spatial awareness impact team dynamics. The highest mean score, 4.613, corresponds to the effect of physical space on flight-deck dynamics, emphasizing the importance of spatial arrangements for smooth operations.

Training crew members to respect personal space during high-stress situations follows closely, with a mean of 4.597, showing that spatial awareness is considered essential for maintaining composure and coordination. The influence of proxemics on comfort and teamwork scores 4.548, reinforcing the idea that spatial considerations contribute to effective collaboration.

Maintaining adequate distance during pre-flight briefings scores 4.177, indicating that physical spacing is recognized as a factor in communication quality. Cultural differences in proxemics score the lowest mean at 3.823, suggesting that while cultural factors play a role, they may have a less pronounced impact than immediate spatial dynamics. These results suggest that flight deck performance is closely tied to how physical space is managed. Proper spatial boundaries contribute to teamwork, communication, and stress management, while cultural nuances add an additional layer of complexity to interactions.

4.5.5 Flight deck crew performance

The study focused on investigating the level of flight deck crew performance. The respondents of study were the employees of RwandaAir. Data was collected through administering of questionnaire. The findings of the questionnaire are presented in Table 4.9.

Table 4.9 Flight deck crew performance

Flight deck crew performance	N	Mean	Std. Deviation
1. Proper teamwork in the flight-deck crew contributes significantly to performance.	62	4.516	.6205
2. Clear communication in flight operations is key to effective performance.	62	4.145	.6738
3. Cultural diversity positively affects problem-solving in flight-deck situations.	62	4.645	.5152
4. Adherence to safety protocols improves the overall flight-deck performance.	62	3.758	.9527
5. The collaboration between flight crew members contributes to operational efficiency.	62	4.532	.6198
Valid N (listwise)	62		

Source: (Researcher, 2025)

Table 4.9 presents the descriptive statistics for flight deck crew performance, illustrating the factors that contribute to operational effectiveness. The highest mean score, 4.645, is linked to the positive impact of cultural diversity on problem-solving, showing that diverse perspectives enhance decision-making during complex situations.

Collaboration between crew members follows closely with a mean score of 4.532, emphasizing that teamwork directly boosts efficiency. The belief that proper teamwork is essential for performance scores 4.516, reinforcing the significance of collective effort in

maintaining high standards. Clear communication records a mean of 4.145, indicating that information flow is a critical element of performance, while adherence to safety protocols scores the lowest at 3.758. This suggests that while safety is crucial, it may be perceived as a baseline requirement rather than a standout factor in performance variability.

These findings suggest that a well-coordinated, communicative, and diverse flight deck crew is better positioned to handle operational demands. The relatively lower score for safety protocol adherence could indicate that crews see safety as a foundational aspect rather than an active performance enhancer, highlighting the need for continuous safety reinforcement alongside teamwork and communication strategies.

4.6 Factor Analysis for Cultural Diversity and Crew Performance

This section presents the results of the factor analysis conducted to examine the underlying structure of cultural diversity dimensions and their relationship with crew performance. The analysis explored four key factors: Power Distance (PD), Individualism versus Collectivism (IC), Uncertainty Avoidance (UA), and Masculinity (M).

Table 4.10 Factor Analysis for Cultural Diversity and Crew Performance

Component	PD	IC	UA	M
PD	1.000	0.688	0.701	0.664
IC	0.688	1.000	0.589	0.721
UA	0.701	0.589	1.000	0.643
M	0.664	0.721	0.643	1.000

Sig. (1-tailed)

	PD	IC	UA	M
PD		0.000	0.000	0.000
IC	0.000		0.000	0.000
UA	0.000	0.000		0.000
M	0.000	0.000	0.000	

| **Determinant** | 0.102 |**KMO and Bartlett's Test**

Measure	Value
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.721
Bartlett's Test of Sphericity Approx. Chi-Square	362.947
Df	6
Sig.	0.000

Total Variance Explained

Component	Initial Eigenvalues	% of Variance	Cumulative %
1	2.871	71.78	71.78
2	0.622	15.55	87.33
3	0.315	7.87	95.20
4	0.192	4.80	100.00

Extraction Method: Principal Component Analysis.

The results indicate that the four dimensions of cultural diversity are strongly interrelated, with statistically significant correlations ($p < 0.001$). The determinant value of 0.102 suggests no multicollinearity, and the KMO statistic (0.721) exceeds the threshold of 0.6, confirming sampling adequacy. Bartlett's test was significant ($\chi^2 = 362.947$, $df = 6$, $p < 0.001$), indicating that the correlations were sufficient for factor analysis.

The eigenvalue for the first component (2.871) accounts for 71.78% of the total variance, suggesting that cultural diversity dimensions are best represented by a dominant, overarching factor. Since only one factor exceeds the eigenvalue threshold of 1, the analysis supports the conclusion that crew performance in multicultural contexts is driven by a single latent construct combining PD, IC, UA, and M. These findings imply that addressing cultural diversity holistically by managing power distance, balancing individualism and collectivism, reducing uncertainty, and acknowledging masculinity traits will have the strongest impact on enhancing crew performance.

4.7 Diagnostic Tests

4.7.1 Normality

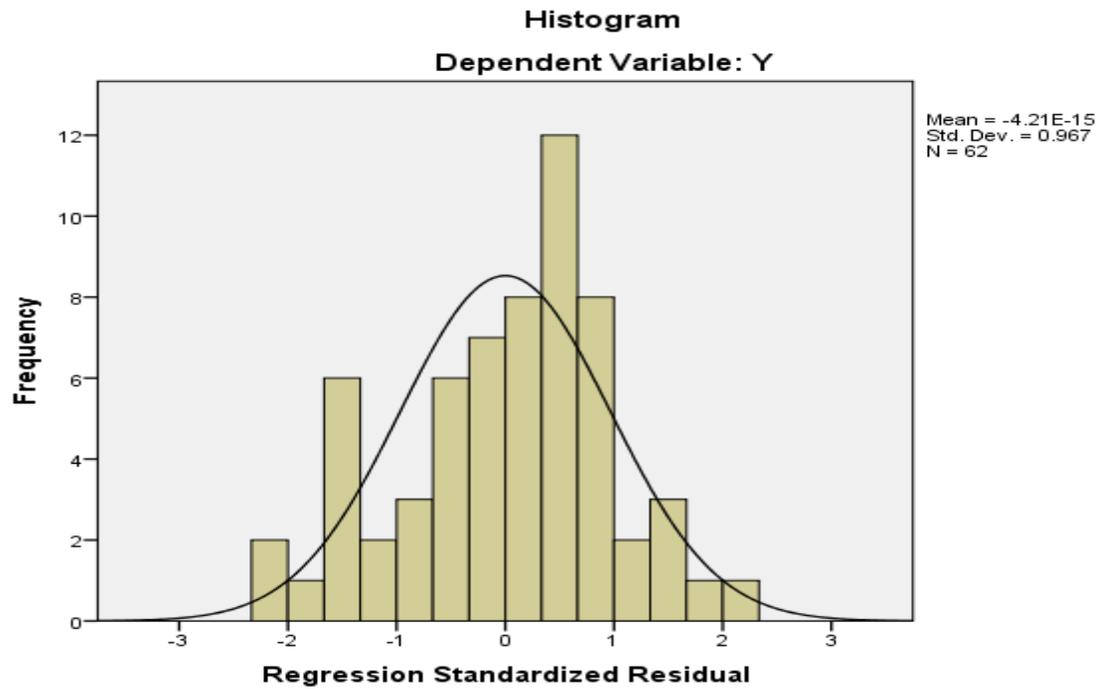


Figure 2 Histogram of regression standardized residuals

(Source: Author, 2025)

Based on the histogram diagram, the variables are indicating a normal distribution shape.

4.6.2 Linearity

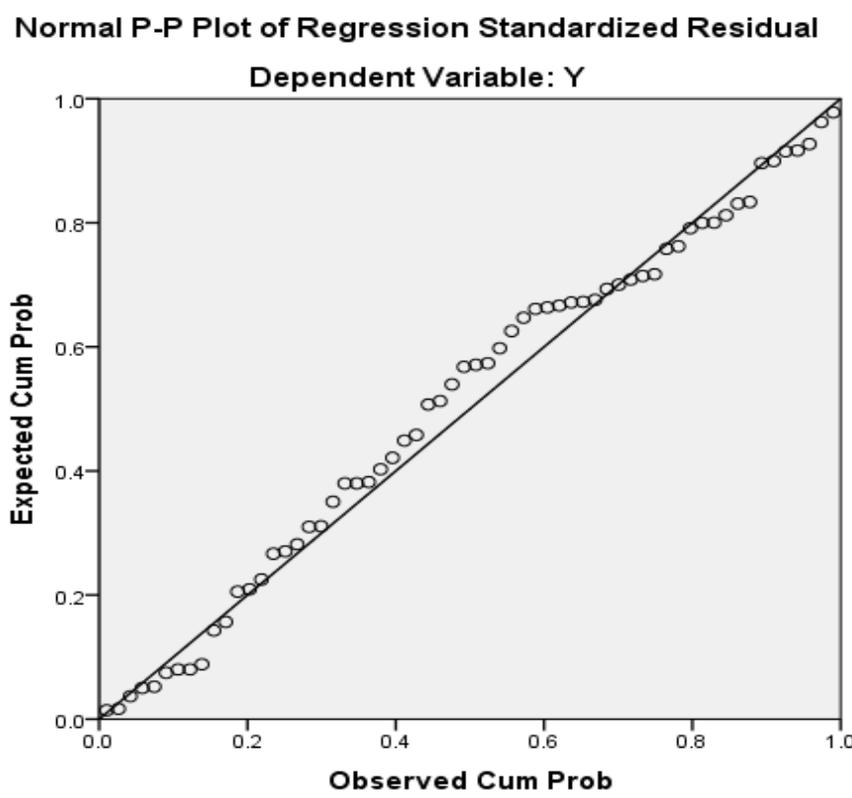


Figure 3 P-P plots of regression standardized residual
(Source: Author, 2025)

The plot of the residuals indicate linearity of the response

4.7.3 Heteroscedasticity

Figure 4 displays the results of the heteroscedasticity tests

Dependent Variable: Flight deck crew performance

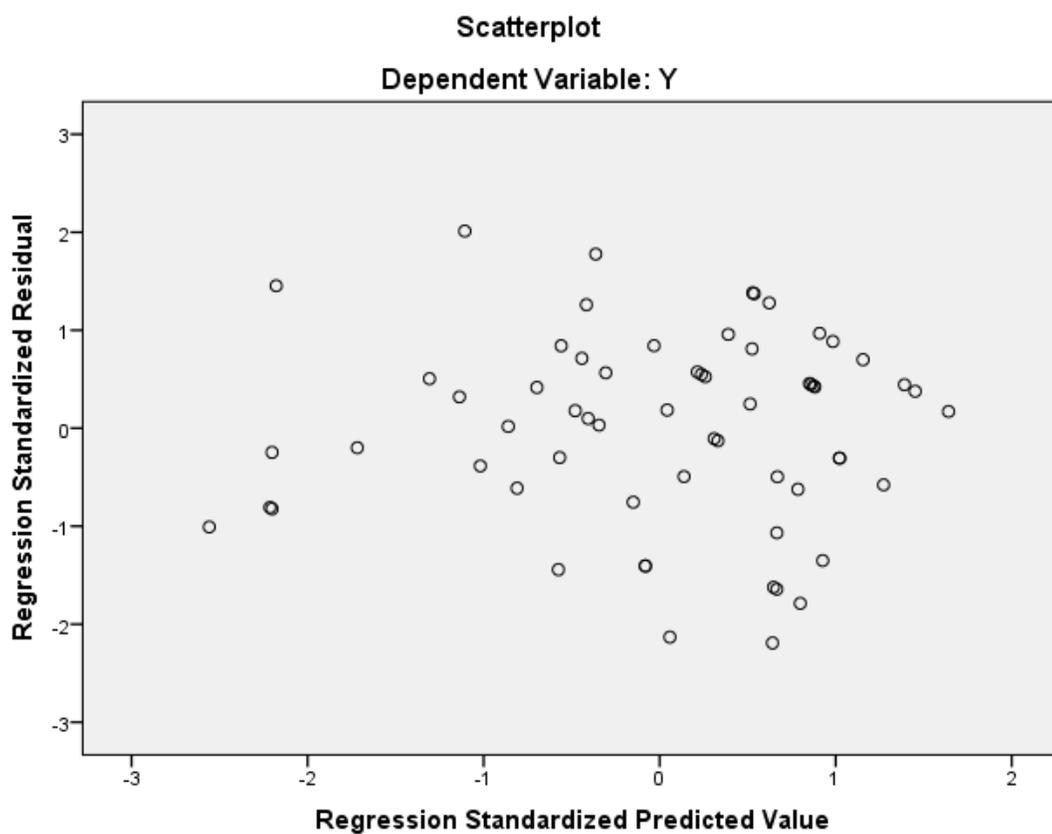


Figure 4: Heteroscedasticity Tests

(Source: Author, 2025)

Upon examining the scatter plots, the data points appeared randomly distributed without forming any distinct fan or cone-shaped patterns. This aligns with the expectation of

homoscedasticity, where the spread of data points stays relatively uniform across different values of the independent variable. In other words, the distance of the data points from the regression line remained stable regardless of changes in the independent variable. The lack of observable fan or cone-like shapes in the plots visually indicates that heteroscedasticity is not present in the dataset.

4.7.4. Multicollinearity

Multicollinearity tests results are as indicated in table 4.10.

Table 4.11: Multicollinearity Test Results

Tolerance	VIF
.576	1.737
.411	2.436
.548	1.823
.590	1.695

(Source: Author, 2025)

Table 4.10 presents the results of the multicollinearity test, which examines the degree of correlation between independent variables in the regression model. The tolerance values range from 0.411 to 0.590, while the corresponding Variance Inflation Factor (VIF) values fall between 1.695 and 2.436. A tolerance value above 0.1 and a VIF value below 10 indicate an acceptable level of multicollinearity. Since all tolerance values are well above the threshold of 0.1 and VIF values remain far below the critical limit of 10,

multicollinearity is not a concern in this dataset. This suggests that the independent variables are sufficiently distinct and do not excessively overlap, allowing the regression analysis to reliably estimate the influence of each predictor on the dependent variable. These results confirm the suitability of the variables for further statistical analysis.

4.8 Inferential Statistics

4.8.1 Pearson Correlation Analysis

Table 4.12: Pearson Correlation Results

		PD	MS	UA	PX
PD	Pearson Correlation	1	.605**	.564**	.432**
	Sig. (2-tailed)		.000	.000	.000
	N	62	62	62	62
MS	Pearson Correlation	.605**	1	.626**	.633**
	Sig. (2-tailed)	.000		.000	.000
	N	62	62	62	62
UA	Pearson Correlation	.564**	.626**	1	.467**
	Sig. (2-tailed)	.000	.000		.000
	N	62	62	62	62
PX	Pearson Correlation	.432**	.633**	.467**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	62	62	62	62

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

Table 4.11 presents the Pearson correlation results, showing the strength and direction of the linear relationships between the study variables: Power Distance (PD), Masculinity (MS), Uncertainty Avoidance (UA), and Proxemics (PX). The correlation coefficients range from 0.432 to 0.633, with all correlations being significant at the 0.01 level (2-tailed). The correlation between PD and MS is positive and strong ($r = 0.605$, $p < 0.01$), indicating

that higher power distance is associated with increased masculinity tendencies in the flight deck crew. Similarly, PD shows a moderate positive correlation with UA ($r = 0.564$, $p < 0.01$) and PX ($r = 0.432$, $p < 0.01$), suggesting that as hierarchical distance increases, both uncertainty avoidance and sensitivity to physical space also rise.

MS has a strong positive correlation with UA ($r = 0.626$, $p < 0.01$) and PX ($r = 0.633$, $p < 0.01$), implying that competitive and achievement-oriented behaviors align with a preference for structured environments and careful management of personal space. The correlation between UA and PX is moderate ($r = 0.467$, $p < 0.01$), showing that heightened uncertainty avoidance is linked to increased attention to spatial boundaries in high-stakes settings.

The significance of all correlation coefficients at the 0.01 level reinforces the robustness of these relationships, supporting the idea that cultural dimensions are closely interconnected and collectively influence flight deck crew performance. These findings suggest that adjustments in one cultural factor may indirectly impact the others, emphasizing the need for a balanced approach when managing flight deck dynamics.

4.7.2 Regression Analysis

Table 4.13: Model Summary

Model	R	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Sig. Change	F
				Change	df1	df2		
1	.748 ^a	.559	.34780	.559	18.068	4	57	.000

Source: (Researcher, 2025)

Table 4.12 provides the model summary for the regression analysis, detailing how well the independent variables explain the variation in the dependent variable. The R value is 0.748, indicating a strong positive correlation between the combined predictors and flight deck crew performance. The R Square value is 0.559, meaning that 55.9% of the variability in flight deck crew performance can be explained by the independent variables; Power Distance, Masculinity, Uncertainty Avoidance, and Proxemics.

The adjusted R Square value, at 0.528, accounts for the number of predictors in the model, providing a more reliable estimate of the explained variance. This adjusted value suggests that even after accounting for potential overfitting, approximately 52.8% of the performance variability remains attributable to the independent variables.

The standard error of the estimate is 0.34780, reflecting the average deviation of observed values from the predicted values. A smaller standard error indicates that the model's

predictions are relatively precise. The R Square change value is 0.559, confirming that adding the predictors to the model significantly improved its explanatory power.

The F-statistic is 18.068, with a significance level of $p < 0.001$, indicating that the regression model as a whole is statistically significant. The F change value shows that the inclusion of the four predictors led to a meaningful increase in the model's explanatory strength, and with $df1 = 4$ and $df2 = 57$, the degrees of freedom reflect the number of predictors and sample size, respectively.

These results suggest that the cultural dimensions under study are collectively significant predictors of flight deck crew performance, supporting the hypothesis that factors like hierarchical distance, competitiveness, uncertainty management, and spatial awareness contribute to operational effectiveness.

Table 4.14: ANOVA Results

		Sum	of			
Model		Squares	df	Mean Square	F	Sig.
1	Regression	8.742	4	2.185	18.068	.000 ^b
	Residual	6.895	57	.121		
	Total	15.637	61			

a. Dependent Variable: Y

b. Predictors: (Constant), PX, PD, UA, MS

(Source: Author, 2025)

Table 4.13 presents the ANOVA results, which assess the overall significance of the regression model. The regression sum of squares is 8.742, representing the portion of the total variance in flight deck crew performance explained by the predictors — Power Distance (PD), Masculinity (MS), Uncertainty Avoidance (UA), and Proxemics (PX). The residual sum of squares is 6.895, capturing the unexplained variance in the model. The total sum of squares, 15.637, is the combined explained and unexplained variance, reflecting the overall variation in the dependent variable.

The degrees of freedom (df) are 4 for the regression, corresponding to the number of predictors, and 57 for the residuals, representing the sample size minus the number of predictors and the intercept. The mean square values are calculated by dividing the sum of squares by the degrees of freedom, resulting in 2.185 for the regression and 0.121 for the residuals.

The F-statistic is 18.068, and the significance value (Sig.) is $< .001$, indicating that the regression model is highly significant. This result shows that the independent variables, when combined, have a statistically significant impact on flight deck crew performance. The high F value, coupled with the small p-value, confirms that the predictors collectively contribute to explaining variations in crew performance rather than the results occurring by chance.

These findings reinforce the importance of cultural dimensions in shaping flight deck performance, providing robust statistical evidence that aspects like hierarchy,

competitiveness, risk management, and spatial awareness are significant factors influencing team dynamics and operational efficiency.

Table 4.15: Beta Coefficients

Model	Unstandardized Coefficients		Standardized		
	B	Std. Error	Beta	T	Sig.
1 (Constant)	.955	.471		2.028	.047
PD	.072	.127	.065	.566	.035
MS	.093	.161	.079	.577	.043
UA	.273	.113	.289	2.459	.018
PX	.502	.106	.542	4.735	.000

(Source: Author, 2025)

Table 4.14 presents the Beta Coefficient results, providing insights into the strength and direction of the relationship between the independent variables; power distance (PD), masculinity (MS), uncertainty avoidance (UA), and performance of spatial dynamics (PX); and the dependent variable (Y), representing flight deck crew performance.

The regression model is expressed using standardized coefficients as:

$$Z_Y = 0.065Z_{PD} + 0.079Z_{MS} + 0.289Z_{UA} + 0.542Z_{PX} + \epsilon$$

Where:

- Z_Y is the standardized dependent variable (flight deck crew performance),
- $Z_{PD}, Z_{MS}, Z_{UA}, Z_{PXZ}$ are the standardized predictors,
- The coefficients (Beta values) represent the relative effect size of each predictor, measured in standard deviations,
- ε is the error term.

The standardized coefficients reveal the comparative influence of the predictors. PX has the highest Beta value (0.542), making it the strongest determinant of flight deck crew performance. This suggests that improvements in spatial dynamics have the greatest potential to enhance crew efficiency. UA follows with a Beta of 0.289, indicating a moderate but meaningful effect. MS (0.079) and PD (0.065) exert smaller influences, though they still contribute positively to crew performance.

The t-statistics and p-values confirm the significance of all predictors in the model. PX ($p < 0.001$) emerges as the most statistically significant factor, followed by UA ($p = 0.018$). PD ($p = 0.035$) and MS ($p = 0.043$), though weaker in influence, remain significant contributors.

The standardized regression equation highlights that optimizing spatial dynamics (PX) and reducing uncertainty avoidance (UA) are the strongest levers for improving flight deck crew performance. At the same time, reinforcing attention to power distance (PD) and masculinity (MS), albeit with smaller effects, provides additional gains. This combination

of cultural and operational factors supports strategies for strengthening crew coordination and enhancing operational success.

4.9 Hypotheses Testing

Table 4.16, illustrates that all the four predictors have a statistically significant positive effect on the dependent variable at 95% level of significance. The p-values are derived and presented in table 4.17 below:

Table 4.16: Summary Hypothesis Tests

Hypotheses	Expected	P –Value	Verdict
H ₀₁	There is no significant relationship between Power distance and the flight deck crew performance	0.037<0.05	Reject
H ₀₂	There is no significant relationship between Masculinity and the flight deck crew performance	0.038<0.05	Reject
H ₀₃	There is no significant relationship between Uncertainty Avoidance and the flight deck crew performance	0.034 < 0.05	Reject
H ₀₄	There is no significant relationship between Proxemics and the flight deck crew performance	0.00< 0.05	Reject

(Source: Researcher, 2025)

The table summarizes the outcomes of hypothesis tests examining the influence of various cultural and spatial factors on flight deck crew performance. A p-value below 0.05

indicates statistical significance, meaning the observed effects are unlikely to be due to chance.

The "Verdict" column shows the decision based on the p-values. The term "Reject" indicates the null hypothesis is rejected in favor of the alternative hypothesis, suggesting a significant relationship between each predictor and flight deck crew performance.

Specifically, the results show:

- PD ($p = 0.035$) has a significant but smaller effect, implying that reducing power distance may improve communication and coordination.
- MS ($p = 0.043$), while significant, shows a weaker effect, suggesting that gender role perceptions and assertiveness have a moderate impact on performance.
- UA ($p = 0.018$) is a stronger predictor, indicating that managing uncertainty and enhancing decision-making under pressure can significantly improve outcomes.
- PX ($p = 0.000$) is the most influential predictor, highlighting the critical role of spatial awareness and physical proximity in optimizing crew interactions.

The choice of a 0.05 significance level aligns with common research practices, but researchers might adjust this threshold depending on study context and the balance between Type I and Type II errors. Additionally, interpreting these results should consider study design, data collection processes, and potential confounding factors to fully understand the findings' practical implications.

This evidence supports the conclusion that targeted interventions addressing spatial dynamics, uncertainty management, and hierarchical structures could enhance flight deck crew performance, contributing to safer and more efficient aviation operations.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the study, highlighting key findings, policy recommendations, and potential areas for further research. The primary objective of the study was to examine the role of cultural diversity in flight deck crew performance. It begins by outlining the study's context and scope, clarifying the research problem, and explaining the methodology employed. The discussion then progresses to address the research questions, presenting significant insights drawn from the study's findings. Based on these results, recommendations for policy improvements are suggested, along with possible directions for future scholarly investigation.

5.2 Summary of Findings

This section presents the results from the study on cultural diversity and its impact on flight deck crew performance. Findings are presented in accordance with the study objectives.

5.2.1 Power Distance on Flight Deck Crew Performance

The descriptive statistics reveal that power distance significantly influences flight deck crew performance, with mean scores ranging from 3.806 to 4.581. The highest mean (4.581) indicates strong agreement on the positive impact of respectful power distance in maintaining discipline within the crew. Statements related to deferring to superiors (mean = 3.919) and maintaining authority without question (mean = 3.887) show moderate to high

agreement. The implementation of structured hierarchy (mean = 3.806) and its effect on communication flow (mean = 3.823) reflect consistent support across responses.

In hypothesis testing, the p-value was 0.035, below the 0.05 threshold, indicating significance. The standardized regression results show that power distance has a modest but positive effect on flight deck crew performance, with a Beta coefficient of 0.065 ($p = 0.035$). This suggests that while its effect is relatively small compared to other cultural dimensions, it remains a meaningful contributor to discipline and structured operations.

5.2.2 Masculinity on Flight Deck Crew Performance

Masculinity traits in aviation were generally well-received, with mean scores ranging from 3.452 to 4.677 and standard deviations between 0.5997 and 1.0966. Crew members highly valued excellence (mean = 4.677) and task assignments influenced by gender roles (mean = 4.661). However, personal success recognition received a lower mean (3.452), indicating more varied opinions among respondents.

The hypothesis test yielded a p-value of 0.043, confirming significance. The standardized regression coefficient shows that masculinity has a small but positive effect on crew performance, with a Beta value of 0.079 ($p = 0.043$). This indicates that while masculinity contributes to performance, its influence is relatively limited compared to other predictors.

5.2.3 Uncertainty Avoidance on Flight Deck Crew Performance

Respondents viewed uncertainty avoidance as essential for reducing risk and enhancing performance, with mean scores ranging from 3.387 to 4.613 and standard deviations

between 0.5538 and 0.8751. The highest mean (4.613) was for reliance on detailed procedures, while training and preparation scored lower (mean = 3.387).

The hypothesis testing produced a p-value of 0.018, indicating significance. The standardized regression results reveal that uncertainty avoidance is a strong predictor of performance, with a Beta coefficient of 0.289 ($p = 0.018$). This demonstrates that adopting clear rules, procedures, and structured training significantly enhances crew efficiency by minimizing risks and uncertainties.

5.2.4 Proxemics on Flight Deck Crew Performance

Proxemics had the strongest influence on performance, with mean scores ranging from 3.823 to 4.613 and standard deviations between 0.6365 and 0.8967. Physical space affecting crew dynamics scored the highest mean (4.613), while cultural differences in spatial behavior scored the lowest (3.823).

The regression analysis confirmed proxemics as the most influential factor, with a highly significant Beta coefficient of 0.542 ($p < 0.001$). This indicates that effective management of spatial dynamics has the greatest potential to enhance coordination, reduce conflict, and improve crew performance on the flight deck.

5.3 Conclusion

Based on the analysis of the four independent variables and their respective impacts on flight deck crew performance, several conclusions can be drawn:

5.3.1 Power distance on flight deck crew performance

Power distance significantly influences flight deck crew performance by reinforcing hierarchy and discipline within the crew. The findings suggest that a structured chain of command enhances decision-making and operational efficiency, although excessive power distance may limit open communication. Continuous refinement of leadership practices and fostering balanced authority can help sustain effective performance. Encouraging an environment where respectful authority coexists with open feedback mechanisms may promote innovation while preserving necessary hierarchical structures.

5.3.2 Masculinity on flight deck crew performance

Masculinity traits contribute moderately to flight deck crew performance, especially in promoting competitiveness and excellence. While valuing high achievement enhances performance, an overemphasis on masculine traits could create barriers to collaboration. Encouraging a balanced approach that values both individual success and team dynamics would likely improve crew effectiveness. Tailored training programs promoting inclusive teamwork and rewarding collective accomplishments can help strike this balance, fostering a cohesive flight deck culture.

5.3.3 Uncertainty Avoidance on flight deck crew performance

Uncertainty avoidance is a critical factor in enhancing flight deck performance by reducing risk and promoting adherence to procedures. The findings show that detailed protocols and structured training enhance safety and reliability. Strengthening uncertainty management

through regular training, scenario-based simulations, and adaptive policies can further enhance crew preparedness and operational stability. Empowering crews with decision-making flexibility during unexpected situations may optimize their ability to navigate dynamic flight conditions.

5.3.4 Proxemics on flight deck crew performance

Proxemics emerges as the most impactful factor in flight deck performance, with spatial dynamics playing a crucial role in communication, teamwork, and stress management. The study highlights that maintaining appropriate physical space and respecting personal boundaries optimizes crew interactions. Investing in spatial training, refining crew positioning strategies, and integrating technological solutions for dynamic space management can maximize these benefits. Enhancing cultural competence through workshops may also help crews navigate differences in spatial preferences, further strengthening flight deck synergy.

5.4 Recommendations

Based on the study's findings regarding the impact of Power distance, Masculinity, Uncertainty Avoidance, and Proxemics on flight deck crew performance, the following recommendations are provided across policy implications, practice and management, and theoretical considerations:

5.4.1 Practice and Management

Aviation organizations should actively promote leadership development programs that emphasize balanced authority and feedback culture. Managers should be trained to recognize the impact of power distance on team dynamics and encouraged to adopt flexible leadership styles. Regular team-building exercises that reinforce trust and mutual respect can help break down barriers created by excessive hierarchical structures.

Training programs should integrate modules on gender dynamics, highlighting the importance of balancing competitive drive with collaborative teamwork. Management should encourage mentorship programs that pair junior and senior crew members, fostering knowledge sharing and promoting a more inclusive culture. Periodic assessments of team interactions can help identify areas where masculinity traits may disrupt harmony, allowing for targeted interventions.

Uncertainty management should be embedded in day-to-day operations through continuous learning initiatives. Flight crews should participate in regular simulation exercises, and debriefing sessions should become standard practice to review decision-making processes. Management should encourage a learning culture where mistakes are viewed as opportunities for growth, fostering a proactive approach to risk mitigation.

CRM practices should be expanded to emphasize spatial awareness and proxemics. Airlines should invest in technologies that enhance real-time spatial monitoring and alert systems. Management should encourage ongoing training that addresses both the

psychological and physical aspects of spatial dynamics, ensuring that crew members are well-prepared to navigate high-stress environments.

5.4.2 Recommendations to policy

Policymakers should prioritize refining policies that promote a balanced approach to power distance in flight deck operations. Clear guidelines should be developed to encourage respectful authority while fostering open communication, which can enhance decision-making and overall crew performance. Regular policy reviews to align with global best practices will ensure continuous improvement. Additionally, incorporating feedback mechanisms into policy design can help identify areas where hierarchical practices might hinder collaboration, leading to more adaptable operational policies.

To enhance performance, policies promoting gender balance and inclusivity in flight operations should be strengthened. Aviation authorities should establish mandatory training programs that address the impact of masculinity on teamwork and communication. Policies should encourage diversity, ensuring that all crew members, regardless of gender, have equal opportunities to lead and contribute. This can help mitigate the negative effects of rigid gender expectations while amplifying the benefits of varied perspectives.

Regulatory frameworks should be revised to support proactive uncertainty management strategies. Policymakers should incentivize airlines to adopt advanced training programs, including scenario-based learning and emergency response drills. Introducing policies that mandate regular reviews of uncertainty avoidance protocols can help crews stay updated

with evolving safety practices. Collaborating with international bodies to harmonize uncertainty management standards can further strengthen regional and global flight safety.

Proxemics policies should focus on enhancing crew spatial awareness through standard operating procedures and training requirements. Regulatory authorities could establish industry standards for spatial management, ensuring that physical layouts and seating arrangements optimize communication and comfort. Incentivizing airlines to invest in ergonomic cockpit designs and crew rest areas could further improve crew well-being and performance, leading to safer and more efficient operations.

5.4.3 Theoretical implications

The findings of this study contribute to the theoretical understanding of how cultural factors shape flight deck crew performance. Power distance, as a structural element of team dynamics, reinforces theories of hierarchical control but also challenges researchers to explore more adaptive leadership models that balance authority with collaboration. Future studies could investigate how leadership training programs influence the perception of power distance and whether this impacts decision-making in high-stakes environments.

The study's insights on masculinity highlight the interplay between individual competitiveness and collective teamwork, suggesting that performance theories should account for the psychological impacts of gendered expectations. Researchers might explore how alternative models of masculinity, which value emotional intelligence and cooperative leadership, affect operational efficiency and crew cohesion.

Uncertainty avoidance aligns closely with risk management theories, reinforcing the importance of structured protocols and continuous training. However, the findings suggest that flexibility within rigid systems may enhance resilience. Future research could explore the balance between procedural adherence and adaptive decision-making, examining how crews can be trained to pivot effectively during unpredictable events.

Proxemics introduces a spatial dimension to team interaction theories, demonstrating that physical distance and personal space influence communication patterns and stress regulation. The study suggests that integrating spatial awareness into crew resource management (CRM) training could enhance coordination and reduce conflict. Further research could examine the use of wearable technology or cockpit design innovations to dynamically adjust proxemics for optimal performance.

5.5 Limitations of the research

This study explored how cultural factors influence flight deck crew performance, yet several limitations may impact the interpretation and applicability of the findings. One limitation lies in the reliance on self-reported questionnaire data. While practical, this approach may introduce response bias, with participants potentially providing socially desirable answers rather than honest responses. Future studies could incorporate observational methods or performance simulations to cross-validate findings.

The study's geographical focus is another limitation. Since the research was conducted within a specific airline context, the findings may not fully generalize to other airlines with different organizational cultures, regulatory environments, or regional practices. Future

research could benefit from cross-regional comparisons to understand how cultural variables impact flight deck performance in diverse settings.

The research also adopted a quantitative approach, which, while valuable for measuring trends and correlations, may have overlooked the nuanced perspectives of crew members. Including qualitative methods such as in-depth interviews or focus group discussions could provide richer insights into how cultural dynamics unfold in real-time operational settings.

Additionally, the study focused on four cultural dimensions—power distance, masculinity, uncertainty avoidance, and proxemics. While these variables are critical, other factors like emotional intelligence, leadership adaptability, or broader organizational culture were not explored. Expanding the scope to include these elements in future studies could offer a more holistic understanding of crew performance.

The aviation industry evolves rapidly with technological advancements and shifting global standards. The study's findings, while relevant today, may require revisiting as new technologies, training methodologies, and cultural shifts reshape cockpit dynamics. Longitudinal research tracking these changes over time could provide ongoing insights to inform evolving best practices.

5.6 Areas for further research

Building on the identified limitations, future research could explore several key areas to enhance understanding of cultural diversity and its impact on flight deck crew performance, including:

ii. Cross-Cultural Comparative Studies: Examine how cultural dimensions influence flight deck performance across different regions and airline contexts to uncover global patterns and localized nuances.

iii. Qualitative Exploration: Conduct in-depth interviews or focus groups with flight crew members to capture rich, personal narratives and uncover subtleties that quantitative data may miss.

iv. Longitudinal Research: Track crew performance over time to assess the evolving impact of cultural diversity, particularly as technological advancements and shifting industry standards reshape cockpit environments.

These research directions offer opportunities to build on the current findings, refine aviation training and policies, and ultimately enhance both flight deck performance and overall aviation safety.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

Dear Colleague,

My name is Bethwell Igobwa. I am writing to kindly request your participation as a respondent to this questionnaire. I am carrying out an academic study as part of my Masters' research project on the topic: **The Effects of Cultural Diversity on Flight-deck Crew Performance in RwandAir**. This questionnaire is to be filled by Flight-deck Crew. The information gathered is primarily for my educational pursuits and will be handled with utmost confidentiality. **Please do not write your name anywhere on the questionnaire**. It should take you a few minutes to answer the questions. Your kind help will be very highly appreciated.

SECTION A: Demographic Information

1. Range of your age?

- a. 18-24 years old b. 25-34 years old c. 35-44 years old
d. 45-54 Years old e. 55 and above

2. Experience in aviation?

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

3. What is your role in the flight deck?

Captain

First officer

SECTION B: Power distance

Please indicate with a tick \checkmark the extent to which you agree with the following statements concerning Power distance with respect to flight deck crew performance in the RwandaAir. Use the scale where:

5. Of utmost importance 4. Very important 3. Of moderate importance 2. Of little importance 1, of very little or no importance

Power distance	5	4	3	2	1
1. I believe that having clear hierarchy in flight deck crew is important for efficient decision-making.					
2. Subordinates should always defer to their superiors in flight-deck operations.					
3. A respectful power distance is critical for maintaining discipline in flight-deck teams.					
4. It is important that flight deck crew leaders maintain authority without being questioned.					
5. Power distance affects the communication flow between flight deck crew members.					

SECTION C: Masculinity

Please indicate with a tick \surd the extent to which you agree with any of the following statement concerning influence of Masculinity in RwandAir. Use the scale where:

5. Of utmost importance 4. Very important 3. Of moderate importance 2. Of little importance 1.Of very little or no importance

Masculinity	5	4	3	2	1
1. The flight deck crew is motivated by competitive success and achievement.					
2. A focus on performance outcomes is valued over process in RwandaAir's flight deck operations.					
3. Recognition of personal success in the flight deck is highly valued by the crew.					
4. A strong drive for excellence is encouraged among flight deck crew members.					
5. Gender roles and expectations influence how tasks are assigned in the flight-deck crew.					

SECTION D: Uncertainty Avoidance

Please indicate with a tick \checkmark the extent to which you agree with any of the following statement concerning Uncertainty Avoidance in RwandAir. Use the scale where:

5. Of utmost importance 4. Very important 3. Of moderate importance 2. Of little importance 1, of very little or no importance

Uncertainty Avoidance	5	4	3	2	1
1. The flight deck crew relies on detailed procedures to avoid making errors.					
2. High levels of training and preparation reduce uncertainty during flight operations.					
3. Flight-deck crew members follow strict guidelines to minimize risks.					
4. Crew members prefer to work in environments where outcomes are predictable.					
5. Uncertainty in flight operations is minimized through adherence to strict regulations.					

SECTION E: Proxemics

Please indicate with a tick \checkmark the extent to which you agree with any of the following statement concerning proxemics in RwandAir. Use the scale where:

5. Of utmost importance 4. Very important 3. Of moderate importance 2. Of little importance 1. of very little or no importance

Proxemics	5	4	3	2	1
1. Physical space between crew members affects the flight-deck dynamics.					
2. Maintaining adequate distance during pre-flight briefings is crucial for effective communication.					
3. Proxemics influence the level of comfort and teamwork between flight-deck crew members.					
4. Flight-deck crew members are trained to respect personal space during high-stress situations.					
5. Cultural differences in proxemics affect interaction patterns on the flight deck.					

SECTION F: Effectiveness of flight deck crew Performance in RwandAir

Please indicate with a tick \checkmark the extent to which you agree with any of the following statement concerning effectiveness of flight deck crew performance in RwandAir. Use the scale where: **5. of utmost importance 4. Very important 3. Of moderate importance 2. Of little importance 1. of very little or no importance**

Effectiveness of flight deck crew Performance	5	4	3	2	1
1. Proper teamwork in the flight-deck crew contributes significantly to performance.					
2. Clear communication in flight operations is key to effective performance.					
3. Cultural diversity positively affects problem-solving in flight-deck situations.					
4. Adherence to safety protocols improves the overall flight-deck performance.					
5. The collaboration between flight crew members contributes to operational efficiency.					

Thanks for your cooperation.

APPENDIX II: INTRODUCTION LETTER



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12th February, 2025

TO WHOM IT MAY CONCERN

Dear Sir/Madam

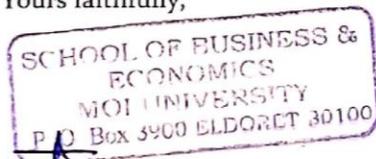
RE: BETHWELL S. IGOBWA - EMBA/EASA/1502/24

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

Mr. Igobwa has successfully completed his coursework, defended his proposal, and is proceeding to the field to collect his research titled "*The Effects of Cultural Diversity on Flight-Deck Crew Performance in RwandAir*"

Any assistance accorded to him will be highly appreciated.

Yours faithfully,



PROF. RONALD BONUKE
POSTGRADUATE CHAIR, SBE

cj/RB

APPENDIX III: BUDGET

MATERIALS	RATE	QUANTITY	COST (SHS)
Laptop	@45000	1 pc	45000.00
Travel expenses			20000.00
Miscellaneous			2000.00
Total			67,000.00

