CHALLENGES IN ADAPTATION OF CARBON OFFSETTING APPS BY COMPANIES FOR BUSINESS RELATED AIR TRAVEL

by

AGYA PAL SINGH,PMP

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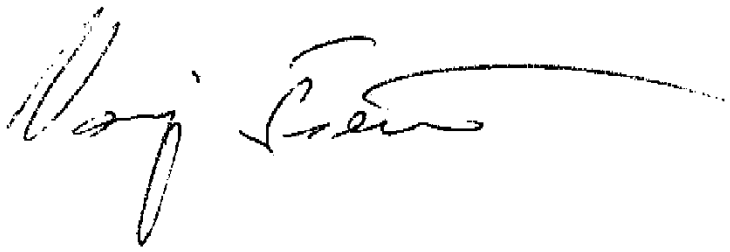

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Admissions Director

Dedication

This research is dedicated to my father, Mohinder Partap Singh (1932–2017). His passion and dedication towards the development and implementation of environmentally friendly technologies left a lasting impression on my pursuit of understanding the challenges in the adaptation of carbon offsetting platforms for business-related air travel.

He designed and developed technologies and devices to reduce dependency on fossil fuels for energy needs, especially in sub-Himalayan regions. Throughout his life, he was a strong proponent of non-conventional energy resources like solar and wind energy and worked towards reducing reliance on conventional fuels.

His major achievement was to design and implement a solar water heating system, electricity generation solutions, and solar cooking to cater to the needs of a small community in Himachal Pradesh (India) and develop it as a model to be replicated for future townships.

He was awarded a lifetime achievement award by the Minister of Environment, Government of India in 2016, for his efforts in taking technology to people and showcasing its environmental, financial, and social benefits.

Acknowledgements

I would like to express my deepest gratitude to all those who have supported and guided me throughout the journey of completing this thesis. Their unwavering encouragement, invaluable insights, and selfless assistance have been instrumental in shaping this work.

First and foremost, I extend my heartfelt appreciation to my mentor Dr. Hrvoje Volarević for his constant guidance, expert advice, and patience. His dedication to my academic growth and his meticulous attention to detail have been indispensable in refining the scope and content of this research.

I am grateful to my family for their unending love, encouragement, and sacrifices. Their unwavering belief in my abilities has been my driving force, and I am truly fortunate to have their unconditional support.

I would also like to acknowledge the invaluable insights and perspectives provided by my friends and colleagues, who engaged in thought-provoking discussions and provided constructive feedback. Their diverse viewpoints have contributed to the depth and breadth of this study.

Furthermore, I extend my thanks to the participants of this research, whose contributions and cooperation were essential for the data collection process. Their willingness to share their experiences and insights has been crucial in shaping the empirical foundation of this thesis.

Finally, I want to express my gratitude to all the authors, researchers, and scholars whose works I consulted during my literature review. Their pioneering contributions laid the

groundwork for this study and provided me with a comprehensive understanding of the field.

In conclusion, this thesis would not have been possible without the collective efforts of the individuals and institutions. Their support has been a cornerstone of my academic journey, and I am truly humbled by their contributions.

Thank you.

Agya Pal Singh

September 2024

ABSTRACT
CHALLENGES IN ADAPTATION OF CARBON OFFSETTING APPS BY COMPANIES FOR BUSINESS RELATED AIR TRAVEL

Agya Pal Singh
2024

Dissertation Chair: <Chair's Name>
Co-Chair: <If applicable. Co-Chair's Name>

The global imperative to address climate change has prompted businesses to explore sustainable practices, including carbon offsetting, to mitigate the environmental impact of their operations. This research delves into the challenges encountered by businesses in adopting carbon offsetting platforms specifically for air travel-related emissions.

This research is specific to challenges in adopting carbon offsetting platform for Business related air travel at it is major contributor of Greenhouse Gases (GHG)

Focusing on emissions from air travel is crucial, as air travel continues to grow. According to the David Suzuki Foundation, a quarter of all emissions could be from flying by 2050" (David Suzuki Foundation, 2022).

This research aims to understand the challenges and factors that impacts adoptions of carbon trading applications for business-related air travel and to build the conceptual model based on the existing studies and reports and relevant data collected by conducting Survey and interviews.

In this study, we conducted an in-depth analysis of the barriers that hinder the widespread implementation of carbon offsetting initiatives within the context of business-related air

travel. Through a comprehensive literature review and empirical investigation, we identified and categorized the primary challenges faced by individuals and organizations aiming to integrate carbon offsetting into their air travel practices.

Result of this research will be of assistance to achieve the Sustainability goals of business organization by understanding the challenges in one of the key areas related to reducing carbon footprint. Furthermore, it will also help the Carbon offset platform companies in determining the potential solutions to the highlighted challenges.

The findings reveal a multifaceted landscape of obstacles, encompassing both practical and conceptual dimensions. From a practical standpoint, complexities arise in accurately quantifying emissions, selecting appropriate offset projects, and effectively communicating the carbon offsetting process to employees and stakeholders. Moreover, challenges linked to the credibility and transparency of offset projects emerge as significant concerns.

Conceptually, the research uncovers a range of psychological and organizational factors influencing the adoption of carbon offsetting platforms. These encompass issues of employee engagement, organizational commitment, and the alignment of carbon offsetting with corporate sustainability goals. Furthermore, the study highlights the tension between economic considerations and ethical imperatives, posing a dilemma for businesses seeking to strike a balance between financial viability and environmental responsibility.

In conclusion, this research contributes to a deeper understanding of the barriers faced by businesses in embracing carbon offsetting for air travel-related emissions. By shedding light on the intricate interplay of practical and conceptual challenges, this study provides

valuable insights for organizations, policymakers, and industry stakeholders seeking to navigate the complexities of sustainable business practices in the aviation sector.

Keywords: Carbon offsetting, business travel, sustainability, environmental impact, challenges, adoption, aviation, emissions mitigation.

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CHAPTER I:

INTRODUCTION

1.1 Introduction

As COVID-19 restrictions ease, business-related air travel is resuming, increasing the demand for platforms that track carbon offsetting activities to achieve sustainability goals.There is a need to study on the challenges faced by various stakeholders on using carbon offsetting platforms.

These platforms are providers for Carbon offsetting activities to offset the carbon footprint due to business related air travel as that will help in future research for identification of actions that may help in increasing adoptation of Carbon offsetting platform thus contribute to building a greener and clean environment.

1.2 Research Problem

“Current projections estimate that demand for air passenger journeys in 2050 could exceed 10 billion. The expected 2021-2050 carbon emissions on a ‘business as usual’ trajectory is approximate 21.2 gigatons of CO2.” (IATA, 2023)

As per IATA strategy towards net zero emissions “Achieving net zero by 2050 will require a combination of maximum elimination of emissions at the source, offsetting and carbon capture technologies.” (IATA 2023) and “19% of CO2 emissions is planned to be handled by offsets and carbon capture.” (IATA 2023)

With this research intention is to understand the key challenges in adopting the Carbon offset app for business related air travel. With this study we can improve our understanding on the challenges faced by various stakeholders in effectively using carbon offsetting platforms.

In order to understand the challenges faced in adoptions of carbon offsetting platforms to offset carbon footprint due to air travel the following research questions needs to be addressed:

1. What are key challenges for adopting carbon offsetting platform by business organizations for business related air travel?

2. Do these challenges vary across countries and cultures?

3. Do these challenges differ across industries?

4. Does this cha llenge relate to size and type of business organization?

5. Does the organizational practices and procedure impact adoption of carbon offsetting platform?

1.3 Purpose of Research

This research is specific to challenges in adopting carbon offsetting platform for Business related air travel as “Business related air travel is major contributor of green House Gases (GHG) as flights account for about 90% of business travel emissions. That makes it the lowest-hanging fruit for companies setting reductions targets.” (Jamie and Rajesh, 2021).

1.3.1 Set reduction target and track performance :

Identify GHG “hot spots” by optimizing the business travel and prioritize reduction efforts across the value chain, Set overall scope 3 GHG reduction targets and Quantify and report GHG performance over time.

1.3.2 Engage with partners for CHG management:

With increased awareness corporates can partner with offset partners, suppliers, customers, and other companies in the value chain to achieve GHG reductions due to air travel , Expand GHG accountability, transparency, and management in the supply chain , Enable greater transparency on companies efforts to Reduce energy use, costs, and risks in the supply chain and avoid future costs related to energy and emissions, Reduce costs through improved supply chain efficiency and reduction of material, resource, and energy use

1.3.3 Enhance ESG and public reporting :

Improve corporate reputation and accountability through public disclosure , Meet needs of stakeholders (e.g., investors, customers, civil society,governments), enhance stakeholder reputation, and improve stakeholder relationships through public disclosure of GHG emissions, progress toward GHG targets, and demonstration of environmental stewardship ,Participate in government- and NGO-led GHG reporting and management programs to disclose GHG-related information.

1.4 Significance of the Study

"There are three groups of greenhouse gas emissions that every company owner should be aware of. The emissions are categorized into groups which are known as Scopes by the Greenhouse Gas (GHG) Protocol. Emissions created directly from an owned asset such as fuel combustion for space heating in a building, company-owned vehicle emissions and fugitive emissions such a refrigerant gas leakage from an AC unit, would be classed as Scope 1. Scope 2 would cover indirect emissions from purchased electricity, heat, steam and cooling. Scope 3 includes all other indirect emissions that occur in a company's value chain such as business travel, purchased goods and services, waste disposal and employee commuting. In many sectors, these emissions make up a huge proportion of a company's emissions scale but because they generally fall outside a company's direct control, they are difficult to account for. This means they are often overlooked making net zero goals unachievable." (RPS Group,2023)

"Current projections estimate that demand for air passenger journeys in 2050 could exceed 10 billion. The expected 2021-2050 carbon emissions on a 'business as usual' trajectory is approximate 21.2 gigatons of CO2." (IATA 2023)

"Aircraft engines have burned more than 1 billion litres of fuel per day in the years 2016–2019 before the pandemic " (Lee et al 2021)

As per IATA strategy towards net zero emissions "Achieving net zero by 2050 will require a combination of maximum elimination of emissions at the source, offsetting and carbon

capture technologies. and 19% of CO2 emissions is planned to be handled by offsets and carbon capture. “(IATA 2023)

This study is also significant from the prespective of ESG reporting purpose as the emissions from business related Air travel is covered under scope 3 of widely accepted GHG Protocol that sets up standards for acccouting and corporate standards.

Figure 1.1
Green House Gasses Protocol scopes and emissions across the value chain

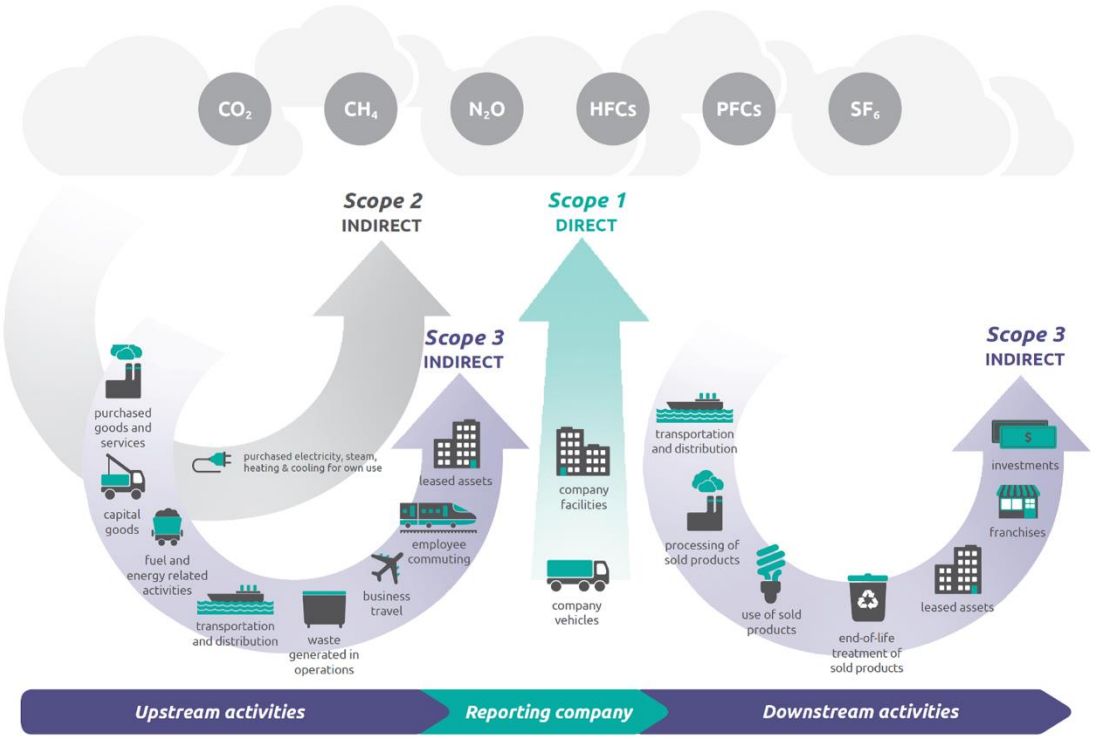

Image Source: Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2023) Page.5.

As with rise in emission due to business air travel this study is significant to understand the challenges faced in adoption of carbon offset platforms to reduce impact of Scope 3 emissions and making Net zero goals achievable by companies.

1.5 Research Purpose and Questions

With this research we intend to know the key challenges in adapting the Carbon offset app for business related air travel and improve our understanding on the challenges faced by various stakeholders in effectively using carbon offsetting platforms.

Research aim to answer the following research questions to have better understancing of the Challenges and underlying root causes:

1. What are key challenges for adopting carbon offsetting platform by business organizations for business related air travel?
2. Do these challenges vary across Regions?
3. Do these challenges differ across industries?
4. Does this challenge relate to size and type of business organization?
5. Does the organizational practices and procedure impact adoption of carbon offsetting platform?

Answer to abovementioned research question may help the companies and carbon offset platform providers to increase the adaption rate and thus help in achieving their sustainability goals and contribute to build greener and cleaner environment.

CHAPTER II:

REVIEW OF LITERATURE

2.1 Introduction

Definition of Carbon offset as per United States Environmental Protection Agency (EPA) Waste Reduction Model (WARM) Definitions and Acronyms is:

"Emission savings or storage that can be considered to cancel out emissions that would otherwise have occurred. For example, electricity produced from burning landfill gas is considered to replace electricity from the grid, leading to a carbon offset because landfill gas production and combustion results in lower GHG emissions than grid electricity production from fossil fuels."

Corporates are getting increasingly conscious about climate and have sustainability goals aligned with United nation sustainability goals. Based on the review of existing literature it was evident that Air travel is major cause of overall emissions and Business-related travel contribute up to 90% of air travel.

"Multi-scale global assessment of the air quality and human health impacts of aviation, accounting for both fine particulate matter and ozone, estimating that aviation emissions result in ~16 000 early deaths each year." (Steve H L Yim *et al* 2015)

Carbon offsetting is a major tool for reducing the carbon impact Carbon emissions and Carbon offsetting platforms are getting popularity and there is need of further studies to be conducted in this area. There is need of systematic study to understand the challenges in adaptation of digital carbon offsetting platforms for business travel.

How does Carbon Offsetting work?

"In simple terms, when an activity like air travel produces CO2 emissions, these emissions can be compensated – or offset – by preventing or reducing a similar amount of emission elsewhere. This compensation can be performed by the airline itself or by its passengers. Such offsets can be sourced from various types of project activities and can be purchased through specialized offset providers or carbon brokers. The buyer then receives a certificate or record from the seller providing details about the project and the amount of reduced CO2 emissions. The diagram below illustrates this process" (IATA 2023)

Figure 2.1
Illustration of Carbon offsetting process

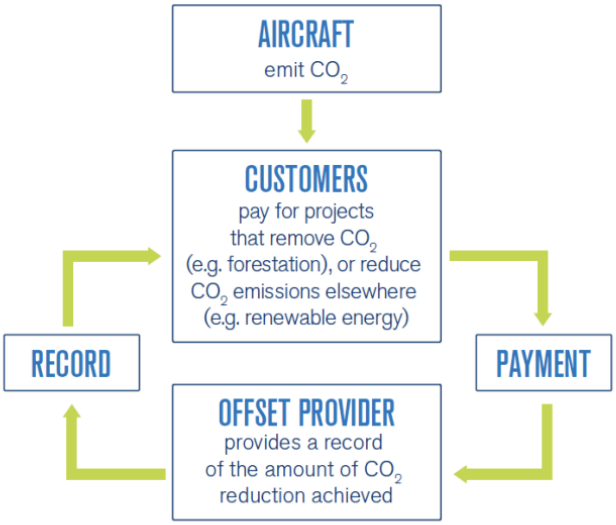

Image Source : IATA - aviation_carbon_offsetting_guidelines.pdf (IATA,2023)

“Offsets can be a helpful way to address climate change, provided they truly result in reduced carbon dioxide in the atmosphere. To ensure actual carbon reductions, offsets should have the following four characteristics:

1. Additionality. Carbon reduction would not have happened without the offset.
2. Permanence. Reduction will continue for the entire certification period of the offset.
3. Absence of Leakage. Implementing an offset policy in one place should not simply lead to a relocation of those emissions in another place (e.g., you protect trees in one location, so lumber companies cut them down elsewhere.)
4. Verification. The above characteristics should be certified by a third party.” (Walsh et all,2021)

Understanding Carbon Offsetting in context of Air travel.

“Organizations purchase offsets to lower their net emissions. However, the means of calculating one’s total emissions burden varies widely across organizations. “(Lee, Henry and Abigail Mayer.2020)

“The terms carbon offset, and carbon offset credit (or simply “offset credit”) are used interchangeably, though they can mean slightly different things. A carbon offset broadly refers to a reduction in GHG emissions – or an increase in carbon storage (e.g., through land restoration or the planting of trees) – that is used to compensate for emissions that occur elsewhere. A carbon offset credit is a transferable instrument certified by governments or independent certification bodies to represent an emission reduction of one metric tonne of CO2, or an equivalent amount of other GHGs . The purchaser of an offset

credit can “retire” it to claim the underlying reduction towards their own GHG reduction.” (Broekhoff et. all, 2019)

“Offsets can be a helpful way to address climate change, provided they truly result in reduced carbon dioxide in the atmosphere. To ensure actual carbon reductions, offsets should have the following four characteristics:

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2.2 Theory of Reasoned Action

“The Theory of Reasoned Action (Ajzen and Madden ,1986) suggests that an individual’s intention to adopt a technology is determined by two basic factors, one reflecting personal interest and one reflecting social influence. The personal factor, which is termed attitude toward the behavior, is the individual’s favorable or unfavorable evaluation of adopting the technology. The social influence factor, subjective norm, refers to the individuals’ perceptions of what they believe others expect them to do and the strength of their motivation to comply with those expectations.” (Rita et all,2003)

The Theory of Reasoned Action (TRA) can provide insights into the adoption of carbon offset platforms for business-related air travel.

The adoption of carbon offset platforms can be attributed to the attitudes, beliefs, and intentions of individuals and organizations.

Attitude:. Attitudes towards adaption of carbon offsetting can be shaped by beliefs about the effectiveness of carbon offset platforms in reducing carbon emissions, as well as perceptions of the costs and benefits associated with the adoption of these platforms.

"Business travelers do not consider the environmental impact their travel has. They included a frequency of business travel variables and found that the willingness to change travel behavior to be more sustainable was only significantly associated with those who travelled the least "(Lu & Wang,2018)

Subjective Norms: The perceived social pressure or expectations to perform or not perform the behavior, can influence adoption of carbon offset platforms this can be attributed to attitudes and beliefs of significant others, such as business partners, customers, or employees. If a business perceives that their stakeholders expect them to adopt carbon offset platforms, they may be more likely to do so.

"Achieving the desired goal of sustainable travel requires the actions of the corporation, through establishment of appropriate policies, to encourage pro-sustainability behaviors by the business traveler." (Walsh et all,2021)

Intention: The adoption of carbon offset platforms is a result of the intention to perform the behavior. The strength of the intention is determined by the attitude towards carbon offsetting and the perceived subjective norms. If a business has a positive attitude towards

carbon offsetting and perceives that their stakeholders expect them to adopt carbon offset platforms, their intention to adopt these platforms may be stronger.

“For every company that travels, addressing travel-related carbon emissions is an important part of the decarbonisation journey. In fact, SAP Concur research found that 37% of businesses have carbon compensation as a key objective for their 2022 sustainability agenda.” (Andreas Slettvoll,2022)

Perceived Behavioral Control: In the theory of reasoned action (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980) considers that behavioural intention is the best indicator of whether a specific behaviour is undertaken, and is influenced by a person's attitudes and subjective norms. The theory of planned behaviour (Ajzen, 1985, 1991) included the perceived behavioural control to cause specific behaviour. The concept of perceived behavioral control involves the belief about whether one can control his or her performance of a behavior.

Individual's perception of the ease or difficulty of performing the behavior. The perceived behavioral control can be influenced by factors such as the awareness, complexity of the carbon offset calculation and the perceived credibility of these platforms. If a business perceives that adopting carbon offset platforms is within their control and feasible, they may be more likely to do so.

“There is some optimism that technology, such as videoconferencing technology, may reduce the need for travel, thereby reducing emissions. Evidence, however, suggests that the virtual workplace may not substantially limit business travel because the physical and

virtual working environment are complementary, as opposed to substitutes, supporting the notion that business travel will remain strategic to the business and its ability to achieve its business outcomes."(Jones et all,2018)

Theory of Reasoned Action can help to explain the adoption of carbon offset platforms for business-related air travel. Attitudes towards carbon offsetting, perceived subjective norms, and perceived behavioral control can influence the intention to adopt carbon offset platforms, which ultimately leads to the adoption or non-adoption of these platforms.

2.3 Human Society Theory

Human Society Theory can offer insights into the adoption of carbon offset platforms for business-related air travel by emphasizing the role of social structures and institutions in shaping human behavior. According to this perspective, the adoption of carbon offset platforms is influenced by various social, economic, and political factors that operate at multiple levels of analysis.

Human society theory emphasizes the role of social institutions and structures in shaping individual behavior. For example, governments can use regulatory policies and economic incentives to encourage businesses to adopt carbon offset platforms. Similarly, industry associations and advocacy groups can promote the adoption of carbon offsetting as a best practice among their members. At the same time, social norms and cultural values can also shape the adoption of carbon offset platforms by influencing the attitudes and beliefs of individuals and organizations.

Social networks and communities play important part in shaping the adoption of carbon offset platforms. For example, businesses may be more likely to adopt carbon offsetting if they see other businesses in their industry doing the same. Social networks and communities of practice can also provide a space for sharing information and best practices related to carbon offsetting, which can help to overcome barriers to adoption such as a lack of knowledge or understanding.

Organizations across the globe are targetting “Net Zero” carbon footprint yet based of the research survey there are still 46% of organizations that still need to set the “Net zero targets”.

Figure 2.2
Response to Does your organization have net zero goal

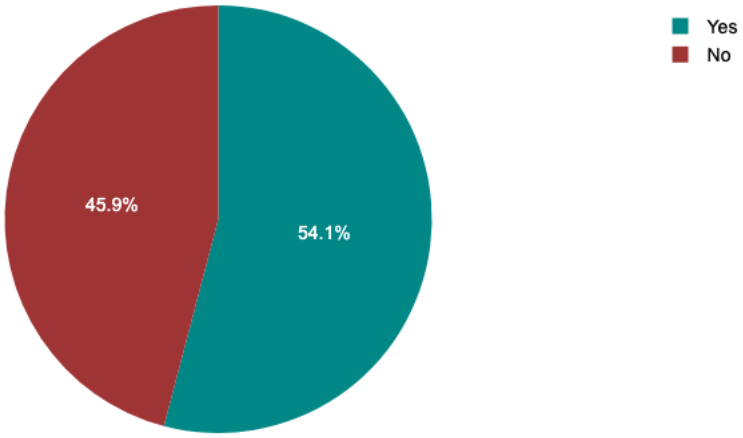


Image Source : Created by the Author

Human society theory emphasizes the role of individual agency in shaping the adoption of carbon offset platforms. individual employees within a business may be motivated to

advocate for the adoption of carbon offsetting if they are passionate about environmental sustainability or feel a sense of moral obligation to reduce their carbon footprint. Similarly, individual customers may be more likely to choose a business that has adopted carbon offsetting as a way to signal their own environmental values.

At micro level majority 96% of responsdent of online survey were willing to invest in green projects to offset the carbon footprint is indication towards shaping of individual behaviours receptive towards taking measures to reduce carbon footprint .where as at meso level the actual adaption of carbon trading platforms is not adapted so widely.

Table 2.1:
Number and percentage of respondent willing to invest in green projects to offset the carbon footprint.

As a responsible citizen are you ready to invest in green projects to offset your carbon footprint?	Frequency	%
Response :Yes	53	96.36%
Response :No	2	3.64%
Total	55	100%

Table Source : Created by the Author

In summary, Human Society Theory can help to explain the adoption of carbon offset platforms for business-related air travel by highlighting the role of social structures, institutions, and networks in shaping individual behavior. By considering the multiple levels of analysis that influence the adoption of carbon offsetting, businesses and policymakers can develop more effective strategies for promoting the adoption of these

platforms.Based on the survey results it can also be derived that human factors like lack of awareness and Skepticism on effectiveness of carbon offsetting are significant reason for not using Carbon offsetting platform for offsetting air travel emissions.

The following table provide the responses to the question "In your opinion what are reasons for not using Carbon offset platforms to offset the Green-House Gasses emissions due to air travel? "

Table 2.2:
Insights on not using Carbon offset platform for offsetting air travel emission.

Reason stated for not using Carbon Offset platforms	Yes%
Lack of Awareness	60%
Cost Factor-financial constraints	68%
Skepticism on effectiveness of carbon offsetting	58%
Inadequate Standards	66%
Lack of Incentive	65%
Regulatory environment	51%

Table Source : Created by the Author

2.4 Summary

The chapter reviewed the existing literature to have deeper understanding of the overall Carbon offsetting and in context of business related air travel and studied theory of Reasoned Action to explain the adoption of carbon offset platforms for business-related air travel. Attitudes towards carbon offsetting, perceived subjective norms, and perceived

behavioral control can influence the intention to adopt carbon offset platforms and ultimately leads to the adoption or non-adoption of these platforms.

Human Society Theory can help in adoption of carbon offset platforms for business-related air travel by highlighting the role of social structures, institutions, and networks in shaping individual behavior.

This chapter review shows that the business related air travel need more awareness towards environment impact and improve adoption of measures like carbon offsetting platforms can help achieve sustainability goals.

The next chapter discusses the methodology, data collection methods, data analysis,validity, and reliability of the study.

CHAPTER III:

METHODOLOGY

3.1 Overview of the Research Problem

The intent of this research is to identify key challenges in adopting the Carbon offset app for business related air travel. With this study we can improve our understanding on the challenges faced by various stakeholders in effectively using carbon offsetting platforms.

The need for focus on emission from air travel is very important as Air travel itself is growing and as per David Suzuki Foundation "quarter of all emissions could be from flying by 2050" (David Suzuki Foundation, 2022).

Achieving the desired goal of sustainable travel requires the actions of the corporation, through establishment of appropriate policies, to encourage pro-sustainability behaviors by the business traveler. (Walsh et all, 2021)

3.2 Operationalization of Theoretical Constructs

To operationalize the theoretical constructs and find challenges in the adoption of carbon trading platforms for business-related air travel, this research defined and measured the key variables :

3.2.1 Construct: Challenges in the adoption of carbon trading platforms

Identify and measure specific challenges faced by businesses in adopting carbon trading platforms. This is done through a combination of qualitative and quantitative methods of interviews and surveys.

3.2.2 Construct: Business-related air travel

Define and quantify the extent of air travel conducted by businesses for business purposes. This will be measured using objective indicators such as the number of business flights, distance traveled, or carbon emissions from air travel,

3.2.3 Construct: Carbon trading platform adoption

Measure the level of adoption or usage of carbon trading platforms by business organizations. This can be assessed through self-reported data, surveys, or by collecting information on the use of specific carbon trading platforms or initiatives.

3.2.4 Construct: Size and type of business organization

Categorize business organizations based on their size (e.g., small, medium, large) and type of industry (e.g., aviation, manufacturing, technology). This information can be obtained from existing industry classifications or self-reported data from the organizations.

3.2.5 Construct: Organizational practices and procedures

Assess the impact of organizational practices and procedures on the adoption of carbon trading platforms. This can be measured by evaluating the presence of sustainability policies, environmental initiatives, or corporate social responsibility practices within the organization.

3.2.6 Summary of theoretical constructs

The data for these constructs is collected by using research methods such as surveys, interviews, and document analysis . Surveys include Likert scale questions to quantify the level of agreement or disagreement with specific challenges, while open-ended questions can capture qualitative insights on the nature and underlying reasons for the challenges faced.

By operationalizing these theoretical constructs, collected data is analyzed to understand the challenges in the adoption of carbon trading platforms for business-related air travel and their relationship with other variables such as organizational practices, industry type, and company size.

3.3 Research Purpose and Questions/hypothesis

To understand the challenges faced in adoptions of carbon offsetting platforms to offset carbon footprint due to air travel the following research questions needs to be addressed:

Research Question : What are key challenges for adopting carbon offsetting platform by business organizations for business related air travel?

Sub Question 1. Do these challenges vary across regions?

Sub Question 2. Do these challenges differ across industries?

Sub Question 3. Does these challenges relate to size and type of business organization?

Sub Question 4. Does the organizational practices and procedure impact adoption of carbon offsetting platform?

3.4 Research Design

Designing a research study to investigate the challenges in the adoption of carbon offset platforms in the airline industry can be complex and involve multiple steps. Here is an outline of a research design:

3.4.1 Identification of Research question: What are the challenges faced by airlines in adopting carbon offset platforms?

3.4.2 Literature review: Conducted a comprehensive review of existing literature on carbon offset platforms, carbon emissions in the airline industry, and challenges faced by airlines in adopting sustainable practices. The literature review will help to identify research gaps and provide a foundation for the research design.

3.4.3 Research method: The primary research will be done to build the conceptual model based on the relevant data collected by primary data methods of survey and interviews. Secondary sources existing studies and reports will also be studied pertaining to environment data and Challenges in adoption of Carbon offset platforms.

3.4.4 Population and Sampling design: To identify challenges in adoption of carbon offset platform the target population should represent key decision makers, executives

responsible for sustainability goals, employees with travel profile from different type of business organizations.

3.4.5 Data collection: Collect data using the selected research method. For qualitative methods, data could be collected through interviews, observations, or document analysis. For quantitative methods, data could be collected through surveys or analysis of existing data.

3.4.6 Data analysis: Analyze the data using appropriate statistical or qualitative methods. The analysis should focus on identifying the challenges faced by airlines in adopting carbon offset platforms and understanding the reasons behind these challenges.

3.4.7 Findings: Present the findings of the study, including a summary of the challenges identified and any trends or patterns observed in the data.

3.4.8 Conclusion: Draw conclusions from the study and make recommendations for addressing the challenges identified. The recommendations could be targeted towards airlines, carbon offset platform providers, or policymakers.

3.4.9 Limitations: Identify the limitations of the study, such as sample size, data collection methods, or research design, and discuss how these limitations could be addressed in future studies

3.5 Population and Sample

“The target population is the specific, conceptually bounded group of potential participants to whom the researcher may have access that represents the nature of the population of interest. To be successful in defining the target population, one must examine all the boundary considerations in an iterative manner to ensure that the end description of the target population is inclusive enough to pro- vide sufficient data to the study.” (Casteel, A., & Bridier, N. L. ,2021).

“The first and most common approach in hypothesis testing is using an a priori power analysis to determine the minimum required sample size. The purpose of an a priori power analysis is for the re- searcher to determine in advance the minimum sample size required to provide sufficient statistical power to the analysis based upon anticipated or predetermined parameters, including the ability to measure a desired effect size with statistical significance”. (Casteel, A., & Bridier, N. L. ,2021).

“The population of interest for the study is comprised of the individuals, dyads, groups, organizations, or other entities one seeks to understand and to whom or to which the study results may be generalized or transferred and is the principal group about which the research is concerned. Populations create boundaries for the scope of a study and provide environmental and context cues for the reader. Such boundaries place natural delimitations upon the research to afford the researcher the proper focus so as not to present a one-size-fits-all set of results. The definition of boundaries also allows the researcher to clearly

identify subpopulations, such as the target population, sampling frame, and sample, and to ensure alignment between these groups within the research "(Salkind,2010)

"One of the most challenging aspects of research – particularly dissertation research – is obtaining enough data to conduct an appropriate data analysis. In quantitative research, there are two primary approaches for determining the appropriate sample size.

The first and most common approach in hypothesis testing is using an a priori power analysis to determine the minimum required sample size. The purpose of an a priori power analysis is for the re- searcher to determine in advance the minimum sample size required to provide sufficient statistical power to the analysis based upon anticipated or predetermined parameters, including the ability to measure a desired effect size with statistical significance." (Casteel, A., & Bridier, N. L. ,2021).

"The second method of determining sample size is mostly used within quantitative descriptive designs in which one is interested in describing the characteristics of the population of interest and when representing all members of that group are a priority. This second method uses confidence level calculations, which provides the minimum sample size one must recruit to meet the desired statistical constraints; namely, the sample represents the characteristics of interest for the entire population of interest. "(Casteel, A., & Bridier, N. L. ,2021).

3.6 Participant Selection

"The criteria for selecting the individual may vary, including seeking a specific narrative to explore, a common ex- perience with a phenomenon, membership in a culture, or being in position to assist in developing a theory "(Creswell, 2013).

For purpose of this research Convenience sampling and Volunteer sampling methods were used to get the population to collect data specific to Challenges in adoption of carbon offset platform for business related air travel.

"Convenience sampling is characterized by selecting participants based upon their proximity to the re- searcher in which the researcher recruits from an opportune sampling frame. An issue arising from the use of convenience sampling is that the sample rarely represents the population of interest, as it does not offer the randomness and diversity that exists within the population of interest. Conven- ience samples often are from the same geographic region, share similar socioeconomic characteris- tics, and regularly have similar racial or ethnic backgrounds" (Emerson, 2015)

The primary research was conducted on the select group of participants selected via there position , location , industry type to respond to internet based survey to get the required insights .

"Volunteer sampling seeks out participants for a study based upon the participant's self-selection to provide data. Unlike convenience sampling in which the localized sampling frame is proactively re- cruited by the researcher for participation, volunteer sampling

occurs when the individual comes across the opportunity to participate in the research and opts into the study "(Fricker, 2016).

Participants for this research were recruited on a voluntary basis, and the survey was distributed among interest groups via online platform, over all 61 participants responded and their valuable insigts were used in data analysis .

3.7 Instrumentation

The study used Online survey and semi structured interview as primary data sources to obtain insights on the challenges in adaption of carbon trading platform required demographical data related to type of business organization, size, revenue and level of adaption and potential challenges.

"Online survey approach provides convenience in several ways, for example, a) respondent can answer at a convenient time; b) respondent can take as much time as they need to response questions; c) respondent can complete survey in multiple sessions. Like the paper-based survey; online questionnaire surveys are capable of question diversity (e.g. dichotomous questions, multiple-choice questions, scales), skip irrelevant questions for sub-groups in the sample (i.e. no pregnancy questions for men) and even collect an open-ended question (qualitative data) through a free text box. Similarly, the construction of the online questionnaire can also be built to help better response rate for each item; for example, respondents must answer a question before advancing to the next question.

This, however, might create an unfavorable situation to some research participants if they do not want to answer sensitive questions such as sexual behaviors or drug use. Unlike the

paper postal survey, through this approach, follow up could be easy through email which enhance response rate." (Regmi, Pramod R et al. 2016)

The survey questionnaire used in this research is designed to get the relevant responses from the respondents that are using carbon platform for offsetting carbon footprint business related air travel.

Environment report of various corporates was reviewed along with various documents, websites of various government and global organizations as well as academic journal articles were reviewed to get the better understanding to focus beyond the existing literature on carbon footprint and carbon offset information.

3.8 Data Collection Procedures

"Data collection through an online survey appears to have the potential to collect large amounts of data efficiently (i.e. with less error due to the lack transferring written data on to a computer), economically (as it requires low human resource efforts while collecting or managing data) and within relatively short time frames." (Regmi, Pramod R et al. 2016)

"Collected data should be stored in a proper way for statistical analysis. Online survey technique is useful to store data online after submitting the filled-in form. Real-time storing of data is an automatic procedure in the online survey technique. The data will be stored in the central server of the website, and the researcher can download the data from the server. The main threat for online storing of data is the crash of data in servers because of server issues or hacking of the websites. The solution for this threat is to download the data regularly and storing it on a personal computer. Online data storing has an extra advantage,

i.e. stored data is not accessible for others; thus, it will be free from data editing. "(Nayak, Mudavath & K A, Narayan. 2019).

Online internet-based Survey was sent to get the information on the research question and the response was stored online. The online survey was published for collection of data at various forums and professional networking sites to have maximum reach and depth. More than fifty responses were received and were later analyzed for finding answers for research question and verification of hypothesis.

3.9 Data Analysis

The data analysis section outlines the methodologies and procedures employed to analyze the data collected through an online survey using a quantitative approach. This study aims to examine the key challenges for adopting carbon offsetting platform by business organizations for business related air travel and identify patterns to identify patterns and relationships within the data. The analysis includes descriptive statistics, inferential statistics, and appropriate data visualization techniques.

Step 1: Data Preparation

Before proceeding with the analysis, the collected survey data underwent a rigorous preparation process. This included:

Data Cleaning: Removing incomplete responses and addressing any inconsistencies or errors in the data entries.

Coding: Assigning numerical values to categorical responses for ease of analysis. For instance, organizational size categories (Small, Medium, Large) were coded as 1, 2, and 3 respectively.

The organizations were categorized based on number of employees working and the data was categorized in three sizes categories.

Table 3.1:
Categories of Organization based on number of employees.

Size Category	**Number of employees**
Small	less than 100 employees
Medium	101 to 1000 employees
Large	More than 1000 employees

Table Source : Created by the Author

Table 3.2
Distribution of Organization based on number of employees.

Number of Employees	**Frequency**	**%**
Large	36	59.02%
small	15	24.59%
Medium	10	16.39%

Table Source : Created by the Author

The organizations were categorized based on Annual revenue of organization in USD and the data was categorized in three sizes categories.

Table 3.3
Categories of organizations based on Annual revenue in USD.

Category	Annual revenue in USD
Small	Less than 10 million USD
Medium	10 to 100 million USD
Large	More than 100 million USD

Table Source : Created by the Author

Table 3.4:
Distribution based on Annual revenue in USD.

Size based on Organization Revenue	Frequency	%
Large	29	47.54%
Small	21	34.43%
Medium	11	18.03%
Total	**61**	**100%**

Table Source : Created by the Author

Missing Data Treatment: Handling missing data using appropriate techniques such as imputation or exclusion, depending on the extent and nature of the missing values.

Step 2: Descriptive Statistics

Descriptive statistics provide a summary of the basic features of the data. These include measures of central tendency and dispersion:

Frequency Distribution: The number of responses in each size category (Small, Medium, Large) was calculated.

Percentages: The percentage of responses within each category was determined to understand the distribution across the sample.

Measures of Central Tendency: Mean and median were calculated for the sample.

Measures of Dispersion: Standard deviation and range were used to assess the variability in challenges.

Step 3 Data Visualization

Data visualization techniques were employed to present the findings in a clear and understandable manner:

- Bar Charts: Used to illustrate the frequency distribution.
- Pie Charts: Depicted the percentage distribution.
- Histograms: Showed the distribution across the entire sample.

Step 4 Inferential Statistics

Inferential statistics were utilized to generalize about the population based on the sample data:

Hypothesis Testing:

Null Hypothesis (H0): There is no significant difference in challenges among different parameters.

Alternative Hypothesis (H1): There is a significant difference in challenges among different parameters.

Tests Used: ANOVA (Analysis of Variance) was conducted using DATATAB software to compare the differences between challenges among different parameters.

Step 5 Interpretation of Results

The results from the descriptive and inferential analyses were interpreted to draw meaningful conclusions:

Descriptive Analysis: Summarizing and organizing data in a manner that provides a clear overview of its main features. This type of analysis focuses on describing the basic characteristics of data, rather than making inferences or predictions. It is often the first step in any data analysis process and provides a foundation for further statistical analysis.

Inferential Analysis: Making inferences about a population based on a sample of data drawn from that population. The primary goal of inferential analysis is to make predictions, test hypotheses, and estimate population parameters using the data collected from a sample.

Step 6 Conclusion

The data analysis provided valuable insights into the distribution of. The findings highlighted significant differences challenges among different categories, contributing to a better understanding of challenges. These results will inform subsequent discussions and recommendations in the following chapters.

3.10 Research Design Limitations

"An online survey may yield a non-probabilistic sample, a researcher can get diverse participants. Professional groups are available on many websites such as LinkedIn, ResearchGate, WhatsApp groups. A sample population having expertise in one specific field can be obtained from these groups. "(Nayak, Mudavath & K A, Narayan. 2019).

Based on the prelimanary research and literature review six major challenges were identified in adaption of carbon offset platforms for business related air travel :

- Lack of awareness
- Financial constraint as carbon offsets are costly
- Skepticism on effectiveness of carbon offsetting
- Inadequate Standards
- Lack of Incentives
- Regulatory environment

Research infrences are limited to the responses based from responses coming from Asia , North America and Europe refer to Table 3.2 showing demographic information of survey participants.

This have created the confirmation bias in survey participants even they had oppurtunity to provide there insights of any additional challenges they face in adaption of carbon offset platforms.

The participants personal senstive information was not collected and participants interested in results and further information shared their email id purely on volunteerly with consent and the survey information is kept confidential.

3.11 Conclusion

In this section discussed about overall research methodology and its components that included the Operationalization of Theoretical Constructs that would identify the challenges in adoption of carbon offsetting platforms. the research question and hypothesis

on the Population and sample, Instrumentation, Data collection procedures, Data analyis and Limitations.

The next chapter contains the results of the survey and notes from case studies.

CHAPTER IV:

RESULTS

4.1 Key challenges in adopting carbon offsetting platform

To address the research question on key challenges in adoption of carbon offsetting platforms by business organizations for business related air travel. The survey respondents are divided in two target groups based on the application of carbon offsetting platforms in their respective organization.

Group 1: Descriptive Statistics for target group using carbon offset platform.

4.1.1 Lack of transparency

The responses were captured to find whether existing Carbon offsetting platform is transparent in providing information about effectiveness of carbon reduction efforts.

Figure 4.1
Transparency in Carbon offsetting platform

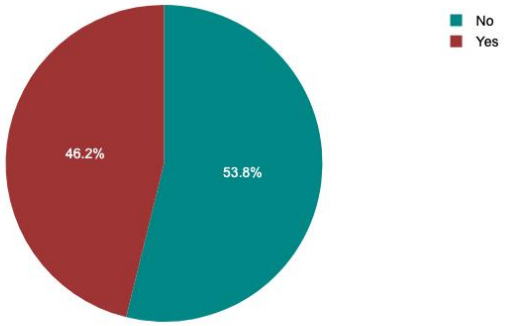


Image Source: Created by the Author

It is observed that approximately 54% of respondents feel that the carbon offsetting platform lacks transparency in providing information about the effectiveness of carbon reduction efforts.

4.1.2 Verification and certification

Commerce of carbon offsetting proposes the existence of verification and certification of every carbon credit as that which is true, calculable, and open to verification. Although such measures have been put in place to mitigate the menace, there are various certification criteria and not all of carbon offset projects may meet the stakeholders working definition of the standard.

Survey sources eliciting, who are users of the existing carbon platform are not satisfied with the verification and certification of carbon credits undertaken by the specific carbon offsetting companies.

Figure 4.2:
Distribution of responses on satisfaction on verification and certification by existing carbon platform.

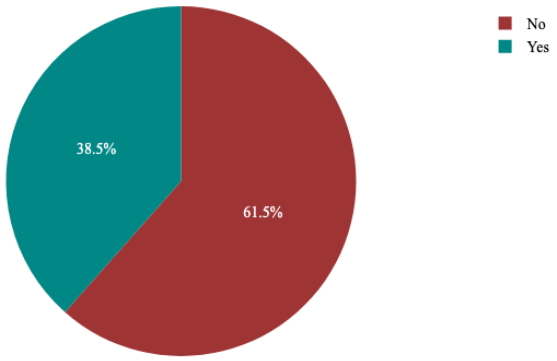


Image Source: Created by the Author

Table 4.1
Distribution of responses on satisfaction on verification and certification by existing carbon platform.

Satisfied by verification and Certification	Frequency	%
No	8	61.54%
Yes	5	38.46%
Total	13	100%

Table Source : Created by the Author

4.1.3 Quality of Carbon offset projects:

Some of them are highly effective while others do very little or nothing to the target of emission reduction. Also, certain activities may yield effects that were not planned, and that are unfavorable (socially, culturally, environmentally). Investigation is required before carbon offset projects are undertaken because those should reflect the values of the organization and bring benefits.

Concerning the response received on the survey question “Are you satisfied by the Quality of carbon offset projects?” most users are not pleased with the quality of Offset projects in their opinion on quality, most users are unable to distinguish the quality of projects which is worth their contribution towards implementation.

Figure 4.3
Percentage of respondents satisfied by quality of carbon offset project.

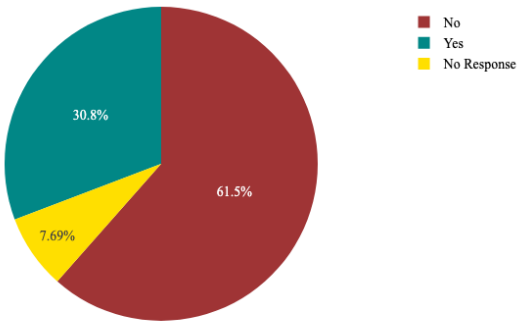


Image Source: Created by the Author

Table 4.2
Satisfaction on Quality of existing Carbon offset application.

Satisfied by Quality of Application	Frequency	%
No	8	61.54%
Yes	4	30.77%
No Response	1	7.69%
Total	13	100%

Table Source : Created by the Author

4.1.4 Cost Vs Budget Allocation

Moving on to the response received on the survey question “Are the carbon offset project costs are as per your long-term budget allocations?”. most of the respondents responded yes they are. Thus, allocation in a budget does not seem to be among the main obstacle for this target group of carbon offset platform users

Table 4.3:
Responses for "Is the carbon offset project costs are as per your long-term budget allocations?"

Cost of Carbon offset project	Frequency
Yes	12
No	1
Total	13

Table Source : Created by the Author

4.1.5 Verification of the reduction

Verification on the claims made about the amount of carbon emissions that are reduced in implementing any project tends to be a major problem. This is because some of the projects meant for offsetting these emissions are based on estimates or assumptions than actual measurements of these emissions. And this is because it would be very difficult to measure the actual effect of any given project in cutting down carbon emissions.

Table 4.4
Responses on verification of reduction in emissions as provided by existing Carbon offset application.

Verification of Reduction of emission	Frequency
Yes	10
No	2
No Response	1
Total	13

Table Source : Created by the Author

The factors such as ability to control and verify the claimed emission reductions by the carbon offset platform are important attributes and as per the survey results it seems that the majority of the respondents were able to check the emission reductions claimed by the

platforms which is an offsetting and is not a major limitation to the target group utilizing the carbon offsetting platforms nuisance.

4.1.6 Integration – Data Capturing

The carbon offset platform can work alongside other applications that gather business travel information and furnish enterprises with precise information and efficient systems leading to improved decision-making; thus fostering efficient carbon mitigation and more sustainable operational practices among the organizations.

Table 4.5
Responses on integration with other applications to capture the business-related travel data with existing Carbon offset application.

Integrated with other application	Frequency
Yes	8
No	4
No Response	1
Total	13

Table Source : Created by the Author

Figure 4.4
Percentage of carbon offset platform integrated with Travel applications

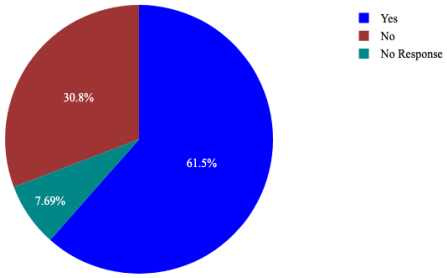


Image Source: Created by the Author

4.1.7 Organizational processes.

The organizational factors that facilitate the incorporation of a carbon offset platform will be beneficial in positive environmental impacts, corporate social responsibility, compliance, cost efficiency, market position, internal stake holders, cooperative activities, and improve level of investor confidence.

Table 4.6
Responses to Is your organizational processes enables adaption of carbon offset platform.

Organizational processes enables adaption	Frequency
Yes	10
No	2
No Response	1
Total	13

Table Source : Created by the Author

Group 2: Descriptive Statistics for target group not using carbon offset platform.

4.1.8 Awareness

Lack of awareness about carbon offsetting is one plausible challenge or barrier and to test this hypothesis, a group of survey respondents who are not using carbon offsetting platform was asked to verify the following hypothesis as to whether Lack of awareness is a limitation to taking up business related air travel on the carbon offsetting platform.

i. Lack of awareness as challenge for business travelers.

The table 4.7 exhibits the insight on if lack of awareness is a hindrance in adapting a carbon offsetting platform for Business related Air travel for the group of respondents solicited to travel for business purposes.

Table 4.7
Distribution of responses for business travelers on lack of awareness

Lack of awareness	**n**	**%**	**n**	**%**
No	7	25.93%	7	25.93%
Yes	16	59.26%	16	59.26%
Not Sure	4	14.81%	4	14.81%
Total	**27**	**100%**	**27**	**100%**

Table Source : Created by the Author

Of 27 user's the most meaning a 58% agreed that lack of awareness is challenge in adaption of Carbon offsetting platform.

On the other hand for the non and potential business air travellers "Lack of awareness" is not a key reason in the reason for non-adaption of Carbon offsetting platform.

Table 4.8
Distribution of responses for business travelers on lack of awareness.

Lack of awareness	Non-Business Travellers		Potential Business Travellers		Total	
	n	**%**	**n**	**%**	**n**	**%**
No	5	27.78%	4	22.22%	9	50%
Yes	5	27.78%	3	16.67%	8	44.44%
Not Sure	1	5.56%	0	0%	1	5.56%
Total	11	61.11%	7	38.89%	18	100%

Table Source : Created by the Author

ii. Lack of Awareness as challenge based on members of sustainability team in organization.

The following distribution relates to adoption of Carbon offsetting platform using awareness where members answering are members of sustainability team for their respective company.

Table 4.9
Distribution of responses regarding awareness for members of sustainability team.

Lack of awareness	Member Sustainability team = Yes	
	n	%
No	4	30.77%
Yes	7	53.85%
Not Sure	2	15.38%
Total	**13**	**100%**

Table Source : Created by the Author

Table 4.10
Distribution of responses regarding awareness for respondents not a member of sustainability team.

Lack of awareness	**Member Sustainability team = No**	
	n	%
No	12	37.5%
Yes	17	53.13%
Not Sure	3	9.38%
Total	32	100%

Table Source : Created by the Author

4.1.9 Cost of Carbon offsetting

Emissions reduction through Carbon offsetting can sometimes be costly, and this is why there are organizations that may refuse to offset their emissions.

i. Cost as challenge for business travelers

As major concern most non-business traveler's responses summarized and even argued that 83% non-business travelers responded positive on cost factor as challenge for adaption of Carbon offset platforms.

Table 4.11
Distribution of responses for business travelers on cost factor

Cost factor	**n**	**%**
No	10	37.04%
Yes	13	48.15%
Not Sure	4	14.81%
Total	27	100%

Table Source : Created by the Author

This was mostly observed with non-business travellers in terms of cost of carbon offsetting where in the last survey, majority 83% non-business travellers responded positive on cost as a challenge against adapting the platform.

Table 4.12
Distribution of responses for non-business travelers on cost factor.

	Non-Business traveller					
Cost as Factor	**No**		**Potential**		**Total**	
	n	%	n	%	n	%
No	0	0%	3	16.67%	3	16.67%
Yes	11	61.11%	4	22.22%	15	83.33%
Total	11	61.11%	7	38.89%	18	100%

Table Source : Created by the Author

ii. Cost as challenge members of sustainability team of organization

Table 4.13
Distribution of responses for Sustainability team members on cost factor.

Cost factor	**Member Sustainability team = yes**	
	n	%
No	4	30.77%
Yes	9	69.23%
Total	13	100%

Table Source : Created by the Author

From the above table 4.13, Cost appears to be the most common perception among the majority of 69% of respondents who are members of sustainability team mechanistic in the use of Carbon offsetting platform.

Table 4.14:
Distribution of responses for non-Sustainability team members on cost factor.

Cost factor	**Member Sustainability team = No**	
	n	%
No	9	28.13%
Yes	19	59.38%
Not Sure	4	12.5%
Total	32	100%

Table Source : Created by the Author

Cost factor is reported as major challenge for the respondents that are not part of sustainability teams as they also responded that the cost factor is key challenge faced in adaptation of Carbon offsetting platform

4.1.10 Skepticism on effectiveness of carbon offsetting

There may be concerns as regards carbon offsetting, and some entities may not believe that an organization can go carbon neutral through this strategy successfully.

From the responses it can be depicted that other organization are sceptical about the reality of the carbon offsetting platform.

Table 4.15
Response to survey question regarding Skepticism on effectiveness of carbon offsetting as challenge for adapting carbon offsetting platform.

Skepticism	Frequency	%
Yes	25	59.52%
No	17	40.48%
Total	42	100%

Table Source : Created by the Author

Figure 4.5
Skepticism on effectiveness of carbon offsetting

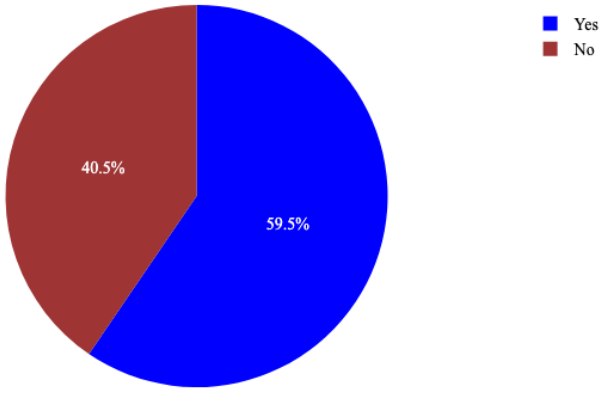


Image Source: Created by the Author

4.1.11 Inadequate Standards

Some organizations default to the standards and/or certification of a carbon-offsetting platform and don't think their offsets have real effect.

Table 4.16: Response to survey question regarding Inadequate Standards as challenge for adapting carbon offsetting platform.

Standards	Frequency	%
Yes	26	63.41%
No	15	36.59%
Total	41	100%

Table Source : Created by the Author

Figure 4.6
Distribution of responses for Inadequate standards as challenge

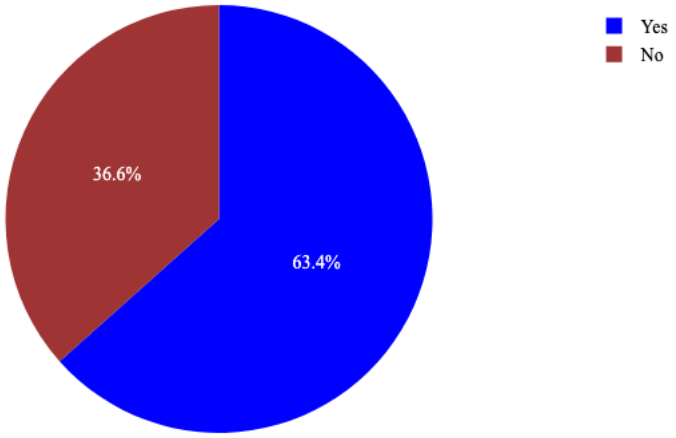


Image Source: Created by the Author

In the same gradient, Lack of Adequate Standards in this platform hampers the industry in its growth of instilling carbon offsetting as a norm in organizations carbon management.

4.1.12 Lack of Incentives

In some cases, too few incentives exist for the industry to embrace the use of a carbon offsetting platform such as policies which compel them to offset their emissions as well as some financial aspects that require them to offset emissions. From the responses it can be

depicted that Lack of Incentives is a key challenge in adaption of carbon offsetting platform.

Table 4.17
Response to survey question regarding Lack of Incentives as challenge for adapting carbon offsetting platform.

Lack of Incentives	**Frequency**	**%**
Yes	29	67.44%
No	14	32.56%
Total	43	100%

Table Source : Created by the Author

Figure 4.7
Distribution of responses for lack of incentives challenge

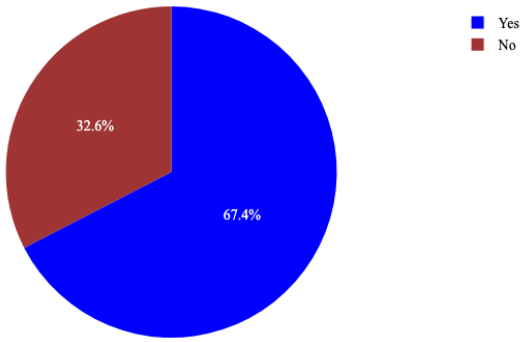


Image Source: Created by the Author

4.1.13 Other reasons:

Survey contained a section to capture any other reasons that are not mentioned in above sections and the following insights were captured.

Table 4.18

Response to survey question regarding other challenges that are not mentioned in survey

Other Reasons
Indian market is just not developed enough.
I charge my flights back to my customer and hence would expect him to compensate if he finds it appropriate.
I am not required. If required by law I will do it.
Carbon offsetting platforms = greenwashing. I don't trust these companies that were born overnight and claim they are offsetting gazillions of tons of carbon emission at a cost of 2 dollars per flight. It's not a viable solution, it's a scam
I don’t know the reasons. This decision is probably taken at board level
Carbon offsets are pointless.

Table Source : Created by the Author

4.2 Variation of challenges across geographical regions

Demographic Analysis: Information related the demographical characteristics was captured during the online survey and survey respondents were asked to indicate their location in geographical area. The Demographic information is beneficial to analyse the data and relate it to the research questions.

4.2.1 Demographic analysis – Location

In order to get the geographical location of respondents to the survey captured the broad area where the respondent belongs as figure 4.8 did not show the exact area of the respondents in compliance to General data protection regulation (GDPR).

Figure 4.8
Map used in Survey to identify location of survey respondents

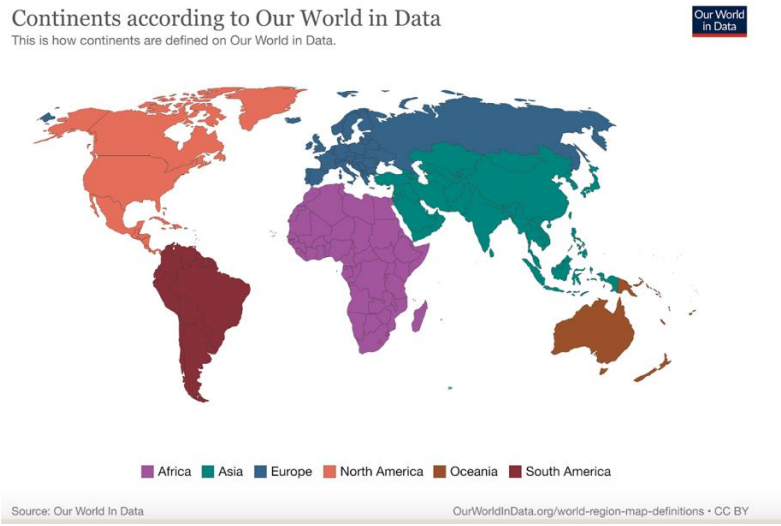


Image Source: Our World in Data: OurWorldinData.org/world-region-map-definitions

Table 4.18
Location wise Number and Percentage of respondents

Location	**Frequency**	**%**
Asia	33	54.1%
Europe	14	22.95%
North America	14	22.95%

Table Source : Created by the Author

The table 4.18 indicates that most of the respondent's population is from Asia, comprising slightly above half of all the respondents (54.1%). Both Europe and North America have equal proportions of the respondent population accounting for 22.95% percent each. Such information with regard to the population under study could be relevant for understanding

the population geographic diversity in the study which could have implications in generalization of the research outcomes.

This assists in understanding the geographical trends, patterns, or differences in responses based on location, the above table provides a preliminary overview of the location of respondents which is vital for such analysis.

4.2.2 Demographic Analysis distribution based on the location on Net zero goal of organization

Table 4.19

Demographic distribution based on the location and Net zero goal of organization.

	Net Zero Goal				
	Yes		**No**		**Total**
Location	**n**	**% Within Location**	**n**	**% Within Location**	**n**
Asia	20	60.61%	13	39.39%	33
Europe	5	35.71%	9	64.29%	14
North America	8	57.14%	6	42.86%	14
Total	**33**		**28**		**61**

Table Source : Created by the Author

The percentage of net organizations with a Net Zero goal also demonstrates a disparity across regions:

Asia, out of 60% of organizations wearing a net zero goal, comprises relatively high percentages of more than half of organizational commitments to sustainability goals in this region.

Europe: Very small organizations have set a Net Zu goal of 35.71% which seems relatively basing in comparison to that of Asia.

North America: Of the 57.14%, organizations have a net zero goal which, straddles between the two countries of Asia and Europe with a wide margin above that of Europe.

Regarding the regional commitment to net zero goals the regions, Asia and America have shown and still have very high receptiveness to helping with the Net Zero goals campaigns with more than 50% majorities of organizations in these regions being oriented towards sustainability.

The percentage of organizations with a goal of going climate net zero shrinks in the region of Europe which can suggest region based differences in willingness or capability to meet these goals.

Out of total 61 organizations, slightly higher (54.10%) have a Net Zero goal while 45.90% of the organizations do not have. This overall distribution suggests that while there is a push towards net-zero goals. inter-organizational policy targeting net zero slowly gaining, there is sizeable portion of organizations still left that has no self-declared commitment.

4.2.3 Demographic Analyisis : distribution based on organizations adapted the Carbon offset platforms.

Figure 4.9
Location wise distribution of organizations adapted the Carbon offset

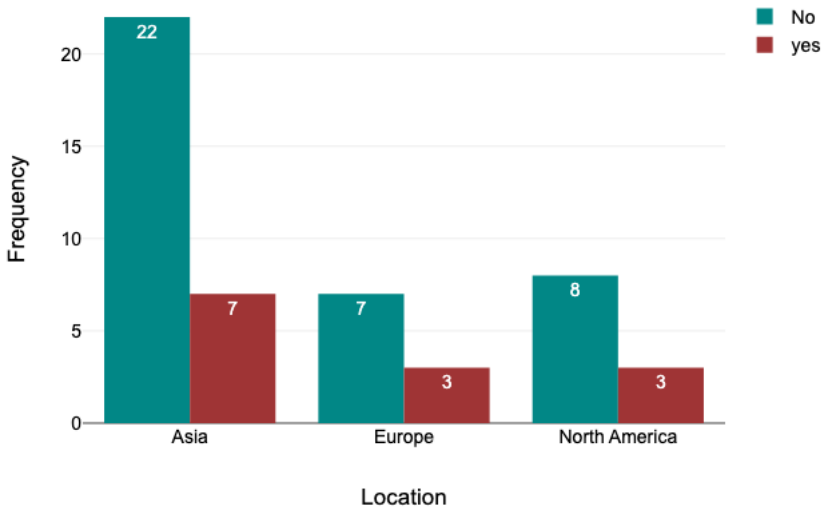


Image Source: Created by the Author

Table 4.20
Location wise distribution of organizations adapted the Carbon offset platforms.

Are you currently using Carbon offset platform in your Organization for Offsetting emissions from Air Travel?			
Location	**No**	**Yes**	**Total**
Asia	22	7	29
Europe	7	3	10
North America	8	3	11

Table Source : Created by the Author

Adoption Rates:

in Asia, only 7 or 24.1% of such respondents has embraced the use of carbon offsetting air travel emissions.

In 30% (3 out of 10 respondents) in the organizational categories have these types of platforms.

Out of the 11 respondents in North America, 3 or 27.3% are engaged in these platforms.

Regional Comparison class key Vectors:

It is observed that carbon offset platforms were most widely used in Europe (with 30% adoption level) and in North America (27.3%) and in Asia (24.1%).

Although Asia has the highest potential number of organizations to be surveyed, it bears the least percentage of adoption.

General Observation:

Most of the organizations in all the territories studied did not face carbon offset applications for air travel carbon emissions. Concerning the total number of the organizations surveyed per region, Asia had the highest number and Europe had the smallest

4.2.4 Demographic Analyis : distribution based on Air miles travelled in a year

Table 4.21
Location wise Air miles travelled in a year by respondents.

Airmiles	Frequency	Median	Minimum	Maximum	Skew
Asia	33	7000	0	90000	1.91
Europe	14	2250	0	20000	1.32
North America	14	6000	40	100000	3.22

Table Source : Created by the Author

Whereas Asia had the highest median and maximum air miles per region, air miles from the Asian respondents appear to be travelled on more internally than those of other regions Europe on the other hand has the lowest median and maximum miles indicating minimal response potential in air travel as compared to the rest populations.

The data demonstrates a large discrepancy across the geographic air miles distribution with different regions possessing different distributional patterns. The observations made in each region on the skewness implies that the air miles accrued do not follow the general normal distribution but rather depend on respondents with traveling habits.

4.2.5 Descriptive Statistics

Information concerning the respondent’s location in the world was gathered in the survey questionnaire. The data, which pertained to a subgroup of people, who are not active on the carbon offsetting platform, was presented as per the demographic and the specific problem of trying to establish whether the specific problem is region specific

Table 4.21
Lack of awareness as challenge across the region for Carbon offset application.

Lack of awareness	Asia		Europe		North America		Total
	n	%	n	%	n	%	n
No	7	26.92%	3	37.5%	6	54.55%	16
Yes	15	57.69%	4	50%	5	45.45%	24
Not Sure	4	15.38%	1	12.5%	0	0%	5
Total	26	100%	8	100%	11	100%	45

Table Source : Created by the Author

The insight related concern about ignorance for their target group who were the non-carbon offsetting platforms users was why there lack of considerable awareness in the Asian region and European region.

Table 4.22
Cost factor as a challenge across the region for Carbon offset application.

Cost factor	Asia		Europe		North America		Total
	n	%	n	%	n	%	n
No	7	26.92%	1	12.5%	5	45.45%	13
Yes	16	61.54%	7	87.5%	5	45.45%	28
Not Sure	3	11.54%	0	0%	1	9.09%	4
Total	26	100%	8	100%	11	100%	45

Table Source : Created by the Author

The respondents from Asia and Europe have clearly indicated the cost as major challenge, Interestingly, it was also found that cost was a key factor that posed challenges to the respondents from Europe due to 87.5% of them agreeing to this cost factor.

Table 4.23
Skepticism as a challenge across the region for Carbon offset application.

Skepticism	Asia		Europe		North America		Total
	n	%	n	%	n	%	n
No	8	30.77%	4	50%	5	45.45%	17
Yes	15	57.69%	3	37.5%	5	45.45%	23
Not Sure	3	11.54%	1	12.5%	1	9.09%	5
Total	26	100%	8	100%	11	100%	45

Table Source : Created by the Author

Inferences regarding the respondents from Asia indicate that the respondents appear to have reservations about the carbon offsetting platform.

Table 4.24
Inadequate Standards as a challenge across the region for Carbon offset application.

Inadequate Standards	**Asia**		**Europe**		**North America**		**Total**
	n	%	n	%	n	%	n
No	8	30.77%	2	25%	3	27.27%	13
Yes	14	53.85%	5	62.5%	7	63.64%	26
Not Sure	4	15.38%	1	12.5%	1	9.09%	6
Total	26	100%	8	100%	11	100%	45

Table Source : Created by the Author

It can be derived from above table that Barriers to the acceptance of the carbon offsetting standards as well as the processes involve organizations in the regions where the offsets are purchased are expected to be high

Table 4.25
Lack of Incentive as a challenge across the region for Carbon offset application.

Lack of Incentive	**Asia**		**Europe**		**North America**		**Total**
	n	%	n	%	n	%	n
No	9	34.62%	2	25%	3	27.27%	14
Yes	15	57.69%	5	62.5%	7	63.64%	27
Not Sure	2	7.69%	1	12.5%	1	9.09%	4
Total	26	100%	8	100%	11	100%	45

Table Source : Created by the Author

In Asia, the percentages of respondents who do not understand the absence of incentive exceeded the percentage of writers: 34.62%, 57.69% responded the presence of a lack of incentive, and 7.69% responded unsure of any situation.

In Europe answers concerning the presence of incentive were 25% disagreeing unnecessary the incentive, 62.5% have reported a shortage troubleshooting the incentive, 12.5% uncertain about reporting an incentive.

In North America, 27.27% of respondents reported no lack of incentive, 63.64% reported experiencing a lack of incentive, and 9.09% were not sure.

It appears that with regard to the use of carbon offsetting platforms, there is likely to be insufficient amount of incentives for organizations across regions.

Table 4.26
Regulatory environment as a challenge across the region for Carbon offset application.

Regulatory environment	**Asia**		**Europe**		**North America**		**Total**
	n	%	n	%	n	%	n
No	9	34.62%	3	37.5%	7	63.64%	19
Yes	12	46.15%	4	50%	3	27.27%	19
Not Sure	5	19.23%	1	12.5%	1	9.09%	7
Total	26	100%	8	100%	11	100%	45

Table Source : Created by the Author

The regulatory atmosphere is not seen as limiting consideration the case of North America. While replying to this question respondents from Europe and Asia have slightly pointed to it being a challenge.

4.3 Variation of challenges across industries

To test whether further components vary across the three industries a balanced design including the three Industries was used. The industries which has adequate representation with frequency >2 has been targeted for further exploration as well.

Table 4.27
Distribution of carbon offset platform user based on industry/Sector of survey respondents.

	Carbon offset platform user							
	No		yes		No Response		Total	
Sector	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Information technology & Software	9	14.75%	4	6.56%	3	4.92%	16	26.23%
Manufacturing	2	3.28%	0	0%	0	0%	2	3.28%
Construction and Engineering	2	3.28%	2	3.28%	1	1.64%	5	8.2%
Finance and Banking	1	1.64%	2	3.28%	1	1.64%	4	6.56%
Automobile	2	3.28%	1	1.64%	0	0%	3	4.92%
Media	1	1.64%	0	0%	0	0%	1	1.64%
Indian Armed Forces	1	1.64%	0	0%	0	0%	1	1.64%
Agriculture and Allied	2	3.28%	1	1.64%	0	0%	3	4.92%
Healthcare and pharmaceutical	3	4.92%	0	0%	1	1.64%	4	6.56%
Education and training	5	8.2%	2	3.28%	2	3.28%	9	14.75%
Retail	0	0%	0	0%	1	1.64%	1	1.64%
Marketing and Advertisement	1	1.64%	0	0%	0	0%	1	1.64%
Aerospace	0	0%	1	1.64%	0	0%	1	1.64%
Hardware silicon chip	1	1.64%	0	0%	0	0%	1	1.64%
Chemical	1	1.64%	0	0%	1	1.64%	2	3.28%

	Carbon offset platform user							
	No		yes		No Response		Total	
Sector	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Heavy Industry	1	1.64%	0	0%	0	0%	1	1.64%
Utilities	0	0%	0	0%	1	1.64%	1	1.64%
Logistics	1	1.64%	0	0%	0	0%	1	1.64%
Telecom	1	1.64%	0	0%	0	0%	1	1.64%
oil and gas	1	1.64%	0	0%	0	0%	1	1.64%
Hospitality	1	1.64%	0	0%	0	0%	1	1.64%
government	1	1.64%	0	0%	0	0%	1	1.64%
Total	**37**	**60.66%**	**13**	**21.31 %**	**11**	**18.03 %**	**61**	**100%**

Table Source : Created by the Author

To have better statistical calculations and inferences the industries were selected with frequency more than two for further analysis.

Table 4.28: Number of Industries in survey with frequency > 2

Which industry are you from?	**Frequency**
Information technology & Software	10
Education and training	6
Healthcare and pharmaceutical	4
Total	20

Table Source : Created by the Author

Hypothesis testing for Variance for challenges

4.3.1 Challenge: Lack of Awareness

Hypothesis testing was done using ANOVA on DATATAB software on the three Industries and respective challenge related to lack of awareness as per survey responses. The industries having significant representation with frequency >2 was considered for further analysis.

Null hypothesis H0: There is no difference between the 3 categories of the industries with respect to the challenge related to Lack of awareness about Carbon offset platforms.

Alternative hypothesis H1: There is a difference between the 3 categories of the industries with respect to the challenge related to Lack of awareness about Carbon offset platforms.

Figure 4.10
Lack of awareness as challenge across industries

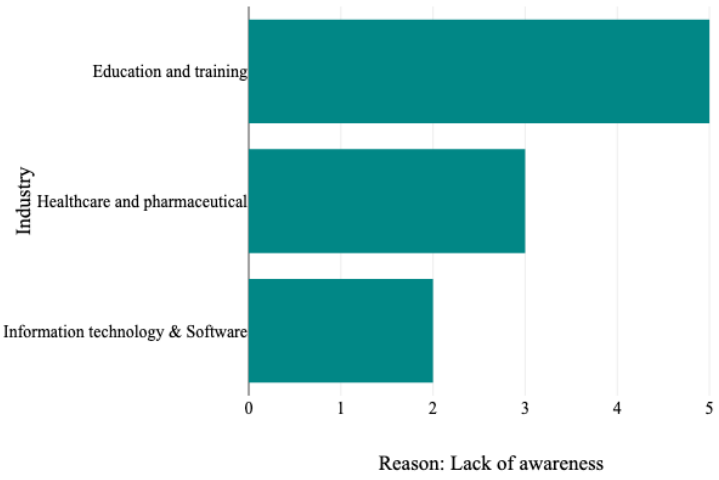


Image Source: Created by the Author

Table 4.29
Distribution of challenge related Lack of awareness across industries

Lack of awareness as challenge	Frequency
Information technology & Software	2
Education and training	5
Healthcare and pharmaceutical	3
Total	10

Table Source : Created by the Author

Analysis of variance

A one-factor analysis of variance has shown that there is a significant difference between the industry and challenge related to Lack of awareness.

$F = 4.85$

$p = .022$

Thus, with the available data, the null hypothesis is rejected.

Effect size

η^2	η_p^2	Cohen's f^2
0.36	0.36	0.57

f	Classification according to Cohen (1988)
0.2	weak effect
0.15	moderate effect
0.35	strong effect

Post hoc Test

The ANOVA showed that there was a significant difference. A Bonferroni Post hoc test was used to compare the groups in pairs to find out which was significantly different.

The Bonferroni Post hoc test showed that the pairwise group comparison of Information technology & Software Vs Education and training has an p-value of less than 0.05, and thus, based on the available data, it can be assumed that the two groups are significantly different.

Result: Based on available data Null Hypothesis is rejected and Alternative hypothesis H1 hold true so it is proved that there is a significant difference between the 3 categories of the industries with respect to the challenge related to Lack of awareness about Carbon offset platforms

4.3.2 Challenge: Cost factor-financial constraints across industries

Information was captured in form of survey question whether the cost factor or factor is percieved as challenge the following table shows the mean and standard deviation for the three industries.

Table 4.30
Distribution of challenge related to cost factor – financial constraint across industries

	Frequency	Mean	Std. Deviation	Minimum	Maximum
Information technology & Software	10	0.8	0.42	0	1
Education and training	6	0.83	0.41	0	1
Healthcare and pharmaceutical	4	0.75	0.5	0	1

Table Source : Created by the Author

Null hypothesis H0: There is no difference between the 3 categories of the industries with respect to the challenge related to Cost factor or financial constraint related to Carbon offset platforms.

Alternative hypothesis H1: There is a difference between the 3 categories of the industries with respect to the challenge related to Cost factor or financial constraint related to Carbon offset platforms.

Analysis of variance

A one-factor analysis of variance has shown that there is no significant difference between the categorical variable Indusrty and the Cost factor-financial constraints

$F = 0.04$

$p = .957$

Thus, with the available data, the null hypothesis is not rejected.

Effect size

η2	ηp2	Cohen's f2
0.01	0.01	0.01

f	Classification according to Cohen (1988)
0.2	weak effect
0.15	moderate effect
0.35	strong effect

Post hoc Test

The ANOVA showed that there was no significant difference, so it is not reasonably possible to compute a post hoc test.

Result: Based on available data Null Hypothesis is not rejected so it is proved that there is no significant difference between the 3 categories of the industries for challenge related to the cost factor and financial constraint.

4.3.3 Challenge: Skepticism on effectiveness of carbon offsetting across industries

Information was captured in form of survey question whether the Skepticism on effectiveness of carbon offsetting platform across industries the following table shows the mean and standard deviation for the three industries .

Table 4.31
Distribution of challenge related to Skepticism on effectiveness of carbon offsetting across industries

Industry	Frequency	Mean	Std. Deviation	Minimum	Maximum
Information technology & Software	10	0.7	0.48	0	1
Education and training	6	0.67	0.52	0	1
Healthcare and pharmaceutical	4	0.25	0.5	0	1

Table Source : Created by the Author

Null hypothesis H0: There is no difference between the 3 categories of the industries with respect to the challenge related to skepticism on effectiveness of carbon offsetting

Alternative hypothesis H1: There is a difference between the 3 categories of the industries with respect to the challenge related to Skepticism on effectiveness of carbon offsetting

Analysis of variance

A one-factor analysis of variance has shown that there is no significant difference between the industry and challenge Skepticism on effectiveness of carbon offsetting

$F = 1.25$,

$p = .311$

Thus, with the available data, the null hypothesis is not rejected.

Effect size

η^2	η_p^2	Cohen's f^2
0.13	0.13	0.15

F	Classification according to Cohen (1988)
0.2	weak effect
0.15	moderate effect
0.35	strong effect

Post hoc Test

The ANOVA showed that there was no significant difference, so it is not reasonably possible to compute a post hoc test.

Result: Based on available data Null Hypothesis is not rejected so it is proved that there is no significant difference between the 3 categories of the industries for challenge related difference between the industry and challenge related to Skepticism on effectiveness of carbon offsetting

4.3.4 Challenge: Inadequate Standards followed in carbon offsetting across industries.

Information was captured in form of survey question whether the cost factor or factor is percieved as challenge the following table shows the mean and standard deviation for the three industries .

Table 4.32
Distribution of challenge related to Inadequate Standards followed in carbon offsetting across industries

	Frequency	Mean	Std. Deviation	Minimum	Maximum
Information technology & Software	10	0.5	0.53	0	1
Education and training	6	1	0	1	1
Healthcare and pharmaceutical	4	0.75	0.5	0	1

Table Source : Created by the Author

Null hypothesis H0: There is no difference between the 3 categories of the industries with respect to the challenge related to Inadequate Standards followed in carbon offsetting

Alternative hypothesis H1: There is a difference between the 3 categories of the industries with respect to the challenge related to Inadequate Standards followed in carbon offsetting

Analysis of variance

A one-factor analysis of variance has shown that there is no significant difference between the industry and challenge Inadequate Standards followed in carbon offsetting

$F = 2.48$,

$p = .113$

Thus, with the available data, the null hypothesis is not rejected.

Effect size

η^2	η_p^2	Cohen's f^2
0.23	0.23	0.29

F	Classification according to Cohen (1988)
0.2	weak effect
0.15	moderate effect
0.35	strong effect

Post hoc Test

The ANOVA showed that there was no significant difference, so it is not reasonably possible to compute a post hoc test.

Result: Based on available data Null Hypothesis is not rejected so it is proved that there is no significant difference between the 3 categories of the industries for challenge related difference between the industry and challenge related Inadequate Standards followed in carbon offsetting

4.3.5 Challenge: Lack of Incentives for carbon offsetting across industries.

Information was captured in form of survey question whether the cost factor or factor is percieved as challenge the following table shows the mean and standard deviation for the three industries .

Table 4.33
Distribution of challenge related to Lack of Incentives for carbon offsetting across industries

	Frequency	Mean	Std. Deviation	Minimum	Maximum
Information technology & Software	10	0.6	0.52	0	1
Education and training	6	0.83	0.41	0	1
Healthcare and pharmaceutical	4	0.75	0.5	0	1

Table Source : Created by the Author

Null hypothesis H0: There is no difference between the 3 categories of the industries with respect to the challenge related to Lack of Incentives for carbon offsetting

Alternative hypothesis H1: There is a difference between the 3 categories of the industries with respect to the challenge related Lack of Incentives for carbon offsetting

Analysis of variance

A one-factor analysis of variance has shown that there is no significant difference between the industry and challenge Lack of Incentives for carbon offsetting

F = 0.46

p = .638

Thus, with the available data, the null hypothesis is not rejected.

Effect size

η2	ηp2	Cohen's f2
0.05	0.05	0.05

F	Classification according to Cohen (1988)
0.2	weak effect
0.15	moderate effect
0.35	strong effect

Post hoc Test

The ANOVA showed that there was no significant difference, so it is not reasonably possible to compute a post hoc test.

Result: Based on available data Null Hypothesis is not rejected so it is proved that there is no significant difference between the 3 categories of the industries for challenge related difference between the industry and challenge related Lack of Incentives for carbon offsetting

4.3.6 Challenge: Lack of Incentives for carbon offsetting across industries.

Information was captured in form of survey question whether the cost factor or factor is percieved as challenge the following table shows the mean and standard deviation for the three industries .

Table 4.34
Distribution of challenge related to Lack of Incentives for carbon offsetting across industries

	Frequency	Mean	Std. Deviation	Minimum	Maximum
Information technology & Software	10	0.6	0.52	0	1
Education and training	6	0.83	0.41	0	1
Healthcare and pharmaceutical	4	0.75	0.5	0	1

Table Source : Created by the Author

Null hypothesis H0: There is no difference between the 3 categories of the industries with respect to the challenge related to Lack of Incentives for carbon offsetting

Alternative hypothesis H1: There is a difference between the 3 categories of the industries with respect to the challenge related Lack of Incentives for carbon offsetting

Analysis of variance

A one-factor analysis of variance has shown that there is no significant difference between the industry and challenge Lack of Incentives for carbon offsetting

$F = 0.46$

$p = .638$

Thus, with the available data, the null hypothesis is not rejected.

Effect size

η2	ηp2	Cohen's f2
0.05	0.05	0.05

F	Classification according to Cohen (1988)
0.2	weak effect
0.15	moderate effect
0.35	strong effect

Post hoc Test

The ANOVA showed that there was no significant difference, so it is not reasonably possible to compute a post hoc test.

Result: Based on available data Null Hypothesis is not rejected so it is proved that there is no significant difference between the 3 categories of the industries for challenge related difference between the industry and challenge related Lack of Incentives for carbon offsetting

4.3.7 Challenge: Regulatory environment for carbon offsetting across industries.

Information was captured in form of survey question whether the Regulatory environment for carbon offsetting factor is perceived as challenge the following table shows the mean and standard deviation for the three industries.

Table 4.35
Distribution of challenge related to Regulatory environment for carbon offsetting across industries

	Frequency	Mean	Std. Deviation	Minimum	Maximum
Information technology & Software	10	0.4	0.52	0	1
Education and training	6	0.5	0.55	0	1
Healthcare and pharmaceutical	4	0.5	0.58	0	1

Table Source : Created by the Author

Null hypothesis H0: There is no difference between the 3 categories of the industries with respect to the challenge related to regulatory environment for carbon offsetting

Alternative hypothesis H1: There is a difference between the 3 categories of the industries with respect to the challenge related to Regulatory environment for carbon offsetting.

Analysis of variance

A one-factor analysis of variance has shown that there is no significant difference between the industry and challenge Regulatory environment for carbon offsetting

F = 0.09

p = .917

Thus, with the available data, the null hypothesis is not rejected.

Effect size

η2	ηp2	Cohen's f2
0.01	0.01	0.01

F	Classification according to Cohen (1988)
0.2	weak effect
0.15	moderate effect
0.35	strong effect

Post hoc Test

The ANOVA showed that there was no significant difference, so it is not reasonably possible to compute a post hoc test.

Result: Based on available data Null Hypothesis is not rejected so it is proved that there is no significant difference between the 3 categories of the industries for challenge related difference between the industry and challenge related to Regulatory environment for carbon offsetting

4.4 Challenge based on size and type of business organization

Figure 4.11
Number of responses based on size of Organization (Employee)

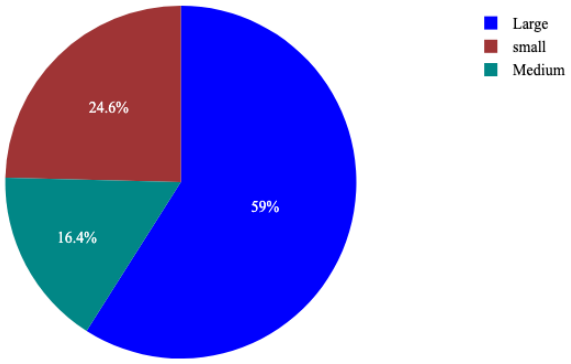


Image Source: Created by the Author

The study seeks to assess whether the aforementioned difficulties are associated with the attributes of the size and the type of organization for the two respondent groups which are active in utilizing carbon offsetting platforms as well as those who do not use carbon offsetting platforms.

Organizations in terms of total employees were classified and the Category of Cut Off Data was done into three sizes categories.

Table 4.36
Categories of Organization based on number of employees.

Size Category	**Number of employees**
Small	less than 100 employees
Medium	101 to 1000 employees
Large	More than 1000 employees

Table Source : Created by the Author

Table 4.37
Distribution of Organization based on number of employees.

Number of Employees	Frequency	%
Large	36	59.02%
small	15	24.59%
Medium	10	16.39%

Table Source : Created by the Author

Table 4.38
Carbon platform adaption based on number of employees working in organization.

	Carbon Platform User							
Organization size based on number of employees	**No**		**yes**		**No Response**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Small	11	18.03%	1	1.64%	3	4.92%	15	24.59%
Medium	7	11.48%	3	4.92%	0	0%	10	16.39%
Large	19	31.15%	9	14.75%	8	13.11%	36	59.02%
Total	**37**	**60.66%**	**13**	**21.31%**	**11**	**18.03%**	**61**	**100%**

Table Source : Created by the Author

The categorization of organizations was from revenue of organization in USD and again the Category of Cut off data was of three sizes categories.

Table 4.39
Categories of organizations based on Annual revenue in USD.

Category	Annual revenue in USD
Small	Less than 10 million USD
Medium	10 to 100 million USD
Large	More than 100 million USD

Table Source : Created by the Author

Table 4.40
Distribution based on Annual revenue in USD.

Size based on Organization Revenue	Frequency	%
Large	29	47.54%
Small	21	34.43%
Medium	11	18.03%
Total	**61**	**100%**

Table Source : Created by the Author

4.4.1 Relation to size of organization for Target group of users using carbon trading platform.

Descriptive Statistics on Lack of transparency to size of organization.

Table 4.41
Distribution Lack of transparency as challenges based on size of organization for Target group of users using carbon trading platform

Size of Organization (Number of Employees)	**Lack of Transparency**				
	No		Yes		Total
	n	%	n	%	n
Small	1	100%	0	0%	1
Medium	1	33.33%	2	66.67%	3
Large	5	55.56%	4	44.44%	9
Total	7		6		13

Table Source : Created by the Author

The results show subtler weak where different size organizations seem to overcome the challenge of a specific issue with regards to transparency. Their feedback shows that none of the respondent from small organizations did not challenge themselves with lack of transparency, and providing mid-level organizations feedback where 66.7 % of them

quoted this as a challenge. There seems to be a single view in large organizations about lack of transparency as some 55.56 % deny it is a problem while 44.44% say it is a problem. The results suggest that lack of transparency as challenges for target users of carbon trading platforms vary across different organizational sizes. In this research small organizations, although fewer in number, seems to prioritize transparency in their operations to build trust and credibility, thus perceiving lack of transparency as a non-issue. Respondents from Medium-sized organizations, due to intermediate resources and stakeholder engagement, may face challenges in transparency across their operations and supply chains. Respondents from Large organizations, while better equipped to implement transparency measures, may encounter difficulties in maintaining consistency and accountability amidst complex organizational structures and processes.

Table 4.42
Distribution Lack of transparency as challenges based on revenue of organization for Target group of users using carbon trading platform

Size of Organization (Rev)	**Lack of Transparency**				
	No		Yes		Total
	n	%	n	%	n
Small	2	50%	2	50%	4
Medium	1	50%	1	50%	2
Large	4	57.14%	3	42.86%	7
Total	7		6		13

Table Source : Created by the Author

The results point to the evidence of a perception of lack of transparency being a challenge among the target users of carbon trading platforms of different sizes from the standpoint of

annual revenue. Organizations at the small scale report an equal incidence of perceiving lack of transparency as a challenge equally with 50 percent of the respondents admitting that it exists 50 percent of the respondents admitting that it exists. Medium sized organizations equally record an incidence of lack of transparency in that 50 percent of the respondents addressing this as a challenge. Large organizations have further shown a little higher incidence of the challenge of the lack of transparency with regard to what the respondents viewed it, 42.86% acknowledged this as problem.

4.4.2 Descriptive Statistics on Verification and certification to size of organization

Table 4.43
Distribution for verification and certification as challenges based on number of employees in organization for Target group of users using carbon trading platform

Size of Organization (Number of Employees)	**Verification & certification challenge**				
	No		Yes		Total
	n	%	n	%	n
Small	1	100%	0	0%	1
Medium	2	66.67%	1	33.33%	3
Large	5	55.56%	4	44.44%	9
Total	8		5		13

Table Source : Created by the Author

Also, a prominent proportion (about 38.46%) of such organizations experienced difficulties related to the verification and certification processes of carbon offsetting platforms, quantifying drawbacks pertaining to the outlined issue. This highlights an important aspect of the market which it is worth to spend additional resources on. The trend shows that with

the increase in the size of the organization, there are more difficulties with the reporting processes of verification and certification, and further these increase with the complexity of the organizations.

Table 4.44
Distribution for verification and certification as challenges based on revenue of organization for Target group of users using carbon trading platform

Size of Organization (Rev)	**Verification and certification as challenge**				
	No		Yes		Total
	n	%	n	%	n
Small	4	100%	0	0%	4
Medium	0	0%	2	100%	2
Large	4	57.14%	3	42.86%	7
Total	8		5		13

Table Source : Created by the Author

i. Resource Allocation: The survey suggests that medium enterprises are more likely to engage in verification and certification practices. This might be attributed to their adequate resources and high credibility needs of stakeholders. On the other hand, small organizations might be inadequately resourced thereby limiting their ability to undertake verification and certification.

ii. Stakeholder Pressure and Regulatory Compliance: Large organizations though being better resourced than smaller ones do not always have similar practices. They might be influenced by varying levels of stakeholder pressure and regulatory expectations. Some

mega companies are equipped with sound sustainable development programs while some are yet to mainstream sustainable practices into their operations.

iii. Barriers to Adoption: Higher cost, complexity and lack of ability to appreciate any immediate return expectations might be some of the critical reasons that make it difficult for small, and some large organizations to use verification and certification. These barriers must be removed through policies, incentives and support systems to enhance the adoption on all organization sizess

4.4.3 Descriptive Statistics on Quality of carbon offset projects to Size of Organization

Table 4.45

Distribution for Quality of carbon offset projects as challenge based on size of organization (Emp) for Target group of users using carbon trading platform

Size of Organization (Emp)	**Satisfied with Quality of carbon offset projects**						
	No		Yes		No Resp.		Total
	n	%	n	%	n	%	n
small	1	100%	0	0%	0	0%	1
Medium	2	66.67%	0	0%	1	33.33%	3
Large	5	55.56%	4	44.44%	0	0%	9
Total	8		4		1		13

Table Source : Created by the Author

Table 4.46
Distribution for Quality of carbon offset projects as challenge-based size of organization (Rev) for Target group of users using carbon trading platform

Size of Organization (Rev)	**Satisfied with Quality of carbon offset projects**						
	No		Yes		No Resp.		Total
	n	%	n	%	n	%	n
Small	4	100%	0	0%	0	0%	4
Medium	0	0%	1	50%	1	50%	2
Large	4	57.14%	3	42.86%	0	0%	7
Total	8		4		1		13

Table Source : Created by the Author

It's quite apparent that respondents especially from smaller sized organizations place a limitation on the scope of projects as the quality of carbon pressures is considered as a challenge.

The survey uncovers a major deficiency in the standard of carbon offset projects for the users of a carbon trading platform. By tackling these addressing these challenges through greater transparency, promoting a wider variety of projects, better user support, and collecting constant feedback on projects, it is very likely that satisfaction levels will increase and the efficient functioning of carbon offset projects will be achieved in relation to the reduction of carbon levels in the atmosphere.

4.4.4 Descriptive Statistics on Carbon offset Costs versus size of organization

Table 4.47

Descriptive Statistics on Costs are as per your long-term budget allocations based on size (No. of Employees)

Size of Organization (Emp)	**Costs are as per your long-term budget allocations**				
	yes		No Response		Total
	n	%	n	%	n
small	1	100%	0	0%	1
Medium	2	66.67%	1	33.33%	3
Large	9	100%	0	0%	9
Total	12		1		13

Table Source : Created by the Author

Table 4.48

Descriptive Statistics on Costs are as per your long-term budget allocations based on size (Annual Revenue)

Size of Organization (Rev)	**Costs are as per your long-term budget allocations**				
	yes		No Response		Total
	n	%	n	%	n
Small	4	100%	0	0%	4
Medium	1	50%	1	50%	2
Large	7	100%	0	0%	7
Total	12		1		13

Table Source : Created by the Author

It is clear in this regard that whether there is a large or a small organization, Costs are in line with the long-term budget estimates, this aspect is thus not perceived as a hurdle/challenge.

4.4.5 Descriptive Statistics on Carbon offset Verification to size of organization

Table 4.49
Size of Organization (No. of Employees) and satisfaction with Verification of emissions reductions

Size of Organization (Emp)	**Satisfied with Verification of emissions reductions**						
	yes		No		No Response		Total
	n	%	n	%	n	%	n
Small	0	0%	1	100%	0	0%	1
Medium	2	66.67%	0	0%	1	33.33%	3
Large	8	88.89%	1	11.11%	0	0%	9
Total	10		2		1		13

Table Source : Created by the Author

Table 4.50
Size of Organization (Annual Revenue) and satisfaction with Verification of emissions reductions

Size of Organization (Rev)	**Satisfied with Verification of emissions reductions**						
	yes		No		No Response		Total
	n	%	n	%	n	%	n
Small	3	75%	1	25%	0	0%	4
Medium	1	50%	0	0%	1	50%	2
Large	6	85.71%	1	14.29%	0	0%	7

Size of Organization (Rev)	Satisfied with Verification of emissions reductions						
	yes		No		No Response		Total
	n	%	n	%	n	%	n
Total	10		2		1		13

Table Source : Created by the Author

It is clear in this regard that whether there is a large or small organization, as per respondents are satisfied with verification of emissions reductions. It does not qualify as one such key challenge.

4.4.6 Descriptive Statistics on Organizational processes enable adaption of carbon offset platform.

Table 4.51
Size of Organization (Number of Employees) and Organizational processes enable adaption

Size of Organization (Emp)	Organizational processes enable adaption						
	Yes		No		No Response		Total
	n	%	n	%	n	%	n
Small	0	0%	1	100%	0	0%	1
Medium	1	33.33%	1	33.33%	1	33.33%	3
Large	9	100%	0	0%	0	0%	9
Total	10		2		1		13

Table Source : Created by the Author

Table 4.5
Size of Organization (Annual Revenue) and Organizational processes enable adaption

Size of Organization (Rev)	**Organizational processes enable adaption**						
	Yes		No		No Response		Total
	n	%	n	%	n	%	n
Small	2	50%	2	50%	0	0%	4
Medium	1	50%	0	0%	1	50%	2
Large	7	100%	0	0%	0	0%	7
Total	10		2		1		13

Table Source : Created by the Author

It is evident that irrespective to the size of organization the Organizational processes enable adaption, therefore it is not considered as a key challenge.

4.4.7 Results of Analysis on challenges based on size of organization for Target group of users not using carbon trading platform

4.4.7.1 Relation of Lack of Awareness as challenge to size of Organization

Table 4.53
Size of Organization (Number of Employees) and Lack of Awareness

Size of Organization (Emp)	**Lack of Awareness**				
	No		Yes		Total
	n	%	n	%	n
Small	6	46.15%	7	53.85%	13
Medium	2	40%	3	60%	5
Large	10	40%	15	60%	25
Total	18		25		43

Table Source : Created by the Author

The findings indicate that perceptions of lack of awareness as a limiting factor are inconsistent across the organization's sizes. This is contrary to what the findings suggest for small organizations who have quite moderate understanding in this area, with 46.15% of respondents indicating that they lack awareness as a challenge. In the case of this study, medium sized organizations show a higher frequency of the problem without awareness with 40% of the respondents indicating of lack of awareness as a challenge. In line with this, large organizations show a similar pattern, with monotonic dominance toward lack of awareness as a challenge perceived by 40% of respondents..

Table 4.54

Size of Organization (Revenue) and Lack of Awareness

Size of Organization (Revenue)	**Lack of Awareness**				
	No		Yes		Total
	n	%	n	%	n
Small	6	42.86%	8	57.14%	14
Medium	4	50%	4	50%	8
Large	8	38.10%	13	61.90%	21
Total	18		25		43

Table Source : Created by the Author

Results indicated differences in levels of the problem of lack of awareness amongst organizations of various revenue sizes. It has been observed that smaller organizations have a relatively greater percentage of low level of awareness mainly with 57.14% and above of respondents admitting this vice. In respect of medium-sized organizations, 50% reported lack of awareness while 50% said that their employees were not lacking attention. Large

organizations on the other hand also reported an even higher percentage regarding prevalence of lack of awareness signified by 61.90% of respondents.

The results point to the fact that awareness, or lack of it, is a problem that bedevils organizations of all revenue variations, though the levels of awareness do differ. The smaller organizations, despite being nimble and flexible as to the integrated structure of the company, have deficits in relative occupancy levels and timing that earmark them in queue about new practices in the marketplace and within internal structure. The medium organizations should be in a better position, however there will still be challenges with creating enough awareness among employees and other stakeholders. The large organizations, however, with more resources will also find it difficult to create awareness and promote communication within departments and levels of hierarchy..

4.4.7.2 Relation of Cost factor as challenge to Size of organization

Table 4.55

Size of Organization (Number of Employees) and Cost factor

Size of Organization (Emp)	**Cost Factor**				
	Yes		No		Total
	n	%	n	%	n
Small	11	78.57%	3	21.43%	14
Medium	4	66.67%	2	33.33%	6
Large	15	62.50%	9	37.50%	24
Total	30		14		44

Table Source : Created by the Author

Table 4.56
Size of Organization (Revenue) and Cost factor

Size of Organization (Rev)	**Cost Factor**				
	Yes		No		Total
	n	%	n	%	n
Small	15	88.24%	2	11.76%	17
Medium	4	50%	4	50%	8
Large	11	57.89%	8	42.11%	19
Total	30		14		44

Table Source : Created by the Author

Cost Factor is a challenge for adaption of carbon offsetting platforms as per respondents irrespective of Size of organization.

4.4.7.3 Relation to Skepticism as challenge with Size of organization

Table 4.57
Size of Organization (Number of Employees) and Skepticism

Size of Organization (Emp)	**Skepticism**				
	Yes		No		Total
	n	%	n	%	n
Small	8	66.67%	4	33.33%	12
Medium	4	80%	1	20%	5
Large	13	52%	12	48%	25
Total	25		17		42

Table Source : Created by the Author

Table 4.58
Size of Organization (Revenue) and Skepticism

Size of Organization (Rev)	**Skepticism**				
	Yes		No		Total
	n	%	n	%	n
Small	10	71.43%	4	28.57%	17
Medium	6	75%	2	25%	8
Large	9	45%	11	55%	19
Total	25		17		42

Table Source : Created by the Author

From the above responses, the Small and Medium sized organizations seem to be somehow scanty to the carbon offsetting platforms.

4.4.7.4 Relation of Inadequate Standards as challenge to size of organization

Table 4.59
Size of Organization (Number of Employees) and Inadequate Standards as challenge

Size of Organization (Emp)	**Inadequate Standards as challenge**				
	Yes		No		Total
	n	%	n	%	n
Small	9	75%	3	25%	12
Medium	1	25%	3	75%	4
Large	16	64%	9	36%	25
Total	26		15		41

Table Source : Created by the Author

This is apparent in organizations of all sizes and is stated to brand inadequate standards as a challenge. Small organizations' respondents perceived the inadequacy of standards as a challenge most at 75% of respondents acknowledging its presence, while lower respondents from medium-sized organizations perceived inadequate standards as a challenge most at 25% only. In contrast, 64% of respondents from large organizational types perceived inadequacy of standards as a challenge occurring at moderate levels.

Table 4.60
Size of Organization (Revenue) and Inadequate Standards as challenge

Size of Organization (Rev)	**Inadequate Standards**				
	Yes		No		Total
	n	%	n	%	n
Small	10	76.92%	3	23.08%	13
Medium	3	37.5%	5	62.50%	8
Large	13	65%	7	35%	20
Total	26		15		41

Table Source : Created by the Author

Based on the above responses the Small and Large sized organizations consider Inadequate Standards as challenge for adapting carbon offsetting platforms.

The results suggest that inadequate standards pose a notable challenge in the adaptation of carbon offsetting platforms, particularly for small organizations. Small organizations may face resource constraints and limited capacity to navigate complex regulatory frameworks and industry standards, thus perceiving inadequate standards as a significant barrier. Medium-sized organizations, although less affected, still recognize the importance of

robust standards in facilitating platform adaptation. Large organizations, while better equipped to address regulatory challenges, may encounter difficulties in ensuring consistency and compliance across diverse operations and supply chains.

4.4.7.5 Relation to Lack of Incentives as challenge to size of organization.

Table 4.61

Size of organization based on number of employees and Lack of incentives

Size of Organization (Emp)	**Lack of Incentive**				
	Yes		No		Total
	n	%	n	%	n
Small	8	66.67%	4	33.33%	12
Medium	4	66.67%	2	33.33%	6
Large	17	68%	8	32%	25
Total	29		14		43

Table Source : Created by the Author

Table 4.62

Size of organization based on Annual Revenue and Lack of incentives

Size of Organization (Rev)	**Lack of Incentive**				
	Yes		No		Total
	n	%	n	%	n
Small	9	64.29%	5	35.71%	13
Medium	7	77.78%	2	22.22%	8
Large	13	65%	7	35%	20
Total	29		14		43

Table Source : Created by the Author

Based on the above responses irrespective of size of organizations they consider Lack of Incentive as challenge for adapting carbon offsetting platforms.

4.4.8 Result of Analysis on challenges based on type of organization for Target group of users using carbon trading platform.

4.4.8.1 Relation of Transparency provided by carbon offset platforms to type of Organization

The survey participant using carbon offset platforms when asked whether "The existing Carbon offsetting platform is transparent in providing information about effectiveness of carbon reduction efforts."

Table 4.63
Organization type and Transparency provided by carbon offset platforms

Organization Type	Transparency				
	No		Yes		Total
	n	%	n	%	n
Private Limited Company	5	50%	5	50%	10
Public Limited Company	2	100%	0	0%	2
Government /Semi Government	0	0%	1	100%	1
Total	7		6		13

Table Source : Created by the Author

4.4.8.2 Relation of Verification and Certification provided by carbon offset platforms to type of Organization

Carbon offset platform users were asked "Are you satisfied by the Verification and certification provided by your existing carbon trading platform"

Table 4.64
Organization type and Verification & Certification provided by carbon offset platforms

Organization Type	Verification & Certification				
	No		Yes		Total
	n	%	n	%	n
Private Limited Company	5	50%	5	50%	10
Public Limited Company	2	100%	0	0%	2
Government /Semi Government	1	100%	0	0%	1
Total	8		5		13

Table Source : Created by the Author

4.4.8.3 Relation of Quality as challenge to type of Organization

Based on responses of survey question "Are you satisfied by the Quality of carbon offset projects:"

Table 4.65
Organization type and satisfaction to Quality of carbon offset projects

Organization Type	Satisfaction with Quality						
	No		Yes		No Response		Total
Org Type	n	%	n	%	n	%	n
Private Limited Company	5	50%	4	40%	1	10%	10
Public Limited Company	2	100%	0	0%	0	0%	2
Government /Semi Government	1	100%	0	0%	0	0%	1
Total	8		4		1		13

Table Source : Created by the Author

4.4.8.4 Relation of Budgetary allocation as challenge to type of Organization

The following table is based on the survey responses to the question "Is the carbon offset project costs are as per your long-term budget allocations?"

Table 4.66
Organization type and Budgetary allocation

Organization Type	Budgetary allocation				
	yes		No Response		Total
	n	%	n	%	n
Private Limited Company	9	90%	1	10%	10
Public Limited Company	2	100%	0	0%	2
Government /Semi Government	1	100%	0	0%	1
Total	12		1		13

Table Source : Created by the Author

4.4.8.5 Relation of Verification and Certification as challenge to type of Organization

The following table is based on the responses of the survey question "Are you satisfied by the Verification and certification provided by your existing carbon trading platform"

Table 4.67
Organization type and Verification and certification

Organization Type	Verification and Certification						
	yes		No		No-Resp.		Total
	n	%	n	%	n	%	n
Private Limited Company	7	70%	2	20%	1	10%	10
Public Limited Company	2	100%	0	0%	0	0%	2
Government /Semi Government	1	100%	0	0%	0	0%	1
Total	10		2		1		13

Table Source : Created by the Author

4.4.8.6 Relation of Integration with other applications as challenge to type of Organization

The following table is based on responses to the survey question “Is your current carbon offset platform integrated with other applications to capture the business-related travel data?”

Table 4.68
Organization type and Integration with other applications

Organization Type	Integration						
	Yes		No		No Response		Total
	n	%	n	%	n	%	n
Private Limited Company	6	60%	3	30%	1	10%	10
Public Limited Company	2	100%	0	0%	0	0%	2
Government /Semi Government	0	0%	1	100%	0	0%	1
Total	8		4		1		13

Table Source : Created by the Author

4.4.8.7 Relation of “Organizational processes enable adaption” as challenge to type of Organization

The following table is based on responses to the survey question “Is your organizational processes enables adaption of carbon offset platform?”

Table 4.69
Organization type and Organizational processes enable adaption

Organization type	**Organizational processes**						
	Yes		No		No Response		Total
	n	%	n	%	n	%	n
Private Limited Company	8	80%	1	10%	1	10%	10
Public Limited Company	2	100 %	0	0%	0	0%	2
Government /Semi Government	0	0%	1	100 %	0	0%	1
Total	10		2		1		13

Table Source : Created by the Author

4.4.8.8 Key Findings for Result of Analysis on challenges based on type of organization users not using carbon trading platform.

4.4.8.9 Relation of Lack of Awareness as challenge to type of Organization

Table 4.70
Organization type and Lack of Awareness

Organization Type	Lack of Awareness				
	No		Yes		Total
	n	%	n	%	n
Private Limited Company	12	52.17%	11	47.83%	23
Public Limited Company	1	14.29%	6	85.71%	7
Government /Semi Government	0	0%	4	100%	4
Freelance	0	0%	1	100%	1
SME Organization	4	80%	1	20%	5
Not for Profit NGO	1	50%	1	50%	2
Proprietorship	0	0%	1	100%	1
Total	18		25		43

Table Source : Created by the Author

Based on the provided table data, which examines the lack of awareness within different organizational types, several observations can be made.

Firstly, most of the Private Limited Companies (52.17%) exhibit a lack of awareness, with 11 out of 23 respondents acknowledging this issue. Public Limited Companies also demonstrate a significant lack of awareness, with 85.71% of respondents admitting to it.

Interestingly, Government/Semi-Government organizations, Freelancers, and Proprietorships have a lower incidence of acknowledging lack of awareness, with 100% awareness among the few respondents from each category. Furthermore, it is notable that SME organizations exhibit a high level of awareness, with 80% acknowledging the issue,

while only 20% deny it. The Not-for-Profit NGO category presents a balanced perspective, with an equal split between those who acknowledge and those who deny lack of awareness within their organizations.

Overall, the data suggests that lack of awareness is prevalent across various organizational types, with varying degrees of acknowledgment. Private Limited Companies and Public Limited Companies seem to be particularly affected, while SME organizations show a relatively higher level of awareness. These findings underscore the importance of implementing strategies to raise awareness and address this issue effectively across different organizational contexts.

4.4.8.10 Relation of Cost of Carbon offset platforms as challenge to type of Organization

Table 4.71
Organization type and Cost as challenge

Organization type	Cost				
	Yes		No		Total
\	n	% within Cost	n	% within Cost	n
Private Limited Company	16	69.57%	7	30.43%	23
Public Limited Company	5	62.5%	3	37.5%	8
Government /Semi Government	3	75%	1	25%	4
Freelance	1	100%	0	0%	1
SME Organization	3	60%	2	40%	5
Not for Profit NGO	1	50%	1	50%	2
Proprietorship	1	100%	0	0%	1
Total	30		14		44

Table Source : Created by the Author

Cost as challenge is widespread and most organizations economically be it at diverse organizational levels. It would appear that larger organizations especially public and private companies incur more costs probably owing to complexity of the operations, myriad regulatory compliance and sheer size of operations. There are, however, other organizations like government and semi-government organizations where such cost pressures are high, possibly due to the bureaucratic system and the need to meet public service requirements. Changing costs of self-employment and performing business

activities, even private freelancers and sole proprietors face such costs. SMEs are tactical in managing costs while allocating resources appropriately indicative of their expansiveness and resilience to cost pressures.

4.4.8.11 Relation of Skepticism on effectiveness of Carbon offset platforms as challenge to type of Organization

Table 4.72
Organization type and skepticism

Organization Type	Skepticism as challenge				
	No		Yes		Total
	n	%	n	%	n
Private Limited Company	11	50%	11	50%	22
Public Limited Company	3	37.5%	5	62.5%	8
Government /Semi Government	1	33.33%	2	66.67%	3
Freelance	0	0%	1	100%	1
SME Organization	1	20%	4	80%	5
Not for Profit NGO	1	50%	1	50%	2
Proprietorship	0	0%	1	100%	1
Total	17		25		42

Table Source : Created by the Author

Respondents from public limited companies with 62.5% exhibit the highest incidence of skepticism as a challenge, followed closely by respondents from Government/Semi-Government organizations at 66.67%. Half of respondents from Private Limited Companies reported skepticism as a significant challenge,. Respondents from SME Organizations demonstrated notable incidence of skepticism, with 80% of respondents

identifying it as a challenge. Not-for-Profit NGOs and Freelancers had a mixed perspective with equal split Respondents from Proprietorships show a singular acknowledgment of skepticism as a challenge.

4.4.8.12 Relation of Lack of incentives to use Carbon offset platforms as challenge to type of Organization

Table 4.73
Organization type and Lack of Incentives

Organization Type	Lack of Incentives				
	Yes		No		Total
	n	%	n	%	n
Private Limited Company	16	69.57%	7	30.43%	23
Public Limited Company	5	62.5%	3	37.5%	8
Government /Semi Government	2	66.67%	1	33.33%	3
Freelance	1	100%	0	0%	1
SME Organization	3	60%	2	40%	5
Not for Profit NGO	1	50%	1	50%	2
Proprietorship	1	100%	0	0%	1
Total	29		14		43

Table Source : Created by the Author

The results of the survey are such that a disincentive is present although in varying degrees across the different types of organizations. Of all respondents, the highest percentage indicating lack of incentives as challenge is found among Freelancers and Proprietorships in which 100 % of respondent's state this. However, there is also a challenge on lack of incentives as reported by respondents of Private Limited Companies and Public Limited

Companies with 69.57% and 62.5% of respondents confirming this challenge respectively. However, the incidence of lack of incentives as challenge was mid-level among Government and Semi-Government organizations with at least two-third of the respondents reporting this lack earning 66.67% of respondents. Among the respondents from SME Organizations and Not-for-Profit NGOs, the incidence of lack of incentives is moderate, which is 60 % among respondents from the former and 50 % from the latter identify it as a challenge.

Respondents from Larger corporations such as Private and Public Limited Companies may face dependence-oriented problems as this affects competition enhancing techniques such as bureaucratic red tape, Strategic management restrictions and Issues on shareholders. Respondents that work with Government and Semi-Government organizations especially considering their roles require them to tackle the public sector may find it hard to strike a balance between meeting the requirements of the employees versus the direction of the entity. Respondents from SME Organizations and Not-for-Profit NGOs face specific issues given their operational context of limited resource support and may be inclined to implement the incentive strategy only where there are no other competing issues.

Respondents that work with Government and Semi-Government organizations especially considering their roles require them to tackle the public sector may find it hard to strike a balance between meeting the requirements of the employees versus the direction of the entity. Respondents from SME Organizations and Not-for-Profit NGOs face specific issues given their operational context of limited resource support and may be inclined to implement the incentive strategy only where there are no other competing issues.

4.5 Impact of organizational practices and procedure

The below table records the responses of survey participants to the survey question “Is your organizational processes enables adaption of carbon offset platform? “

Table 4.74
Frequency of survey responses on organizational processes enables adaption of carbon offset platform

Organizational practices as enablers?	Frequency	%
No Response	49	80.33%
Yes	10	16.39%
No	2	3.28%
Total	61	100%

Table Source : Created by the Author

Most respondents (80%) did not provide a response regarding whether their organizational practices enable the adaptation of a carbon offset platform. This may indicate a lack of awareness and understanding among a significant portion of the surveyed population regarding their organization's practices.

Of the respondents, 16% claimed that it is their organization’s practices which do enable the adaptation of a carbon offset platform. This suggests that there might be some level of the respondents who work in organizations that have adopted practices that support the adoption of carbon offset platforms, probably signaling that those organizations are in support of environmental protection and sustainability.

A small percentage, 3.28% indicated that their organizational practices do not enable the adaptation of a carbon offset platform. This minority may face barriers or challenges within their organizations about carbon offset policy implementation or integration of those initiatives within the organization's operations.

Overall, significant portion of respondents did not provide a response, this suggests that there is lack of awareness and action within organizations regarding the adaptation of carbon offset platforms and this can be an opportunity for organizations to improve communication and engagement regarding sustainability practices among their employees.

4.6 Case Studies

As part of qualitative research, the ESG reports of two corporates American Express and Citi Group were analysed to get further insights on the carbon impact due to business travel.

4.6.1 Case Study:American Express

American Express (AMEX): AMEX Global Business Travel (GBT) ESG report for year 2022 reported 16,646 MT CO2e of emission due to Business travel in year 2022 (American Express ESG report final,2022).

American Express GBT is carbon neutral with respect to employee business travel since 2019. offsets support nature-based solutions that prevent deforestation, fund afforestation and reforestation initiatives, and protect ecosystem services and biodiversity.

According to the SBTi, financing high-quality nature-based carbon offsets today can effectively contribute to society's transition to net zero. This furthers the United Nations Sustainable Development Goals (UNSDGs), including UN SDG 15, Life on Land.

4.6.2 Case study: CITI Group

Citi group ESG report for 2022 has a chapter on efficient travel and in "Due to our global scale, we often need to meet with clients, partners, teams and other stakeholders across the world. To build awareness of how business travel impacts our carbon footprint, our colleagues can see the emissions data related to their air travel when they book travel reservations." (Citi group Global ESG report,2022)

As per emission based on business air travel the Citi group has reported the following trend.

Table 4.75
Scope 3 Emissions for business Air travel

Year	Carbon emission (CO2e MT)
2010	100,243
2018	149,588
2019	126,055
2020	21,785
2021	10,554
2022	63,681

Table Source: Citi group Global ESG report,2022 page 41

The Citi Group Global ESG report for 2022 provides data on the emissions from business air travel over the years, represented in metric tons of carbon dioxide equivalent (CO2e).

In 2010, the emissions from business air travel were recorded at 100,243 metric tons of CO2e. Over the following years, there were fluctuations in emissions, with a notable increase observed in 2018, reaching 149,588 metric tons. However, there was a decrease in emissions in 2019, dropping to 126,055 metric tons.

A significant decrease in emissions occurred in 2020, plummeting to 21,785 metric tons, likely due to reduced travel amid the COVID-19 pandemic and associated restrictions. This trend continued into 2021, with emissions further decreasing to 10,554 metric tons.

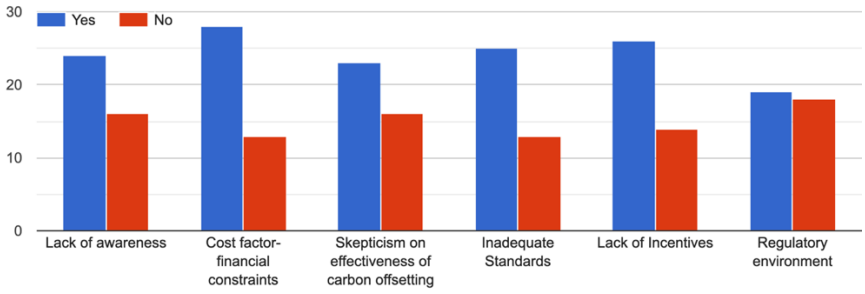
In 2022, there was an increase in emissions compared to the previous year, rising to 63,681 metric tons. This could suggest a partial recovery in business travel activity following the pandemic-related disruptions.

Overall, the data illustrates the fluctuating nature of emissions from business air travel over the years, influenced by various factors such as economic conditions, travel restrictions, and corporate policies.

4.7 Summary of Findings

Figure 4.12

Survey insights on challenges on adaption of Carbon offset platform



ImageSource : Created by the Author

The study demonstrated some key limitations as well as possible sources for enhancing the uptake and efficiency of carbon offsetting systems for business related air travel..

i. Lack of Transparency: More than half of the respondents (54%) feel that there is a lack of transparency in carbon offset platforms. This implies that there is room for engagement to restore trust and credibility such as better communication, more accessible data, and third party verification. .

ii. Verification and Certification Processes The majority of platform users are dissatisfied with validation and certification processes. Enhancing transparency with support, more efficient processes, and reflected cost will enhance these platforms.

iii. Quality of Carbon Offset Applications: The users were also concerned about the effectiveness of the existing carbon offset applications. User driven approaches, usability enhancement, and resolution of technical problems should be embraced to improve the user experience and effectiveness of online platforms.

iv. Cost and Budget Alignment: The average cost of carbon offsetting projects seems to correspond well with the long term budget framing of the organizations suggesting that progress is being made in terms of incorporating sustainability into the financial aspect of the organizations. This bears testimony to growing business sensitivity towards ecological concerns..

v. Verification Trust While 77% of users believe in the verification capabilities of these platforms, addressing the skepticism of the remaining minority is essential. It is important to note that there are encouraging and compelling user oriented policies; powerful and moral policies that will ensure that trust is not lost in them..

vi. Integration Challenges: Many respondents have not fully integrated carbon offset platforms with other applications, leading to inefficiencies in data capture and emissions tracking. Investment in technical solutions and training is needed to resolve these issues.

vii. Organizational Barriers: A notable portion of organizations still face internal challenges in adopting carbon offset platforms. Overcoming these barriers through better communication, flexibility, and integration of sustainability into core processes is crucial for widespread adoption.

viii. Awareness and Cost Concerns: Carbon offset platforms have some thresholds when it comes to usage. While the awareness of carbon offset platforms is satisfactory, a high number of non business travelers are still unaware and the cost associated with offsetting is a critical hurdle. If the education and costs targets are well raised, this would help in improving these rates among this group.

ix. Skepticism and Standards: It can be seen that there is high degree of skepticism (60%) with regards to the effectiveness of carbon offsetting due to lack of proper standards that are supposed to be applied. More rigorous standards and training on the processes and the effects will be some of the foremost things to address the concerns over scepticism..

x. Lack of Incentives: The 67% of respondents indicated absence of strong incentives as key barrier. This enhances requirement to have stronger structures of incentives from Governments and agricultural societies and other bodies..

Those findings highlight the fact that something must be done to ensure that carbon offset platforms in the area of business air travel are more accepted through the offer of improved transparency, better verification processes, improved ease of use, affordable price levels, and adequate motivation.

CHAPTER V:

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

5.1 Introduction

This Research aim is to find out the insights on the following research questions to have better understanding of the Challenges and underlying root causes:

1. What are key challenges for adopting carbon offsetting platform by business organizations for business related air travel?
2. Do these challenges vary across countries and cultures?
3. Do these challenges differ across industries?
4. Does this challenge relate to size and type of business organization?
5. Does the organizational practice and procedure impact adoption of carbon offsetting platform?

This chapter contains detailed discussion of results from Chapter IV of this document. The discussion on results of each research question contains the insights captured through research of the reasons and identification of challenges in adaption of carbon offsetting platforms business related air travel. The implication of the results in identification of key trends and patterns in relation to the research question.

The **Limitation**s section will document the limitations of this research and boundary conditions that are applicable to this research

Recommendations for Future Research section contains information on the future research as needed to find the ways and means to work on challenges and promote the green initiatives like adaption of carbon offset platforms for business-related air travel and other areas in overall operations of business.

Conclusion will document the overall essence and summarize the research journey and discuss the results of this research in bigger context of sustainability and need of reporting.

5.2 Key challenges for adopting carbon offsetting platform

5.2.1 Lack of Transparency

The results of the survey showed that 54% respondents do not believe that the platforms explain satisfactorily how effective they are. This aspect of the discussion explores

- Implications of this findings,
- Potential reasons behind this perception,
- Suggestions on how to improve transparency

5.2.1.1 Perception of Effectiveness

i. Trust: The perception that the platforms are non-transparent could also stem from the absence of consensus between the users and the platforms. Users may have such a feeling if they are not being sufficiently informed on how exactly their contributions is making an impact, that is the platform is credible and effective..

ii. Communication Gaps: It may also be where the platforms do not provide adequate information, data related to their green projects, calculation of the carbon offsets, green project selection and the green project long terms operation monitoring.

5.2.1.2 Impact on User Engagement

i. Reduced Participation It is possible that potential users may not be moved to join carbon offset programs due to lack of confidence in such programs. Theory of reasoned action as discussed in section 2.2 of this document echoes that reasoned action also states that When individuals and businesses are not convinced that their contributions would make a difference, then they will not be willing to support these causes.

ii. Skepticism and Criticism: Existing users might become skeptical and critical, potentially sharing their negative perceptions, which can harm the platform's reputation and hinder its growth and outreach.

5.2.1.3 Regulatory and Ethical Considerations

i. Compliance: Non-compliance is costly, and legal actions can be taken against the company and the company may lose certification from some recognized bodies..

ii. Ethical Responsibility: It is a requirement that carbon offsetting platforms are open for scrutiny for ethical reasons. These platforms are designed to assist in the reduction of the greenhouse gases which can induce users to put their trust in them. Deceiving users may be considered betraying their trust.

5.2.1.4 Potential Reasons for Lack of Transparency

In the following section will discuss the key factors that could contribute to the perceived lack of transparency:

5.2.1.4.1 Complexity of Carbon Offsetting

i. Technical Complexity: Describing the processes and effects of carbon offsetting, in plain and simple words is rather difficult. Since carbon accounting involves technical knowledge science subjects communication with mass audience may be hard.

ii. Verification Processes: The methods used for verification of carbon reductions are not simple and cannot be understood by the ordinary naïve public.

5.2.1.4.2 Inadequate Reporting and Communication

i. Insufficient Data Disclosure: Platforms might not be sharing comprehensive data about their projects. This could include details about carbon reduction metrics, project timelines, and methodologies.

ii. Lack of Regular Updates It is as well necessary to evaluate the progress and the impact of their inputs on the initiatives. Absence of communication gives rise to the perception of lack of transparency.

5.2.1.4.3 Commercial Interests

i. Profit Motives: The platforms operators might prioritize profit over transparency, fearing that full disclosure could reveal inefficiencies and may reduce competitive advantage.

ii. Market Competition: In an active market, such as those for carbon offsets, players involved in the carbon offset platforms are likely to be unwilling to provide information that may be beneficial to other players..

5.2.1.5 Recommendations for Improving Transparency

The below strategies can help to improve transparency in Carbon offsetting platforms.

5.2.1.5.1 Communication as key

The carbon offset practices, details concerning its implementation, and how offset initiatives have helped should be articulated in a simple language that accommodates all. Relatively simple material such as infographics and videos can facilitate understanding of difficult aspects.

5.2.1.5.2 Regular Updates: They are self-explanatory since update on carbon project will be delivered in regular basis at agreed time by use of several communication devices namely emails, newsletters, social networks.

5.2.1.5.3 Detailed Data Disclosure:

i. Reports: In all likelihood, efficient carbon offsetting platforms will include a descriptive section for every project containing the initial and final measurement of carbon emissions, strategies of reduction, observation of the measures undertaken, and the results reported by third parties.

ii. Transparency Dashboards: Such dashboards also provide possibility of tracking the investment flow into and the results achieved from a given set of carbon projects in the course of time.

5.2.1.5.4 Third-Party Audits and Certifications

i. Independent Verification: External auditors not under the control of the management of the entity claiming carbon reduction may be contracted to assess and provide an adequate means of assurance on the carbon claims. Certifications on these platforms from reputable regulators will greatly assist in characteristic portions.

ii.Public Reports: Carbon Audit reports from the third party should be made somewhere accessible to the public to enable address the issue of accountability and create confidence among users.

5.2.1.5.5 Stakeholder Engagement

i. Inter-organizational Communication and User Feedback: Availability of such feedback systems at the research proceedings to the users will enable success of the platform in relation to addressing any challenges users may have..

ii. User Education and trainings: Organize a carbon offsetting awareness to the users of the platform on targeted carbon offset programs and general carbon offsetting..

Conclusion

Lack of transparency in carbon offsetting platforms is significant challenge and addressing that can help to build trust and enhance the effectiveness of these initiatives. Improved communication, detailed and accessible data, engaging third-party verifiers, and fostering stakeholder engagement, carbon offsetting platforms can enhance their transparency.

5.2.2 Verification and certification

Based on the result out of 13 respondents, 5 (38.46%) reported satisfaction with the verification and certification processes. Whereas 8 respondents (61.54%) were not satisfied with these processes.

This means dissatisfaction of a clamor for a greater share of public opinion and implications of most consultations as most respondents (61.54%) indicated dissatisfaction. This shows that more than half of the participants are not pleased with the current verification and certification standards or processes of the carbon platform.

Majority Dissatisfaction from respondents:

Most of users (61.54%) indicated dissatisfaction with the verification and certification processes. More than half of the users surveyed find the current processes inadequate. This could be because of reasons such as the lengthy procedures, unexplainable procedures,

ineffective procedures, or even a gap between what the users are looking for and what is offered..

Minority Satisfaction from respondents:

A substantial minority (38.46%) of users are satisfied with the verification and certification processes. This suggests even with shortcomings for many, it still meets the expectations of a significant portion respondents. This show that certain parts of the process are useful and meet certain needs or particular experience.

5.2.2.1 Potential Factors for above responses:

i. Transparency: For instance, user dissatisfaction might be traced to how well the verification and certification processes are carried out. Thus, such users could become quite disgruntled and dissatisfied.

ii. Efficiency: However, the overall speed of completing and effecting the process may as well be important. For example, users may become dissatisfied where the process appears to take forever.

iii. Cost Implications: Another important factor regarding cost may be the activities of establishing and enforcing the verification and certification. Reasonable costs without any justification or any benefits that are apparent may result in disappointment..

iv. Support and Communication: The availability of support and their style of communicating with the users within the process of verification and certification can determine how users feel about the services offered. Incongruity in the level of support and users leading to poor communication may yield a negative impact to users.

v. User Expectations vs. Reality: It should be noted that inappropriate observation of expectations and limitations may result in various kinds of discontent although in this case the user is not satisfied from verification or certification perspective. If expectations exceed what majority of the desperate users get, it's expected that, there shall be discontent.

5.2.2.2 Implications for the Platform

i. Improve Processes: The platform also ought to carry out self-evaluation with the objective of reviewing the history and applicable procedures for undertaking verification and certification. While this could not entirely eliminate user dissatisfaction, it could go a long way in wilt the processes..

ii. Enhance Transparency and Communication: Providing information to users on verification and certification processes such as the criteria for selection, procedures involved, and such could help manage user expectations. Longer and more arduous communication by support throughout the process could also alleviate the level of discontent experienced by the users..

iii. User-Centric Approach: Seeking the people's views and acting on them rather than making perceived user requirements could, however, decrease the overall satisfaction rate..

iv. Continuous Improvement: An incorporation improvement plan built around the feedback from users with ongoing evaluations might assist the platform to be in touch with end-user satisfaction gradually.

Conclusion

The survey shows that there is a gap concerning carbon platform usage regarding verification and certification of the carbon project status. The platform must incorporate strategies dealing with transparency, efficiency, support and cost value to improve on user satisfaction. Further, ensuring that users are kept on board and that processes are continually improved would be essential in going forward and achieving more enhanced satisfaction levels.

5.2.3 Quality of Carbon offset projects:

Of the 13 respondents, only 4 respondents (30.77%) approved of the quality, while 8 (61.54%) were not satisfied with the quality, and one respondent gave no response (7.69%)..

The research findings indicated a lot of dissatisfaction on the quality of Carbon offset platform. Most respondents of 61.54%, are dissatisfied with quality of presentation of the carbon offset application. This points to the discrete problems regarding the application which when addressed could make the worries of most users of the application go away.

High Level of Dissatisfaction from respondents on Quality:

Most of the respondents who participated in the research (61.54%) admitted their displeasure concerning the quality of the currently employed carbon offset applications. With such positive results, more than half of the users are still unsatisfied with the current applications.

Moderate Level of Satisfaction:

A smaller segment of the respondents (30.77%) reported being satisfied with the quality of the applications. While this indicates that some users find the applications adequate or even beneficial, it still represents less than one-third of the total respondents.

5.2.3.1 Potential Factors for above responses:

i. Usability Issues: issues might be attributed to complicated navigation due to the non-intuitive interface, some important features missing, or the performance being substandard.

ii. Inadequate Information: Limited facts or inaccurately presented information about the carbon offset projects making them of poor quality and less credible..

iii. Technical Problems: annoyance can be caused by typical problems experienced in applications such as Bugs, glitches and other related problems.

iv. Meeting Basic Needs: These applications should, in no doubt, address the basic needs and issues that these users have..

v. Positive User Experience: As 31% of respondents had a moderate level of satisfaction These constituents may be satisfied by the interface and the information and general achievement of the functionality.

vi. Successful Implementation: These constituents may have been able to use these applications effectively and be able to meet their carbon offset targets which will be associated with positive sentiments.

5.2.3.2 Implications for the Carbon Platform:

i. Need For Further Research: The reason for this position is also based on adaptation processes put in place by the user due to the very low levels of user satisfaction with the carbon offset application and service quality. Surveys and feedback activities should be implemented to comprehend what need addressing in order to less the negative feedbacks from the clientele. Another area is to improve usability of the sites and change the design of the web interface to be more appealing to all users thereby making getting all features quite easy. Users of carbon offsetting platforms must ensure the availability of complete, real and current details on the projects in order to win the confidence of the users.

ii. Addressing Technical Issues Some technical issues must be brought to resolve first. Most updates, repairs, improvements and applications must be in operation so as to give the user an easy and reliable experience..

iii. Increasing User Satisfaction: In order to improve the proportion of users in the platform who are satisfied, it is advisable for the platform to invest in User Education and Support by Providing application tutorials, guides, and active customer support to make sure users can use the applications right.

Carbon offsetting platforms should also consider Feature Expansions by adding new features that address user needs and enhance the functionality of the applications.

Conclusion

From the survey results, it is revealed that there is a necessity for the carbon platform to attempt to improve user's complaints on existing carbon offset applications as there are still such users although a few. However, in survey only a few users' express satisfaction with the level of comfort and security provided by the software leading to many areas that still need improvement and fixing. If users' feedback is considered and user experience enhancement practices, relevant information provision and technical challenges are addressed, the carbon platform and application, will be able to increase users' satisfaction and effectiveness of the carbon offset applications

5.2.4 Cost Vs Budget Allocation Carbon offset project

The subsequent survey results indicated that 92% of the respondents concur that the costs expected to be incurred on the carbon offset project are in line with the budgets anticipated to be incurred over time. These findings do inform somewhat about how organizations look at the economic aspect of the carbon offset strategies within a reasonable time range.

The high percentage agreement (92%) among respondents shows a remarkable correlation between the estimated cost of carbon offset project and what the organization has planned to budget for in the long run. In other words, most organizations seem to have embraced the funded elements of carbon offset projects into their planning processes.

5.2.4.1 Potential Factors for above responses:

i. Strategic Financial Planning: Businesses are becoming aware and responsible in terms of sustainability and environmental consciousness. This high percentage of "Yes" responses indicates that these organizations have embraced incorporating carbon offset costs in their strategic financial management.

ii. Accurate Cost Prediction: The result indicates that there is a degree of forecasting at the beginning of the estimates where the costs for the carbon offset projects are identified. This shows that organizations have been able to put steps in place for forecasting cost that will be incurred in such activities in future hence able to improve budgets.

iii. Top Management Support: Engagement of top management as well as high adherence to one budget over a long period of time may also imply considerable endorsement by top management. He further comments that executive sponsorship is critical in obtaining investment and continued development of carbon offset plans. This ensures that these are given the proper importance in the financial ambit of the institution.

iv. Factors Contributing to Budget Alignment

Multiple factors may be attributed to the said budget alignment as responded by the participants.

a. Adherence to rules: Legal dimensions and policies usually have a set of environmental procedures which triggers expenditure by the concerned organizations. These anticipations of compliance obligations and regulatory changes help to enhance the accuracy of budgets.

b. Market Stability and Predictability: The offset market has matured over the years with structure costs and clear-cut rules. This harmony helps organizations in budgeting expenses more effectively.

c. Technological Advancements: The use of new technology and project management tools extended the potential of monitoring and managing carbon offset projects better. Better forecasting techniques and data analytics help in the management of costs and alignment with the budget.

d. Stakeholder Pressure and Corporate Responsibility: Investors, customers, and employees and other stakeholders are the various factors that push organizations in to set sustainability targets. This often leads to commitment of a percentage of budget over the years so that such sustainability proposals for carbon offset projects can be supported.

5.2.4.2 Implications for Organizations

The results of the survey hold promise for organizations that whether recommend or intend to implement coal carbon offset projects are promising. A perceived commitment to long-term budgets means that there is a business case for these projects, and they can be run as cashflow generating entities.

i. Encouraging Sustainability initiatives: This isn't overly surprising, as other organizations may be encouraged to undertake carbon offset projects as some of their peers have internalized these costs into long term plans.

ii. Strengthening Financial Strategies: Organization will harness these observations to make further systems of their financial strategies which will guarantee that the

sustainability plans developed will not only be achieving the environmentally intended goals but are also viable economically..

iii. Enhanced Planning and Risk Management: Organizational carbon offset plans that have a long-term budget formulation allows for better control over risks resulting from unforeseen costs as well as regulatory changes.

Iv Foster Change: Economic wellbeing of carbon offset projects provides room for creativity in sustainable development and further urges the development of new effective ways and technologies to counteract the carbon emission.

Conclusion

Survey findings show that the costs of carbon offset projects correspond to the anticipated expenses with a long-term horizon, which denotes a positive development within the organizations, which have started integrating environmental sustainability within their financial budgets. This integration shows good strategic plans, good estimates of costs and proper backing by the top level management. Finally, as organizations are moving more towards completing sustainable business projects, these results indicate that there is great potential for the deployment and economic sustainability of carbon offset projects.

5.2.5 Verification of the reduction

76.9% of the respondents, as depicted in the data, think that the carbon reduction applications they are using help in authenticating emission reductions achieved. Such

positive response indicates that users have a general trust in the verification processes of these applications.

Negative Responses (No): Only 2 respondents (15.4%) indicated that their carbon offset applications do not undertake any efforts to reduce emissions. While this can be expected from some fraction of the users, this minority perspective may further require evaluation: Some users may have a bias against any carbon offset including defenders or they may have read some disappointing information about these applications. It's possible that some applications lack robust verification processes, leading to user distrust. This could include poor documentation, lack of third-party verification, or previous reports of fraudulent activity.

It’s plausible some applications might have weak verification systems or even none at all, which makes users wary. This can include inadequate documentation, no independent validation, and prior allegations of scams.

No Response: One of the responses that has not been offered is a non-response of single category (7.7%). This may be due to lack of knowledge on the particular elements that are being requested E.g. ‘I don’t know’. The respondent does not have the requisite knowledge or understanding about the particular verification processes for them to answer. Other users may not care about verification in relation to the carbon offset application that they will be using and may care more about other parameters of the application such as convenience or cost.

5.2.5.1 Potential Factors for above responses:

i. Transparency and Trust: The applications may be able to utilize transparent ways of computing and explaining offsets consistent with the information on users building faith on their application**.**

ii. Reputation of the Application Providers: Relying on some applications that have been proven to have gone through vigorous verification processes may also boost the users' confidence.

iii. User Experience: If users have a positive experience and see the tangible results (like the issuance of a crediting report or an Emission Reduction Certificate) they are more likely to believe the application works.

5.2.5.2 Implications of Findings

The implications of findings of this survey are numerous and cut across application developers, policymakers as well as users:

i. Enhancing Verification Processes There is need that carbon offset applications should as a requirement continuously upgrade mechanisms for verification processes. For this, more vigorous third party evaluation is needed and new tools like blockchain to enhance transparency could also be used.

Ii. User Education and Engagement: Users' Skepticism and misconception can be mitigated through providing relevant information including the verification procedures and the need for verified carbon offsets. Providing the information in the right form can assist users in making the right choices and concluding the right decisions

iii. Policy Support: To enhance offsets, policymakers would be in a position to promote the preparation and adoption of a comprehensive set of procedures to be used in verification of carbon trade. This could legislate how to frame the use of various carbon offset technology applications with a view to ensuring that all applications meet certain minimum verification standards.

iv. Feedback Mechanisms Applying the feasible vertical and horizontal feedback approaches within the applications can provide aggrieved users the room to communicate their concerns improving the verification processes.

Conclusion

These users surveyed also show the intention of using carbon offset applications in the belief that these applications can be verified with 77% of the respondents confirming the effectiveness of these applications. Nevertheless, verification processes and any issues active cognizance ought to be given to. Thus, through transparency, education, and strong verification mechanisms, carbon offset applications have opportunities to build and earn trust so that carbon subventions have real meaning in combating climate change.

5.2.6 Integration – Data Capturing

In relation to carbon offset platforms, there is a need for integration with other applications for efficiency in the business capture of travel data. This integration capability where data can be captured from the pre-existing business systems like travel management systems, expense systems, and travel booking systems can enhance carbon accounting and offsetting

practices. This section presents particular problems concerning the integration of additional systems to record business air travel..

Respondents with Integration Capability

Healthy majority of the respondents (8 out of 13 61.54%) stated that their carbon offset platform has a provision for movement tracking through the integration with other applications. This integration considerably improves the carbon offsetting processes by availing the means of automating data capturing, lowering hysterical data entry and the chances of human errors. Thus, organizations are able to keep up with their emissions at any point in time as regards to travel making it easy for them to outline and buy offsets for the emissions responsibly.

Respondents Without Integration Capability

Respondents constituting approximately 30.77% of the overall number indicated that their carbon offset platform is not linked with any other platform. The respondents may have problems relating to input of data using the computer, being the only source of travel database, and cold capturing emissions comprehensively. Failure to provide integration will possibly impact on the seam to less the business impact, checking carbon emission effects more efficiently and easily may prove to be impossible.

Respondents Providing No Response

One respondents didn't provide a response which may imply that the respondent lacks information as to whether there is an integration and or it’s in use. This means that some

people have a platform which is able to do more technical thing that some of them are used to and therefore why some training and/a communication is required.

5.2.6.1 Potential Factors for above responses:

i. Integration Challenges

For businesses, carbon offset platforms' integration with the existing travel and data management systems poses a technical and resource based problem. It is common to many organizations to use different, non-connected booking systems, expense systems, and travel agencies. Additional efforts in demonstrating how these systems interact with the carbon offset platform require technical skills, investment in IT facilities and personnel, and nurturing.

ii. Data Accuracy and Completeness: There is a 30.77% contribution and absence of any mode of integration into respondents' systems. As a result, some companies or any of their departments might be using independent systems that do not work together that manual entry would still be needed. This leads to both causes that make carbon emissions measurements more difficult than should be done. Wearisome activities further increase human effort and human error. This too relates as with risk with respect to offset calculation and reporting.

iii. Scalability and Resource Constraints: For smaller businesses or businesses with thin technical capacities, the issue of trying to incorporate too many systems could be a daunting task. It is likely that such skilled people and funding would be required to put in place and operate the integration that was adopted to discourage total migration onto carbon offset

platforms. Hence the reasons why some of the respondents have said that they have not incorporated their systems even when there are systems that allow such integration would be clear.

iv. User Awareness and Adoption: The single "No Response" in the survey might also suggest that users were unaware or uninterested in the technical features of the system. Sometimes users are unaware of the specific applications available for the carbon offset platform beyond what they have already been trained on. This suggests that there are gaps in engagement of the users and the platform providers.

5.2.6.2 Implications of Findings

i. Increased Data Reliability: The automated linkage with organizations' travel planning and booking systems facilitates the capture of disciplinary trips in real time, which means no customer related trip data is overlooked. Such measures avoid errors in the assessment of an organization's carbon footprint since every aspect of travel is considered in the calculation.

ii. Add-On Benefits in Terms of Time and Cost Efficiency: Such data upload processes take within the system by incorporating integration; this allows for the calculations of carbon emissions and purchase of offsets to be undertaken much faster. It could help companies reduces such costs and time in administration activities and thus helps not to divert the company from its primary business focus.

iii. Improved Reporting and Compliance: An integrated computer system consists of data that is accurate and wide in coverage; this improves the reporting of sustainability programs, adherence to regulations, as well as Corporate Social Responsibility (CSR) reporting. The need to account for carbon reduced is very critical for big companies which wish to be green in their operations.

iv. Seamless User Experience: Integration improves the user experience since information can be interchanged between systems without interferences. Users are not required to change a number of programs or enter the information – carbon offsetting becomes therefore easier.

v. Invest in Integrated Solutions: Shedding entirely the traditional approaches, companies, even those that have not yet merged their travelling data systems, are advised on investing in 'advanced' technical means that will assist in the effort of enabling the integration of carbon offset platforms. This may require engaging with companies that have APIs (application programming interfaces) or other integration tools that would enable linking up systems.

vi. Training and Education: Carbon offset platform providers and organization should focus on educating users about the benefits of integration and how to effectively employ the use of integration. Lessons on how to put these out as features and use them could lower the amounts of users lacking confidence on what the platform can do or how many are yet to embrace it.

vii. Support for Small and Medium Businesses (SMBs): Platform providers may also investigate limiting the costing of the solutions to suit the smaller organizations. Simplified

integration to the systems, lower costs and proper support may aid the smaller firms to break the barriers on the adoption of integrative systems.

viii. Continuous Monitoring and Feedback: There is no point at which an organization stops evaluating the organization's systems in terms of their outputs. Gathering information about the system in terms of how easy it is to use, the data captured by that process and the processes in general can enhance the system and enable new developments.

Conclusion:

Most of the respondents have integrated their carbon offset platforms with other applications to capture travel data. Yet again, a significant proportion of the respondents has not integrated. The integration can lead to loss in data accuracy and increase the amount of manual work that needs to be done while at the same time decreasing efficiency levels in the tracking and relating carbon offset practices. However, with such challenges, organizations can invest in technology, train, and provide appropriate support to enhance the efficiency of carbon offset platforms within the organizations. Integration is essential in growing carbon offset programs and making at least a noticeable difference in carbon footprints

5.2.7 Organizational processes.

On the survey question "Is your organizational processes enables adaption of carbon offset platform" Most of the survey respondents hold the belief in the verification capacity of

these applications and the results of this survey, as summarized below respond this question as follows:

- Yes: 10 respondents
- No: 2 respondents
- No Response: 1 respondent

Encouraging the use of carbon offset platforms can serve as an effective strategy for lots of organizations, while the organization's internal procedures as well as its policies may help promote or impede the success of such initiatives.

The overwhelming majority (76.92%) of the respondents were of the view that their organizational processes were enabling the adoption of a carbon offset platform. This shows that most of the organizations have embraced sustainability in their operational frameworks and policies, thereby facilitating the implementation of carbon offsets initiatives.

5.2.7.1 Potential Factors for above responses:

i. Pre-existing Sustainability Policies: The policies and plans aimed at fostering sustainability encourage the establishment of processes that facilitates the adoption of carbon offset platforms.

ii. Consistency between Organizational Culture and Sustainability Goals: Proper integration of carbon offset mechanisms is possible when there is harmony between the sustainability objectives and operationalization of the processes.

iii. Collaboration across Subordinate Divisions: The satisfactory use of carbon offset platforms may illustrate effective cross-departmental arrangements especially with finance, sustainability, procurement, and travel**.**

iv. Sustainable Development is Not Embedded in Mainstream Business Activities: A minority share of respondents, also, (15.38%) reported the position of their organizational processes does not facilitate the adoption of a carbon offset platform .These are organizations whose core business functions, strategies, management policies along with the governance structures do not adequately or even at all incorporate sustainability measures. This may come in the form of lack of buy in from top management or other departments which are gate keepers of budget.

v. Inflexibility: There may be certain organizational processes that are either too rigid or outdated that can stop an organization from implementing new tools or platforms, ozone offset programs for instance. For example, procurement processes may lack sustainability considerations, or even if the company wants to include sustainability tools, the approval processes are too slow and complicated for any new tools to be adopted quickly.

vi. Financial and Administrative Barriers: Some organizations tend to address carbon off-setting as a burden rather than an important step in pugging the necessary holes. Unless proper financial and other administrative constraints are put in place, adoption is even more difficult, even when there is the willingness to adopt sustainability program.

5.2.7.2 Implications of Findings

i. Enabling Processes: Accepting the use of carbon offset platforms does not seem a challenge to most respondents as it is revealed by organizational processes. It is encouraging evidence that sustainability is being more and more integrated into the very core of the organizational structures of many companies. However, while this group has been able to buckle down towards carbon offsetting, further improvement and flexibility will be required as the carbon markets advance in stages and as new environmental issues will have to be dealt with by the organizations.

ii. Organizational challenges: The 15.38% of respondents reported that their organizational processes do not enable adoption. It can be due to lack of prioritization of sustainability, insufficient resources, or cumbersome procedures. Organizations in this category may need to re-evaluate their internal processes and adjust them to better align with global sustainability goals and regulatory pressures.

iii. Uncertainty: The non-response is a reminder that in some organizations, employees or decision-makers may not be fully aware of the existing processes or the role they play in enabling carbon offset adoption. This attributes a lack of internal communications or strategic alignment in the execution of the operational and sustainability objectives within the organization..

iii. Streamline Processes: For organizations who are encountering difficulties in utilizing carbon offset platforms, it is necessary to reassess and streamline the existing internal processes. This may entail fast tracking the approval processes for sustainability-related

projects, making sustainability a criterion for performance appraisal, and providing alignment of budgetary processes and environment.

iv. Inter-Departmental Engagement: At all levels of the organization, a venturing collaboration between departments can embed and thus facilitate the achievement of sustainability goals. In this case, for instance, the funding agency has to work with the appropriate carbon offset engineering team in order to avail the required financial resources.

v. Enhance Understanding: Organizations will seek more or less deploy employees to understand and even more the decision making elites on issues of carbon off-setting. It may lead to the modification of organizational processes to accommodate such initiatives. Periodic training cycles supported by leadership can engrain sustainability within the culture of the organization..

vi. Flexibility and Adaptability: Even as the sustainability strategies are becoming more established, there needs to be retention of processes about flexibility within an organization. This may involve the use of lean project management techniques or having special groups with decision making powers able to make procurement or join carbon credit exchanges..

Conclusion

The survey results indicate that while most organizations have processes in place that enable the adoption of carbon offset platforms, a notable portion still faces internal challenges. Addressing these barriers through better integration of sustainability into core

processes, enhanced communication, and flexibility can ensure that more organizations successfully adopt carbon offset platforms. In turn, this will contribute to broader efforts to reduce carbon footprints and mitigate the impact of climate change.

5.2.8 Lack of Awareness

The findings indicate that identical proportions of the members (53.85%) and the non-members (53.13%) of the sustainability team's organization report lack of awareness as a challenge. This means that the problem of awareness goes beyond the people directly engaged in sustainability work

5.2.8.1 Discussion: Distribution of Responses for Business Travelers on Lack of Awareness of Carbon Offsetting Platforms

First, the information shows the level of knowledge by business travelers on carbon offsetting platforms. Since it has been recognized that global warming has a major effect on travel patterns, Carbon offsetting is an integral part of travel practices. The responses are quite helpful to ascertain the levels of awareness among frequent travelers so that strategies that will aim to encourage them towards green travel can be developed.

5.2.8.1.1 Key Findings

Majority of respondents reported lack of awareness

Majority of the respondents 59.26% reported that they were not aware of any carbon offsetting platforms. As it is revealed on the above finding, though escalated environmental

concern is on the rise, most business travelers are not knowledgeable about the countermeasures to normalize their carbon emissions.

Cognizant Minority

Only 25.93% of the respondents stated that they are aware of carbon offsetting schemes. This minority represents a segment of the population that could be assumed to be sympathetic towards being environmentally friendly and engaging in responsible travel. Nevertheless, this number indicates a gap that should be addressed by awareness campaigns targeting the mass market.

Uncertainty

As many as 14.81% of the respondents none was aware of the fact that a carbon offsetting platform is persistent so they did not know if they had one or not. This can arise from failure of dissemination or clear explanation of carbon offsetting. It points out a possible deficiency in reaching out and sharing information on alternative methods of traveling sustainably.

5.2.8.1.2 Implications for Stakeholders

i. Travel Industry: This conclusion brings to light the fact that travel agencies, airlines, and any other location related to the travel industry should make improvements in their communication channels. These organizations can close this gap of understanding by promoting the concept of carbon offsetting and clarifying what it means in reality.

ii. Policy Makers and Environmental Organizations: In particular, the data provides some useful insight into policy makers and environmental organizations working with the travel industry to devise and execute education campaigns. Such campaigns would seek to educate business travellers on the need and the practical ways of including carbon offset in their travels.

iii. Corporate Travel Programs: Companies whose operations require them to travel often have a major role that deals with integrating carbon offset into the corporate travel programs. Companies can encourage the use of carbon offset platforms and projecting their sustainability attribute when at the same time educating their employees on low carbon travel.

5.2.8.1.3 Recommendations for Future Research

More studies must be conducted to investigate the causes of unawareness among the business travelers. Qualitative research such as focus groups and interviews could reveal more details on the extent of awareness and engagement with such platforms. It might be useful in this respect also to test different ways of increasing awareness and participation in the carbon offsetting activities to find the most efficient messages and channels for communication.

It can be concluded that the present work illustrates the low level of awareness about carbon emission offsetting platforms among business tourists. This situation should be addressed with appropriate teaching and cooperation to promote a greater cutback to overuse that will, in the long run, achieve even the environmental aims that will be aspired.

5.2.8.2 Discussion: Distribution of Responses for non Business Travelers on Lack of Awareness of Carbon Offsetting Platforms

This is regarding the survey responses on the awareness of the non-business travelers about carbon offsetting platforms. This includes responses both from general nonbusiness travelers and potential business travelers. These groups are considerable portions of the traveling population, and their awareness and practice of sustainable practices will be very important for the effective achievement of the desired scopes of the environmental policies and programs

5.2.8.2.1 Comparison Between Non-Business and Potential Business Travelers

i. Non-Business Travelers Out of the non- business, it was also observed that about 27.78% acknowledged carbon offsetting platforms with some members displaying a mixed level of awareness within this group.

ii. Potential Business Travelers: In this category, knowledge skimming was slightly lower at 22.22% with lack of awareness being higher at 16.67% when compared with non-business travelers. The absence of uncertain customers (0%) seems to suggest that members of this group have a more straightforward but perhaps uneducated view of carbon offsetting.

5.2.8.2.2 Implications for Stakeholders

i. Environmental Organizations: These organizations can engage actively through travel service providers in circulation of information about carbon offsetting. Developing webinars, materials, and utilizing well-known travel bloggers might increase people's engagement.

ii. Training: Teaching non- business travelers about decent and sustainable travel such as carbon offsetting can help educators and other stakeholders combat climate change.

5.2.8.3 Recommendations for Future Research

Future research should consider a qualitative analysis to understand the specific challenges that non-business travelers face in becoming aware of carbon offsetting platforms. Focus groups or in-depth interviews could reveal more about the perceptions, misconceptions, and informational gaps. Additionally, longitudinal studies could track changes in awareness over time, especially in response to targeted educational interventions

Consequently, the data suggests that the non-business travel segment is adequately embedded on the awareness of carbon offsetting platforms; however, this is a has a gap.

The lack of awareness is a concern that the travel industry and environmental bodies should seek to address to ensure that better travel practices are adopted by all classes of travelers.

5.2.8.4 Implications of Lack of awareness:

i. Internal Communication: The gaps in both internal and external trade communication structures present a complex way of resolving the high levels of reported lack of awareness among both groups. This is crucial as employees irrespective of their direct engagement in the sustainability team, should be well apprised on the Carbon offset platforms.

ii. Training and Education: The observation of the study implies that there creating a need for more awareness and education strategies within the organization on Carbon offset platforms and other sustainability initiatives. Restocking can be through regular workshops, seminar programs, and other related informational sessions.

iii. Engagement Strategies: It is important to engage both members and non-members of the sustainability team to improve effectiveness of sustainability initiatives. Strategies should be implemented to increase engagement involving employees in sustainability projects, soliciting feedback, and recognizing contributions to sustainability efforts.

iv. Information: Providing clear, concise, and easily accessible information about sustainability goals, projects, and achievements can help improve awareness. This might involve regular updates via newsletters, intranet postings, or dedicated sustainability sections on the company's website.

5.2.9 Cost of Carbon offsetting

5.2.9.1 Discussion on Survey Results: Challenges in Adoption of Carbon Offset Platforms - Perceived Challenge related to Cost of Carbon Offsetting among business travellers.

5.2.9.1.1 Key Results

- Respondents Not Perceiving Cost as a Challenge
- Number of Responses: 10
- Percentage: 37.04%

A very good proportion of respondents do not consider the cost of carbon offsetting as a challenge. This could be due to better financial management and hence, utilization of financial aids or funds which relative to the costs are less than the costs of these activities in the absence of such factors.

Respondents Perceiving Cost as a Challenge

Approximately half of the respondents, 48.15 percent of the total survey respondents in survey view the carbon offsetting as vast challenge. This means that, for many business travellers, it is the cost of carbon offsetting that prevents them from taking part in such programs. This group of travellers possibly cuts across the upper and lower class as some

business travellers are on budgeted expenses while some do not comprehend the long term benefits of carbon offsetting..

Respondents Unsure About the Cost Factor

A smaller portion of respondents (14.81%) are uncertain whether the cost is a challenge or not. This group might be helped if they are given more information and education on the costs and benefits of carbon offsetting and also the prospects of making savings or receiving financial support..

5.2.9.1.2 Implications of Cost Perception

There are high chances that cost is a barrier to Adoption The perception of cost as a challenge by nearly half of the respondents indicates that a very critical barrier in the uptake of carbon offset platforms by business travellers includes the financial consideration. It is, therefore, imperative to address this issue of Cost Transparency Gap making People Worry. Aside from moving towards practicality, there is an observable gap that revolves information or cost feedback on the carbon offset projects. Cost itemizing and showcasing environmental and even financial returns might eliminate such fears.

There is also the likelihood that organizations would look for financial incentives or support mechanism that would help lower the cost burden on people individually. This measures may include using other services such as offering discounts, subsidizing or including carbon offsetting costs in total trips costs effectively hiding it.

Improving education and awareness with regards to importance of carbon offsetting and its merits in the future will enable people to change their view from upfront costs to the positive contribution. Especially, promotion of successful case studies and third-party testimonial from the companies that benefited from carbon offsetting would be useful.

5.2.9.1.3 Discussion on Recommendations

i. Introduce Financial Incentives: Allow incorporation of financial incentives, such as discount, tax refund and subsidy, to encourage carbon offsetting. Such incentives could help to lessen the weight of costs and opt for participation of more business travellers.
ii. Increase Cost Transparency: Give precise descriptions of affecting costs charged towards carbon offsetting on reporting tools. Include what they cover, why they are included and the purpose of these costs.
iii. Enhance Awareness: Department should prepare different outreach approaches and educate business travellers on the need and advantages of carbon offsetting. The outreach could include among others workshops, seminars, brochures and websites.
iv. Publish Success Stories: Post travel policies on carbon offsetting and success stories obtained in businesses, emphasizing on environmental impacts as well as reputation and financial gains earned.

Conclusion

It does seem that the survey results indicate that carbon offsetting costs have emerged as a major barrier to a significant number of business travellers. Strategies such as finding financial relief from the costs, making the costs known, and educating would help in further

acceptance of carbon offsetting platforms. Governance structures with reasonable subsidies, or stress on net benefits could, conversely, alter the level of involvement in the carbon offsetting initiatives. Definitely, let all the efforts make and even more possible in participating in carbon offset programs for the end sustainability of the world.

5.2.9.2 Discussion on Survey Results: Challenges in Adoption of Carbon Offset Platforms - Perceived Challenge: Cost of Carbon Offsetting for Non-Business Travelers

5.2.9.2.1 Key Findings

This section reviews the findings of a questionnaire that focused on the above-mentioned challenge of the perceived carbon offset cost, targeting specifically non-business travellers. It is important to note the cost as a factor when investigating the decision making processes of non-business travellers because it helps in understanding the factors that inhibit the uptake of carbon offset platforms and suggesting measures that could be taken to enhance uptake.

Respondents Not Perceiving Cost as a Challenge

Out of all the respondents, 16.67% do not relate to the cost of carbon offsetting, which seems to be a particular challenge to carbon offsetting. Most of these respondents accept that there are costs to carbon offsetting but there are benefits that make them pay up. This group, however, constitutes a small minority of non-business travellers.

Respondents Perceiving Cost as a Challenge

Most of them, 83.33% of the targeted group of non-business travellers believe that the price and other possible costs to be incurred while adopting an offset strategy are hindrances to the intended action, showing that within this category, cost is a major consideration that dampens their enthusiasm to utilize platforms for carbon offsets. This large proportion signalled that cost is an important barrier to the adoption of using these platforms for carbon travellers non-business.

5.2.9.2.2 Implications of Cost Perception for Non-Business Travelers

i. Barrier to Widespread Adoption: It is obvious that it is one of the factors responsible for the poor carbon offset platform adoption amongst this group.. it becomes clear that financial considerations are a dominant factor in the low adoption of carbon offset platforms among this group. Non-business travellers may be more price-sensitive since their travel is often not sponsored or reimbursed by an employer, as is common in business travel..

ii. Limited Motivation: Non-business travellers might perceive carbon offsetting as a voluntary or non-essential expense. Unlike business travellers, whose companies may integrate carbon offsetting into corporate social responsibility policies, non-business travellers may feel less motivated to spend on offsetting without external incentives or benefits.

iii. Cost Sensitivity and Travel Frequency: On average, this target group travel less often in comparison with corporate travellers , which may result in them being more frugal in terms of any extra costs related to travel. Given that they are lower in terms of environmental impacts from travel, they do not feel the need to pay for carbon offsets and use it towards other things seeing carbon credits as an avoidable cost not a necessity towards environmental protection.

iv. Potential for Incentives and Awareness Programs: These statistics imply persuading the cause-following groups with the use of motivating factors or educational programs designed for these people is necessary. If financial, monetary, or non-monetary barriers were lowered, they could potentially be motivated to pay towards carbon offset programs. In addition, such campaigns would target the even small contribution some people may make when they travel.

v. Segment-Specific Approaches: Since non-business travellers are typically more cost-conscious and potentially less engaged in sustainability efforts, platforms need to develop targeted strategies for this group. These strategies could focus on the personal benefits of contributing to sustainability (e.g., ecological pride, community recognition, etc.) or explore partnerships with airlines, hotels, and travel agencies to embed the cost of carbon offsetting into travel packages.

5.2.9.2.3 Recommendations

i. Introduce Subsidies or Discounts: To mitigate the financial constraints perceived in making carbon offset purchases particularly for non-business travellers, subsidies and or discounts can be introduced. Joining forces with travel operators or airline companies in marketing less expensive offset packages may also work positively.

ii. Incorporate Carbon Offsetting into Travel Packages: One of the strategies that can be used to overcome this cost challenge is embedding the carbon offsetting fees as part of the whole cost of the travel package. This integration would make the costs of the offset less apparent and manageable by the travelers which would enhance participation.

iii. Create Attractive Payment Arrangement: Offering non-business travelers options of splitting the total amount for carbon offset over a specific period rather than forcing them to pay everything at once may also help in easing such pressure. This too, would create room for budgetary travelers to offset their carbon footprint.

iv. Enhance Awareness of Negative Environmental Impact: Campaigns can be geared towards enlightenment of people on the benefits of carbon offsets instead of focusing only on frustrations of environmental damage. Presenting the ordinary person, especially infrequent travelers, on factors that can be employed to achieve sustainability can raise perceived benefits of carbon offsets plus encourage their uptake.

v. Leverage Community-Based Marketing: Non-business travellers can react positively to community-based marketing campaigns that stress on climate change actions. Individual

carbon offsetting can then be perceived as contributing towards the common goal of a supportive network..

Conclusion

The survey results confirm the hypothesis that the price barrier directed towards carbon offsetting is a significantly high factor among non-business travelers. This addressing challenge could be bumping over in other ways that include subsidies and education, or by including the cost of pollution into the travel package. Transportation costs are aimed at members of this group, other than barring them, encouraging them within reason. On the other hand, the social networks give the opportunity to motivate non-business travelers to take part in behavior that is more socially and environmentally conscious, reducing the financial and social barriers.

5.2.10 Skepticism on effectiveness of carbon offsetting

5.2.10.1 Key Findings

The transition towards carbon offsetting as part of broader climate change mitigation strategies depends heavily on the trust that users place in the effectiveness of these platforms. This section discusses the survey results related to skepticism about the effectiveness of carbon offsetting, one of the key challenges impacting the adoption of these platforms. The goal is to understand the level of skepticism among respondents and its implications for the widespread use of carbon offset platforms.

Respondents Expressing dismissal Skepticism on the Effectiveness of Carbon Offsetting

Evidently the majority of the respondents in the study approximately 60% were quite sceptical about the prospect of carbon offsetting effectiveness. This group demographically probably fears that the intended carbon offset projects will not work as expected, because either the performance will not be measured, verified, or acknowledged appropriately. Such misconceptions stem from information asymmetry, illiteracy on what a carbon offset project entails, or the belief that such endeavours are just a way for companies to purchase goodwill by reducing their CO2 emissions without changing anything in their operations.

Respondents Not Expressing Skepticism on the Effectiveness of Carbon Offsetting

Lending credibility to carbon offsetting is the opinion of a group of respondents amounting to forty percent. This group may either have confidence in the dedication of existing dissolution frameworks or in the contributions that the dissolution initiatives support towards the environment; or perhaps, even more, they are not all ignorant of the particularisation in the carbon offset projects or have witnessed what works for them.

5.2.10.2 Implications of Skepticism on Carbon Offset Platform Adoption

i. Erosion of Trust: Sixty percent of respondents expressing scepticism indicates a significant trust issue that could impede the broader adoption of carbon offset platforms. Users who do not believe that offsetting genuinely contributes to carbon reduction are

unlikely to engage with such platforms, limiting their effectiveness in driving meaningful climate action.

ii. Demand for Transparency and Accountability: Scepticism usually surfaces from a common concern, which in this case is the question of how carbon offset projects are actually selected, verified, and maintained in a transparent fashion. Amongst such concern is whether there is a post management on the projects that ensure a lasting effect of the projects, if the carbon credits are really measurable and lead to changes, and if the offset programs are really scrutinized by independent assessors.

iii. Perceived Inadequate Standards It is also possible that respondents think that the current acceptable standards of carbon offsetting fall short of expectations. If users feel that there is no clear, uniform, robust and enforceable standard axioms across projects, then this scepticism may continue to erode. This apprehension might be caused by inappropriate approaches such as imprecise regulatory issues, inconsistent verification procedures, or loose restriction on acceptable offset projects around the world.

iv. Association with "Greenwashing": The key reason associated with scepticism is the tendency to think that companies/ individuals ‘buy’ carbon offsets to look ethical while internally they do nothing of the sort. This view may be strengthened of the media or through high profile situations where carbon offsetting is promoted as public relations rather than as a measurable environmental action..

v. Educational Gaps: The scepticism may also be a result of educational gaps, De scepticism includes some sociological factors like educational gaps- Users do not quite understand how carbon offsetting works and how it is expected to affect total emissions.

Provision of appropriate and detailed information on the techniques and effectiveness of offsetting can enhance the people's belief in these platforms.

5.2.10.3 Recommendations

i. Heighten Accountability and Independent Verification: Carbon footprint offsetting platforms must have strong third party authentication procedures and explain how and what is the criteria used to select and oversee the projects or them. In this case it may involve full description of the project, interim reports within the required timelines and external control so that users will witness the effects of their contribution..

ii. Global Standards Should Be Set: These procedures may help reduce the concerns on the carbon offsetting system outlining or following the global standards. All these carbon offset projects must also incorporate stringent certification to guarantee that the reduction in the carbon credits is adequate extra and tame. Organizations such as the Verified Carbon Standard VCS or Gold Standard can be argued for supporting the credibility of the projects..

iii. Combat Greenwashing: In order to allay the public concerns about greenwashing, Stand: organizations should be pro green but should also be cautious of being 'green washed'. Carbon offsetting should sit alongside on-going sustainability strategies, such as improved energy performance and less waste generation and emissions. Broadcasting both internal sustainability performance and external offsetting measures will effectively illustrate true green practices.

iv. Educational Campaigns: An in depth education campaign regarding carbon offsets is necessary in order to understand potential users about how carbon offsets are achieved, how these projects are developed, monitored and validated and the rationale behind such projects. This could comprise of arguments, such as the need for an education about the offsets, especially via the web that comprises of FAQs, webinars, detailed project reports, and success stories of projects validated carbon offsets.

v. Foster Community Involvement and Feedback: End users could have the option of being involved in choosing which projects to implement or make suggestions about the projects they have supported. This engagement can promote trust by showing the usefulness of the platform which continually incorporates users' opinions and guarantees that the projects incorporated are within the users' limits and sentiments.

vi. Highlight Success Stories: Carbon offsetting message should incorporate more success stories and achievements of the projects on the platforms that promote this cause. Concrete examples of projects that have worked and made an impact - such as reforestation projects, renewable energy projects and methane project will help alleviate Skepticism and show the positive workings of projects of this nature.

Conclusion

The survey results reveal that scepticism regarding the effectiveness of carbon offsetting is a significant challenge, with nearly 60% of respondents expressing doubts. This scepticism could hinder the adoption of carbon offset platforms unless concerted efforts are made to improve transparency, establish global standards, and better educate users about the

process and impact of carbon offsetting. Addressing these concerns is critical to enhancing trust and ensuring that carbon offset platforms can contribute effectively to global climate change mitigation efforts.

5.2.11 Inadequate Standards

5.2.11.1 Key Findings

This section discusses the survey results related to the perceived challenge of **inadequate standards** in adopting carbon offset platforms. Establishing robust standards is crucial for ensuring transparency, reliability, and effectiveness in carbon offsetting practices. Without clear standards, businesses and individuals may be hesitant to engage with carbon offset platforms due to concerns about the credibility, quality, and impact of the offset projects.

5.2.11.1.1 Respondents Perceiving Inadequate Standards as a Challenge

Inadequate standards are viewed as a challenge by majority of the respondents (63.41%) in embracing the platforms. There has been a common apprehension about inadequacy of the current benchmarks being applied on carbon offset projects and whether such projects accomplish their environmental goals.

This perception could stem from several factors, including:

i. Lack of Uniformity: Some standards may be in place for one governance structure but absent in another making it hard for users to benchmark and evaluate the success of the projects.

ii. Unclear Certification Processes: If the certification and verification processes are not transparent, users may lack confidence in the legitimacy of the offsets being purchased.

iii Lack of clarity in Impact Measurement: Some respondents may think that the criteria to assess the carbon reduction impact on the projects is unclear or not enough detailed.

iv. Absence of Third-Party Validation: A lack of independent third-party validation may also lead to concerns about the reliability of carbon offset claims.

5.2.11.1.2 Respondents Not Perceiving Inadequate Standards as a Challenge

Number of Responses: 15

Percentage: 36.59%

A smaller proportion of respondents (36.59%) do not perceive inadequate standards as a challenge

i. Trust the Existing Standards: These respondents might believe that the current standards are adequate and provide sufficient assurance regarding the quality and impact of carbon offset projects.

ii. Have Better Access to Verified Projects: Respondents in this category might have access to platforms that implement robust, clear standards and offer detailed project certifications, which instils confidence in the process.

5.2.11.2 Implications of Inadequate Standards

The fact that nearly two-thirds of respondents view inadequate standards as a challenge in adopting carbon offset platforms highlights several key issues:

i. Credibility of Carbon Offsets: When users perceive standards as inadequate, it erodes the credibility of carbon offsets, leading to lower adoption rates. Stakeholders may fear that

their investments in carbon offsets will not yield real environmental benefits or that projects may be overestimated in terms of their carbon sequestration potential.

ii. Trust in Platforms: Trust is crucial for the success of carbon offset platforms. If the standards governing these platforms are unclear or inconsistent, users may hesitate to engage. This is especially true for organizations that need to report carbon offsets as part of their sustainability strategies. They require certainty that the offsets they purchase meet rigorous and transparent criteria.

iii. Greenwashing Concerns: Without adequate standards, there is a risk that some companies might engage in "greenwashing" — making exaggerated claims about their sustainability efforts without substantial backing. This undermines the credibility of the entire carbon offsetting ecosystem.

iv. Difficulty in Measuring Impact: Inadequate standards can make it difficult to measure the actual environmental impact of offset projects. If organizations and individuals cannot reliably track the emissions reductions resulting from their investments, they are less likely to continue using the platforms.

5.2.11.3 Recommendations: Challenge of Inadequate Standards

To overcome the challenge of inadequate standards, several strategies can be employed:

i. Establishment of Universal Standards: The development of universal or internationally recognized standards for carbon offset projects is crucial. Organizations such as the Gold Standard or the Verified Carbon Standard (VCS) play a role in ensuring consistency across

platforms. Increasing adoption of these standards can provide users with confidence that they are investing in high-quality projects.

ii. Enhancing Transparency: Carbon offset platforms should enhance the transparency of their certification and verification processes. Users should be able to access detailed information about the projects they are supporting, including the methodologies used to calculate carbon reductions, the duration of projects, and the long-term sustainability of the initiatives.

Iii .Promoting Independent Audits and Third-Party Validation: Independent audits and third-party validation of carbon offset projects can help address concerns about the reliability of offsets. Platforms that offer independently verified projects are likely to gain more trust from users.

iv. Standardization in Reporting: Platforms should standardize the way they report carbon offset data. This can include making sure that all carbon reductions are calculated based on the same metrics, and ensuring that all relevant data points — such as baseline emissions, projected savings, and actual savings — are clearly presented.

v. User Education: It is also essential to educate users about the existing standards and certifications available for carbon offsets. When users understand the rigor behind these standards, they are more likely to trust the process and adopt carbon offset platforms.

vi. Promote the Adoption of Recognized Standards: Carbon offset platforms should align their projects with globally recognized standards, such as the Gold Standard or VCS. This can help ensure uniformity and credibility across platforms.

vii. Increase Platform Accountability: Carbon offset platforms should provide comprehensive documentation and reporting on their projects. This should include third-party validation reports, detailed descriptions of the project's environmental impact, and regular updates on progress.

viii. Raise Awareness About Standards and Certifications: Efforts should be made to raise awareness among businesses and individuals about the importance of standards and certifications in carbon offsetting. Educational campaigns can help users make informed choices when selecting offset projects.

ix Develop Stronger Regulatory Frameworks: Governments and international bodies should develop stronger regulatory frameworks for carbon offset platforms to ensure compliance with established standards. This will provide additional assurance to users about the legitimacy of the offsets they purchase.

Conclusion

The survey results indicate that inadequate standards are perceived as a significant challenge in the adoption of carbon offset platforms by the majority of respondents. Addressing this issue through the development and promotion of clear, rigorous, and transparent standards will be crucial for increasing user confidence and fostering wider adoption of carbon offsetting. By enhancing credibility, transparency, and accountability, carbon offset platforms can help mitigate the environmental impact of carbon emissions more effectively and attract greater participation from businesses and individuals.

5.2.12 Lack of Incentives

5.2.12.1 Key Findings

The transition to carbon offset platforms is essential for reducing global carbon emissions and achieving sustainability goals. However, various challenges can impede the adoption of these platforms by businesses and individuals. One of the most commonly cited barriers is the lack of incentives for organizations and individuals to participate in carbon offset programs. This section discusses the survey results related to the perceived challenge of a lack of incentives, examining how this factor impacts the adoption of carbon offset platforms..

i. Respondents Who Perceive a Lack of Incentives as a Challenge

Number of Responses: 29

Percentage: 67.44%

A significant majority of the respondents (67.44%) indicated that a lack of incentives is a challenge for adopting carbon offset platforms. This suggests that the absence of tangible rewards or motivation to participate in carbon offsetting programs is a substantial barrier. The large proportion of respondents recognizing this challenge indicates that many businesses and individuals may not see a compelling reason to invest in carbon offset initiatives, especially if there are no direct benefits that offset the costs or efforts involved.

ii. Respondents Who Do Not Perceive Lack of Incentives as a Challenge

Number of Responses: 14

Percentage: 32.56%

A smaller group of respondents (32.56%) indicated that a lack of incentives is not a challenge. This group may either recognize other non-monetary or reputational benefits of carbon offsetting or might be motivated by intrinsic values related to sustainability and environmental responsibility. These respondents likely understand the long-term advantages of carbon offset initiatives, such as improved corporate social responsibility (CSR) profiles, compliance with regulatory frameworks, or alignment with environmental goals.

5.2.12.2 The Importance of Incentives in Carbon Offset Adoption

The fact that 67.44% of respondents perceive a lack of incentives as a significant challenge underscores the need for a more robust framework of rewards and motivations to drive participation in carbon offset platforms. Incentives can play a crucial role in accelerating the adoption of these platforms by providing immediate and tangible benefits, thereby justifying the financial and operational investment required.

5.2.12.2.1 Financial Incentives:

i. Tax Credits and Rebates: Offering tax credits or financial rebates to organizations that participate in carbon offset programs can directly reduce the costs associated with these initiatives. For instance, governments could implement policies that offer tax deductions to businesses investing in certified carbon offsets or renewable energy projects.

ii. Subsidies: Providing subsidies for purchasing carbon credits or supporting participation in carbon offset projects can alleviate the financial burden for smaller companies and incentivize them to engage in these activities.

5.2.12.2.2 Non-Financial Incentives:

i. Reputational Benefits: Organizations that invest in carbon offset programs can enhance their brand image and attract environmentally conscious customers. Promoting these reputational benefits and offering certifications that can be used in marketing and corporate reporting may motivate companies to participate.

ii. Compliance and Avoidance of Penalties: Regulatory frameworks can mandate carbon reduction efforts, with penalties for non-compliance. Organizations may see participation in carbon offset platforms as a way to avoid fines or demonstrate compliance with environmental regulations, especially in industries where carbon emissions are a major concern.

5.2.12.2.3 Market-Based Incentives:

i. Cap-and-Trade Programs: Participating in cap-and-trade programs, where companies that reduce emissions below regulatory requirements can sell excess credits, could serve as a strong market-based incentive. Such programs not only reward organizations for reducing emissions but also create a financial market for trading carbon credits, offering further opportunities for profit.

5.2.12.3 Implications Related to Lack of Incentives

The large proportion of respondents identifying a lack of incentives as a challenge suggests that the current incentive structures may not be effectively communicated or perceived as valuable by potential users of carbon offset platforms. Possible barriers include:

i. Perception of Insufficient ROI: Organizations may not see a sufficient return on investment (ROI) from carbon offsetting, especially if the costs outweigh perceived or tangible benefits.

ii. Limited Access to Incentives: Smaller organizations may lack access to financial support, tax credits, or other incentives available to larger firms, making participation in carbon offset programs less attractive.

iii. Complexity of Incentive Programs: Incentive programs may be overly complex or difficult to access, reducing the likelihood of participation by businesses that are unsure of how to navigate the process.

iv. Short-Term Focus: Many businesses prioritize short-term financial performance, and if the benefits of carbon offsetting such as enhanced reputational value or regulatory compliance are viewed as long-term, they may be less likely to adopt these practices.

v. Need for Clear and Accessible Incentive Programs

To overcome these challenges, it is crucial to develop clear and accessible incentive programs that address the needs of both large and small businesses. The survey results suggest that without adequate incentives, businesses are unlikely to prioritize carbon

offsetting in their operational strategies. Therefore, incentives need to be designed in a way that they are not only financially appealing but also easy to access and understand.

5.2.12.4 Recommendations

i. Implement Comprehensive Incentive Packages: Governments, regulatory bodies, and carbon offset platforms should collaborate to create comprehensive incentive packages that provide both financial and non-financial benefits to participants. These packages could include tax breaks, subsidies, and industry-recognized certifications.

ii. Enhance Communication and Transparency: Clearly communicate the available incentives and their benefits to businesses and individuals. Simplifying the application and participation processes can help encourage adoption, particularly for smaller companies.

iii. Develop Industry-Specific Incentives: Different industries face unique challenges in carbon offsetting. Tailoring incentive programs to the specific needs of industries—such as manufacturing, travel, or energy—can enhance their effectiveness.

iv. Monitor and Evaluate the Impact of Incentives: Regular monitoring of the impact of incentive programs on participation in carbon offset platforms can help identify gaps and areas for improvement. This feedback loop can ensure that incentives remain relevant and appealing to participants.

v. Promote Success Stories: Sharing case studies and success stories of businesses that have benefited from carbon offsetting incentives can help build trust and highlight the value of participation. These stories can illustrate both financial gains and long-term sustainability achievements.

Conclusion

The survey results clearly indicate that a lack of incentives is a significant barrier to the adoption of carbon offset platforms, with 67.44% of respondents identifying it as a challenge. This emphasizes the need for governments, organizations, and platform developers to create and promote robust incentive structures. By offering financial rewards, simplifying access to incentive programs, and effectively communicating their benefits, the adoption of carbon offset platforms can be accelerated, contributing to greater environmental and sustainability outcomes

5.3 Do these challenges vary across countries and cultures?
5.3.1 Key findings

Table 5.1:
Summary of findings for variation of challenge across the region for Carbon offset application.

Challenge	**Asia**		**Europe**		**North America**		**Difference in Pattern**
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	
Lack of Awareness	58%	27%	50%	38%	45%	55%	True
Cost factor	62%	27%	88%	12%	45%	45%	True
Skepticism	58%	31%	38%	50%	45%	45%	True
Inadequate Standards	54%	31%	63%	25%	64%	27%	False
Lack of Incentive	58%	35%	63%	25%	64%	27%	False
Regulatory environment	46.%	35%	37.5%	50%	27%	64%	True

Table source: Created by the Author

The data in Table 5.1 presents a summary of the challenges associated with carbon offset applications across three regions: Asia, Europe, and North America. The findings reveal significant regional variations in the perception and impact of these challenges, reflecting differing levels of awareness, economic conditions, regulatory environments, and cultural attitudes towards carbon offsetting.

5.3.1.1 Lack of Awareness:

The challenge of awareness about carbon offset programs shows a notable difference across regions. In Asia, 58% of respondents identified lack of awareness as a challenge, compared to 50% in Europe and 45% in North America. The relatively lower level of awareness in North America, despite its developed economy, may indicate a higher baseline familiarity with environmental issues or more effective awareness campaigns. However, Asia's higher percentage suggests that awareness campaigns are still needed to bring the region on par with others.

5.3.1.2 Cost factor:

The cost of carbon offsetting is a significant challenge across all regions, but the intensity varies. Europe shows the highest concern, with 88% of respondents identifying cost as a challenge, compared to 62% in Asia and 45% in North America. This suggests that while cost is universally recognized as a barrier, European stakeholders are particularly sensitive to the financial implications, possibly due to stricter regulatory frameworks and higher expectations for compliance.

5.3.1.3 Skepticism:

Skepticism about the efficacy and integrity of carbon offset programs also varies by region. Asia again shows a higher level of concern (58%), with Europe at 38% and North America at 45%. The higher skepticism in Asia may reflect a combination of less mature markets and fewer well-established standards, whereas Europe's lower percentage could be due to stronger institutional trust in environmental programs.

5.3.1.4 Inadequate Standards:

Unlike other challenges, the perception of inadequate standards does not show significant variation between regions. Approximately 54% of respondents in Asia, 63% in Europe, and 64% in North America reported this as a challenge. The similarity across regions suggests that while standards are a universal concern, they may be rooted in the evolving nature of global carbon offset frameworks rather than region-specific issues.

5.3.1.4 Lack of Incentive:

The lack of incentives is perceived similarly across the regions, with about 58% of respondents in Asia, 63% in Europe, and 64% in North America identifying it as a challenge. This finding suggests that stakeholders universally recognize the need for stronger incentives to encourage participation in carbon offsetting, regardless of their geographical context.

5.3.1.5 Regulatory Environment:

The regulatory environment is another area where significant regional differences are observed. In Asia, 46% see it as a challenge, compared to 37.5% in Europe and only 27% in North America. This indicates that regulatory barriers may be more pronounced in Asia, possibly due to less mature legal frameworks or more complex bureaucratic processes. Europe's and North America's relatively lower percentages may reflect more established and streamlined regulatory processes that facilitate carbon offset initiatives.

5.3.2 Overall Interpretation

The findings highlight a clear divergence in the perception and impact of challenges related to carbon offset applications across different regions. While some challenges like inadequate standards and lack of incentives appear consistent globally, others such as cost, awareness, and regulatory environment vary significantly, underscoring the importance of region-specific strategies in promoting carbon offsetting. These variations must be considered when designing and implementing carbon offset programs to ensure they are effective and equitable across different geographical contexts.

5.4 Do these challenges differ across industries?

Based on the results based on the series of ANOVA test executed using DATATAB software on three categories of industries namely Information technology & Software, Education and training & Healthcare and pharmaceutical for testing the following hypothesis for level of significance set at 0.05:

Hypothesis H0: There is no difference between the 3 categories of the industries with respect to the challenge.

Hypothesis H1: There is difference between the 3 categories of the industries with respect to the challenge.

Table 5.2: Summary of ANOVA results

Challenge	**ANOVA**		**H0 : Status**
	F	**p**	
Lack of Awareness	4.85	.022	p<.05: Rejected
Cost factor	0.04	.957	p>.05: Not Rejected
Skepticism	1.25	.311	p>.05: Not Rejected
Inadequate Standards	2.48	.113	p>.05: Not Rejected
Lack of Incentive	0.46	.638	p>.05: Not Rejected
Regulatory environment	0.09	.917	p>.05: Not Rejected

Table source: Created by the Author

The ANOVA results displayed in the table provide a statistical analysis of the variation in challenges associated with the adoption of carbon offset applications across different industries. The null hypothesis (H_0) in this context posits that there are no significant differences in the perception of each challenge across industries. The findings are summarized as follows:

5.4.1 Lack of Awareness: The ANOVA results indicate a statistically significant difference in the lack of awareness about carbon offset applications across industries ($p < 0.05$). This suggests that awareness levels vary significantly depending on the industry,

which might reflect differences in exposure to sustainability practices, educational outreach, or the prioritization of environmental issues. Industries where the lack of awareness is more pronounced may benefit from targeted awareness campaigns to improve understanding and engagement with carbon offset initiatives.

5.4.2 Cost Factor: The cost factor does not show a statistically significant difference across industries ($p > 0.05$), as indicated by the ANOVA results. This suggests that the perception of cost as a barrier is relatively consistent across different sectors. The lack of variation implies that cost-related challenges are universally recognized, pointing to the need for broad financial strategies and incentives that can be applied across industries to mitigate this concern.

5.4.3 Skepticism: Skepticism towards carbon offset applications also shows no significant variation across industries ($p > 0.05$). This uniformity implies that doubts regarding the effectiveness or credibility of carbon offset programs are common across sectors. Addressing this challenge may require a universal approach focused on enhancing transparency, ensuring the integrity of carbon offset projects, and improving communication about the tangible benefits of these programs.

5.4.4 Inadequate Standards: The perception of inadequate standards does not vary significantly across industries ($p > 0.05$), suggesting that this concern is widespread and not confined to specific sectors. This finding underscores the need for universally

applicable and robust standards that can instill confidence in carbon offset applications across all industries.

5.4.5 Lack of Incentive: The lack of incentives for adopting carbon offset applications also shows no significant difference across industries ($p > 0.05$). This consistent perception across sectors indicates that more comprehensive and universally appealing incentives are necessary to encourage broader participation in carbon offset programs.

5.4.6 Regulatory Environment: Finally, the regulatory environment does not present significant differences across industries ($p > 0.05$). This suggests that while regulatory challenges are acknowledged, they are similarly perceived across different sectors. This finding may indicate that industries are uniformly influenced by existing regulations, or it could reflect a general need for more supportive and flexible regulatory frameworks to facilitate the adoption of carbon offset applications.

5.4.7 Overall Interpretation

The analysis reveals that, apart from awareness, there are no significant differences in how various challenges to adopting carbon offset applications are perceived across industries. The significant variation in awareness highlights the need for industry-specific educational efforts, whereas the lack of significant differences in other areas suggests the need for broad, cross-industry strategies to address common barriers such as cost, skepticism, inadequate standards, lack of incentives, and regulatory challenges. These insights can

guide the development of both targeted and universal approaches to promoting the adoption of carbon offset applications across different sectors. .

5.5 Does this challenge relate to size and type of business organization ?

The following section will discuss the research question on relation to Challenges faced in adaption of Carbon and Size of business orgaization.

Business Organizations can be categorized by size using various metrics and criteria. The most common dimensions for categorizing organizations include the number of employees, annual revenue, market share, and organizational structure.

For this research the Size of organizarion based on number of employees and annual revenue is considered to understand the relation of challenges to size of business organization .

5.5.1 Carbon platform adaption and number of employees

The organizations were categorized based on number of employees working and the data was categorized in three sizes categories.

Table 5.3:
Categories of Organization based on number of employees.

Size Category	Number of employees
Small	less than 100 employees
Medium	101 to 1000 employees
Large	More than 1000 employees

Table source: Created by the Author

The following table depicts frequency of respondents in each size category to be used in further discussion

Table 5.4:
Distribution of Organization based on number of employees.

Size of Business organization	**Frequency**	**%**
Large	36	59.02%
small	15	24.59%
Medium	10	16.39%

Table source: Created by the Author

Table 5.5
Carbon platform adaption based on number of employees working in organization.

	Carbon Platform User number and percentage							
Organization size based on number of employees	**No**		**yes**		**No Response**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Small	11	18.03%	1	1.64%	3	4.92%	15	24.59%
Medium	7	11.48%	3	4.92%	0	0%	10	16.39%
Large	19	31.15%	9	14.75%	8	13.11%	36	59.02%
Total	**37**	**60.66%**	**13**	**21.31%**	**11**	**18.03%**	**61**	**100%**

Table source: Created by the Author

i. Adoption Rate:

The adoption rate of the carbon platform is higher in large organizations (14.75%) compared to medium (4.92%) and small organizations (1.64%).

This may suggest that larger organizations have more resources or motivation to adopt sustainability initiatives like a carbon platform.

ii. Non-Adoption Rate:
A significant proportion of organizations, especially small (18.03%) and large (31.15%), do not use the carbon platform.This highlights a potential area for increasing awareness or reducing barriers to adoption.

iii. Non-Response Rate:
The non-response rate is relatively higher among large organizations (13.11%) compared to small (4.92%) and medium (0%).

This could indicate variability in the priority or reporting capabilities regarding sustainability practices among different sized organizations.

iv. Conclusion

The data suggests that the likelihood of adopting a carbon platform increases with the size of the organization. However, there is still a substantial proportion of large organizations that have not adopted the platform, indicating potential challenges or areas for targeted intervention. Understanding the specific reasons behind the non-adoption and addressing those could help in increasing the overall adoption rates across all organization sizes.

5.5.2 Carbon offset adaption and Annual Revenue

The organizations were categorized based on Annual revenue of organization in USD and the data was categorized in three sizes categories.

Table 5.6:
Categories of organizations based on Annual revenue in USD.

Category	Annual revenue in USD
Small	Less than 10 million USD
Medium	10 to 100 million USD
Large	More than 100 million USD

Table source: Created by the Author

Table 5.7
Distribution based on Annual revenue in USD.

Size based on Organization Revenue	Frequency	%
Large	29	47.54%
Small	21	34.43%
Medium	11	18.03%
Total	**61**	**100%**

Table source: Created by the Author

Key Insights:
The largest category by proportion is Large organizations, making up almost half of the sample.Small organizations also constitute a significant portion, about one-third of the sample.Medium organizations represent the smallest category, making up less than one-fifth of the sample.

This distribution can provide insights into the prevalence of different-sized organizations within the studied population, which could be useful for understanding market composition, resource allocation, or strategic planning based on organization size.

5.5.3 Variation of challenges based on size of business organizations

Table 5.8: Summary of variation of challenges based on Size of Organization.

Challenge	Variation based on Size of organization
Lack of Awareness	False
Costs as per long-term budget allocation	False
Lack of Transparency	True
Satisfied with Quality of carbon offset projects	True
Organizational processes enable adaption	True
Verification & certification	True
Cost factor	False
Skepticism	True
Inadequate Standards	True
Lack of Incentive	False

Table source: Created by the Author

table helps to understand the challenges organizations face with regard to the adoption of carbon offsetting platforms and particularly whether the challenges are dependent on the size of an organization.

5.5.3.1 No **Variation for Lack of Awareness as challenge**

This challenge does not seem to vary by the size of an organization. Whether small or large, However, the level of awareness regarding how the systems function and their tangible benefits may differ. While larger corporations may have a fully-fledged dedicated team for

Sustainability, smaller businesses may still be equally knowledgeable due to more resources and public awareness than before.

5.5.3.2 No Variation Costs as per Long-term Budget Allocation as challenge

In the same vein as awareness, costs related to carbon offsetting and especially budget planning do not seem to have significant variations owing to organization size

5.5.3.3 Variation on Lack of Transparency as challenge

Transparency becomes a thornier issue in larger organizations. Given that their operations are more involved, this makes it vital to assure the legitimacy and traceability of the various carbon offset projects. On the other hand, it is possible for smaller organizations to have uncomplicated structures thus making the determination of carbon offset projects' transparency easier. In large, established corporations, there are more expectations from offset providers who may be further scrutinized or require more compliance, and verifications may be magnified among larger corporations relative to smaller ones.

5.5.3.4 Variation on Satisfied with Quality of Carbon Offset Project as challenge

The quality of carbon offset projects offered by different organizations seems to be esteemed differently in terms of organizational size. Large organizations are likely to have more complementary offset projects available to them and thus will likely have a more scrutinizing approach when assessing the offset projects. Smaller firms may accept fewer, less complex projects but are also likely more resource constrained such that they would

not be able to measure the whole suite of measures as well as the sustainability effects of such projects

5.5.3.5 Variation on Organizational Processes Enable Adoption as challenge

For larger organizations, the complexity of the processes within the organizations makes the acceptance of carbon offsetting platforms difficult. A large firm is likely to experience several bureaucracies due to the need to satisfy several levels before getting approval and need to get interdepartmental integration. On the other hand, smaller organizations often possess less complex bureaucratic structures which make it easy to implement

5.5.3.6 Variation on Verification & Certification as challenge

Verification and certification forms an integral part especially to the stakeholders in carbon offset or carbon sequestration programs. Larger organizations may find it even more daunting to comply with diverse consented verification structures that cuts across different geographical regions. Smaller companies, dependent mainly on a narrower operational scope, may have an easy time in choosing and following suitable verification approach

5.5.3.6 No Variation on Cost Factor as challenge

The cost factor appears to be rather constant across organizations of various sizes. Both small size organizations and big size organizations rendered carbon neutral have compared the benefits obtained versus the expenses incurred. Even if big cases may have bigger resources to buy carbon credits, they also have bigger emissions that may need carbon

credits up implying higher costs become likely. In the case of smaller companies, even where costs are lower overall, they may incur higher costs relative to income

5.5.3.7 Variation on Skepticism

Skepticism on the effectiveness and the legitimacy of the carbon offset platforms is likely to be more among the bigger organizations with more stake holders. These firms could have numerous partners, more pressure on delivering verified results, and accountability due to disservices. Lower organizations may be less pressured and as such less skeptical regarding external demands however they may still have some level of the belt rub regarding the long-term effects.

5.5.3.8 Variation on Inadequate Standards

A crisis in inadequate standards is more profound in larger organizations. Due to the scale of their operations, they have to deal with different sets of rules and make sure that the offset projects they choose not only wait for internal approval but also approve for outside uses. This concern may be less frequently encountered by smaller organizations, as they are usually active in fewer areas and adhere to less complicated standards

5.5.3.9 Variation on Lack of Incentive

The lack of incentive remains constant regardless of the organizational size. It is thus easy to acknowledge that both large and small organizations may find it difficult to support carbon offsetting if business goals do not permit such a move or if there are no supporting external factors such as tax breaks or regulatory incentives. This issue is prevalent across

the board, as both reflect the overall market and regulatory environment rather than the size of the organization.

Conclusion

To conclude, the expected difficulties in embracing carbon credit costing range in regard to organizational size structure and some devoid of either excess or absence of factors attributable to size. This is because the complexity of operations and involvement of many stakeholders in the case of larger corporations leads to higher levels of transparency as well as more Skepticism on the adequacy of the standards for offsetting. Therefore, smaller organizations do not suffer greatly from such problems, but are still encumbered by the issues of cost and incentive. Such obstacles call for a unique solution, depending on the size of the organization and its internal and external contexts.

5.5.4 Variation of challenges based on type of business organizations

Table 5.9:
Summary of variation of challenges based on Type of Organization.

Challenge	Variation based on Type of organization
Lack of Awareness	True
Costs as per long-term budget allocation	False
Lack of Transparency	True
Satisfied with Quality of carbon offset projects	False
Organizational processes enable adaption	True
Verification & certification	False
Cost factor	False
Skepticism	True
Inadequate Standards	True
Lack of Incentive	False
Integration	True

Table source: Created by the Author

Observing the table, we can emphasize the factors hindering the implementation of carbon offsetting platforms and their adoption in various organizations. Various challenges have been outlined in the table meanwhile it columnates whether the challenges differ according to the type of organization that is public, private, non-governmental or industry specific.

Discussion on the Challenges of Adopting Carbon Offsetting Platforms by Type of Organization

5.5.4.1 Variation on Awareness or Knowledge Gaps (True)

Awareness of carbon offsetting platforms is disparate by organization type. Non-profit and environmental organizations are likely some of the most informed on carbon offsetting concepts, as they are motivated by sustainability. In contrast, some groups, for instance, manufacturing industries or conventional energy companies, may be less exposed to this practice especially when sustainability is not a part of their business. In the same line, public sector organizations are likely to differ in such knowledge depending on what governments are promoting and the policies they have.

5.5.4.2 No Variation on Costs under Long-term Budget Planning (False)

As a consulting activity any exercise on long term budget formulation is not affected by the type of organization. The type of the organization does not matter because they all tend to factor in the expenses of implementing carbon offset platforms in relation to their long-term strategies and their financial viability. Non profits and small size organizations could be however more affected by stricter budgets although this issue cuts across all types in terms of cost assessment.

5.5.4.3 Variation on Lack of Transparency (True)

Transparency becomes even more important for particular kinds of organizations such as public ones and big corporations where the degree of accountability to the stakeholders is higher. There are trust matters that also affect non profit organizations because they rely on donations and need to show that the money spent on offsetting is effective and verifiable.

Private companies may have low levels of external oversight but there are internal pressures to ensure carbon offset intervention strategies are articulated clearly.

5.5.4.4 No Variation on Satisfied with the Quality of Carbon Offset Projects (False)

The reception of the quality of carbon offset projects appeared to show a fairly similar pattern irrespective of the ground organization category. Regardless of whether it is public, private or non-governmental, a good number of clients contact carbon offset platforms and make judgment about the quality of work in terms of knock-on effects, checking and organizational affinities with the particular project. This perception may vary from one organization to another depending on the kind of industry standards that this specific organization operates in, however, it does not show much more substantial variation at a higher level.

5.5.4.5 Variation on Organizational Processes Enable Adoption (True)

Differences in organizational structure and processes, in particular their hierarchy, commonly result in varying degrees of ease in the conquering of carbon offsetting platforms. For instance such larger bureaucratic institutions as public sector bodies may find it quite difficult to adopt these platforms due to most of the time they have a lot of approval levels therefore the integration of these platforms in the different departments may takes longer duration than expected. On the contrary, private companies or fast –paced companies which have low levels of hierarchy have a smooth time adjusting. Non-profit

organizations, on the other hand, sometimes may have institutional structures and procedures regarding the integration of sustainability strategies into the business model.

5.5.4.6 No Variation on Verification and certification (False)

As for the verification and certification challenge, it does not appear to be much different across organizational boundaries. The two, be it public or private organizations, and non-profit organizations as well, have to make sure that the carbon offset projects are up to the required verification standards. Although verification may be more important to public sector organisations due to high regulatory scrutiny, private sector companies are also subjected to theirs by the market and shareholders.

5.5.4.7 No Variation on Cost factor (False)

Bidding and voting stricken membership, there cannot be a more determining factor than the cost factor, like say long term budgetary allocation, in which it does not appear to change from one type of organization to the next. Whether one is operating a public, private or non-profit organization, the temptation to go for carbon offsetting solutions is based on cost-benefit ratio. Every organization, irrespective of its type will pursue inexpensive ways of achieving sustainability and still not withstand financial limitations.

5.5.4.8 Variation on Skepticism (True)

There is positioning around carbon offsetting platforms which gets entrenched in a few industries more than most, and the more private ones like manufacturing or even electric power generation have that positioning ringed around them because of the skepticism in

terms of whether carbon offsetting is indeed useful in addressing the emissions to the required levels. Non-profits, pro-environment organizations could be less skeptical about it as it seems to be in line with their main goals. It appears that public organizations are somewhere in the middle, trying to satisfy regulatory requirements and the public sensitization while having a few doubts internally.

5.5.4.9 Variation on Inadequate Standards (True)

Different sectors and industries express different degrees of concern relative to the concerns being raised by the standards for carbon offsetting. It is noticed that, in the public sector, low standards may be the main dissatisfaction because of the necessity of observing country or international requirements. If they are in such industries which are set to achieve certain targets in the reduction of carbon use, the private institutions may also be affected by the low standards. Non-profits, particular those focused on green causes, appear to be more proactive with regards to these problems so we use political pressure for higher requirements and responsibility.

5.5.4.10 Variation on Lack of Incentive (It is a myth)

The shortage of motivation is a sucky deficiency and remains fairly constant irrespective of the type of the organization. Here, it is worth stating that for the public or the private organizational set up, some extrinsic forces including tax incentives, or even marketing forces may be essential for promoting use of carbon offsetting platforms. Non-Profit

Organizations are likely to be driven by the goal rather than greed, however, they also seek funding from third parties so as to make such steps worthwhile.

5.5.4.11 Variation on Integration

The level of integration of carbon offsetting platforms with other systems in use varies from one organization to another. In the case of public sector agencies, where there is a lot of bureaucratic regimen, the appropriate situational leaderships such as virtual perspective shifts may be necessary to facilitate change integration. On the contrary, integration in private companies dealing in industries related to technology and finance may not be a challenge because of relatively flexible and scalable procedures. Also, non-profit organizations depending on their scope and size may have barriers with integrations if they have little or no technical skills or resource.

Conclusion

In conclusion, the implementation of carbon offsetting solutions via carbon offsetting platforms has its own difficulties depending on the organization's type. Difficulties in transparency, standards, and integration are likely in public sector organizations given the nature of their processes and regulatory constraints. On the contrary, the private sector companies particularly those in the manufacturing concerns may be more cynical toward the programs but may seek quicker integration implemented processes. Non-profit organizations in some instances may have little problem adapting to platform carbon offsetting approaches as it is tied to their core objectives though other aspects such as

transparency and integration still pose limitations. These different personalities and attributes should be appreciated in providing carbon offsetting mechanisms to diverse organizational categories.

5.6 Impact of Organizational practices and procedures

Most respondents believe that parameters established in their organizations allow transition towards carbon offsetting strategies, while two respondents did not report on how their approaches support this transition. One individual did not respond. And these findings suggest that in most organizations, there are processes in place that are likely to support adaptations to carbon offsets, which is a good indication of organizations taking on the sustainability agenda.

On the other hand, the few organizations that fall under this category relating to inadequate processes for the adaptation of carbon offset strategies emanates barriers or gaps which are likely to hinder successful adaptation. Some of these organizations could face issues of lack of support from the institution, limited availability of resources, insufficient knowledge of the subject matter and even issues of resistance to change. These kinds of problems may also help make such a change from one approach to another more difficult than it should have been, thereby posing a challenge that requires complex solutions..

Conversely, the minority of organizations reporting inadequate processes for carbon offset platform adaptation highlights potential barriers or gaps that may impede successful implementation. Challenges such as lack of organizational buy-in, limited resources, insufficient expertise, or resistance to change may hinder adaptation efforts in these

organizations. Addressing these challenges requires targeted interventions, including capacity-building initiatives, stakeholder engagement, and organizational culture transformation.

The responses regarding organizational processes for carbon offset platform adaptation provide valuable insights into the readiness of organizations to embrace sustainability initiatives. While most organizations demonstrate positive signals of preparedness, addressing the needs of those facing challenges is essential for fostering widespread adoption of carbon offset platforms. By enhancing organizational processes, fostering a culture of sustainability, and investing in capacity-building efforts, organizations can maximize their potential to contribute to climate change mitigation and promote environmental stewardship.

5.7 Limitations

This research leaned heavily on the survey information and acknowledges that there are many limitations. This section deals with the limitations of this research and cues for the further investigation on the challenges.

5.7.1 Focus on Business Air Travel:

The present study scope is business air travel and does not consider the wider picture of cost-and-carbon implications for carbon offsetting within other business operations such as supply chain management, corporate usage of energy or emissions related to travels excluding air. This narrow scope in perspective limits the likelihood of coming up with comprehensive strategies in management of general corporate emissions.

5.7.2 Limited Scope of Survey Population:

The study looks and analyzes the users coverable by carbon offset platform which is not a representative of businesses or air travelers in general. This makes the scope of the findings narrower; especially, to the extent of the adoption barriers in industries or companies that are less versed with carbon offsetting strategies.

5.7.3 Potential Bias in Self-Reporting:

Since the data is survey based, there is an inherent self-report bias in response to the surveys. When it comes to carbon offsetting, people might exaggerate their knowledge or downplay their doubts about these practices which would consequently lead to distorted impressions of actual users.

5.7.4 Limited Industry-Specific Insights:

The issue of carbon offsetting platforms is sufficiently discussed but not specifically addressed how different industries would react to the problem. More sector specific problems and solutions would have been optimal as air travel for business and other activities is also not the same across sectors.

5.7.5 Lack of Longitudinal Data:

Information about user perceptions, and user experiences with the platform is gathered at a single time; hence there is no attempt to find out how such feelings may have changed over time. Without following up on how adoption will impact these variables in the future,

for example, how the regulatory environment, market conditions, or technological innovations change, it is impossible to ascertain the effect of the passage of time on platform uptake.

5.7.6 Focus on Perception Over Behavioral Data:

The findings are based on user perceptions rather than actual behavioral data. While perceptions are important, actual adoption rates, usage patterns, and outcomes from using carbon offset platforms are not fully explored, limiting the understanding of real-world platform effectiveness.

5.7.7 Geographical and Cultural Constraints:

The study is limited in its coverage as it does not completely consider how carbon offset platforms challenges differ applying a review of geographical, cultural, and regulatory influences. External factors and attitudes in areas with different levels of legislative initiatives and economic activity may be different which makes the findings less exportable.

5.7.8 Insufficient Exploration of Technical Limitations:

Apart from focusing on the necessity of more seamless integration of carbon offset platforms within other systems, this article contains no analysis of the technical barriers which enterprises face. Also, the interrelationship and coordination of integration, data management, and the technical structure of companies are not thoroughly covered.

5.7.9 Inadequate Analysis of Cost Structures:

While cost-related findings were discussed, the research does not delve deeply into the financial modeling or detailed cost structures of carbon offset projects. There is need to have further insights into overcoming cost-related barriers and, understanding how different pricing models, project types, and funding mechanisms impact user perceptions and adoption.

5.7.10 Lack of Analysis on the Effectiveness of Current Offsetting Projects:

For example, this study contains an analysis of user perception and has not appraised the carbon offsetting projects for their environmental efficacy. It is very important to understand the real objectives of these projects if adaptation problems are to be resolved more easily..

Finding ways to address these limitations in future research could provide a more comprehensive understanding of the factors influencing the adoption of carbon offsetting platforms for business air travel, leading to more targeted and effective solutions.

5.8 Recommendations for Future Research

To improve the adoption rate of carbon offsetting platforms for business-related air travel there are several areas that further investigation, following sections will highlight some of the key areas that needed further research and investigation to provide further insights on wider adoption of carbon offset platforms.

5.8.1 Enhancing Transparency and Communication:

Future studies should incorporate attempts to increase the clarity and openness of carbon offset platforms so that effective and constructive criticism can be harnessed. This can be done, for example, by testing the use of various communication models or data presentation formats, or third-party validation in order to gauge trust and interaction. Understanding how this type of information needs to be presented to a business might help improve the platforms.

5.8.2 Standardization of Verification and Certification:

Additional studies should be conducted on globally recognized standards for carbon offset verification and certification processes. This may include exploring ways and means for certification bodies to establish more rigorous and uniform practices aligned with user's expectations. Conducting comparative studies on the effectiveness of various certification frameworks to provide insights into the more credible and efficient models.

5.8.3 Business Incentives:

The business incentive structures need more research to determine how to create robust ones that promote acceptance of a carbon offset platform by corporate entities. This may involve looking into monetary incentives, tax incentives, or placed in the society programs for recognition. Such knowledge on the type of incentives that can drive businesses to adopt carbon offset programs will influence platform structural design and policies**.**

5.8.4 User Education and Awareness:

Investigating the most effective educational strategies to raise awareness about carbon offsetting among business travellers and decision-makers is critical. Research could examine how targeted education campaigns influence business travel policies, especially in companies with sustainability goals. Studies focusing on the long-term effects of education on behaviour change in corporate travel programs would also be valuable.

5.8.5 Cost-Benefits of Carbon Offsetting to Businesses:

An exciting and promising line of future research will be on the carrying out of more in-depth cost benefit analysis of carbon offsetting during business travel. Knowledge and consideration of the costs and benefits associated with offsetting emissions related to air travel could assist in market setting for platform services in accordance with carbon offsetting strategies. Economic studies on the business of carbon offsetting for industries may produce pricing structures while increasing demand.

5.8.6 Technological Integration for Data Accuracy:

More research should be carried out on the possible building of modern technology that will enable a better connection between a carbon offset platform and other enterprise systems which include travel booking, expenditure tracking and emissions monitoring. Research into the contribution of various levels of automation of certain processes and the consequent labour savings could spur better design and usability of the platforms

5.8.7 Dealing with the Challenge of Trust:

It is very necessary to investigate the root causes of the scepticism that a group of businesses holds regarding carbon offsetting. Research could focus on psychological, social, and cultural factors that affect people's attitudes towards offsetting. Insights into what convinces businesses of possible constructive environment changes due to effective marketing may aid in increasing trust in such platforms.

5.8.8 Impact of Industry-Specific Factors:

Research on the industry specific carbon offsetting programs may provide useful information for creating the platforms based on the industry instead. For instance, how find out which sectors such as technology, finance and consulting that undergo varied air travel intensities adopt carbon offsetting and how the change in usage of large backs will fit onto those coverings in future.

As we have explained this whole research study, these areas when taken care of in future research will lead development and construction of more efficient and user stakeholders focused carbon offset solutions. This will result in better business air travel adoption and making meaningful contributions towards the sustainability objectives.

5.9 Conclusion

In due process of finding answers for research question the study identified key challenges and suggested the areas where carbon offsetting platforms can be improved. The challenges should be dealt with to improve their effectiveness in the fight against global warming. There seems to be a perception that there is low transparency in process, and this appears to be a major challenge as over half the respondents' expresses concern on transparency. Such platforms can improve trust and confidence by enhancing communication, increasing the availability of relevant information, and engaging independent auditors.

Verification and certification processes also appeared as a key subject that needed a lot of work. There is high user dissatisfaction with these processes and therefore it calls for platforms to keep their attention on transparency, efficiency, and better cost to value ratio. Another priority is improving the functionality of the current carbon offset applications, as the comments received from users were rather negative. Enhancing usability, more information provision, and resolving technical problems will be crucial for the increase in user satisfaction.

On the positive side, it appears that there is growing coherence in both the cost of carbon offset projects and their respective long cost sustainability plans, further indicating an upsurge in environmental concerns. Such issues include lack of confidence on the performance measure of carbon offsets and low standards for carbon offsets that limit fundamental acceptance. Almost 60 percent of respondents were doubtful which points to the necessity of greater and improved transparency, global standards and user education.

Furthermore, integration with other systems to obtain travel-related material, although some have realized success, is a struggle in most organizations. Solving this concern would be paramount in enhancing the efficiency and accuracy of tracking and reducing carbon.

At last, a further barrier to global acceptance is the absence of incentives and low understanding of context among non-business travelers. Carbon offset platforms can expedite usage and be more effective in meeting sustainability goals by increasing the financial benefits of accessing those incentives, making the incentives himself more up-front, and enhancing educational activities.

Last but not the least, to be able to meet these challenges such as transparency, robust standards, user education and incentives, tools to offset carbon must be further developed to be able to fully achieve their purpose.

CHAPTER VI:

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Summary

This research investigates the key challenges for the adoption of carbon offset platforms for business-related air travel, focusing on transparency, verification, application quality, cost, and organizational processes.

6.1.1 What are key challenges for adopting carbon offsetting platform by business organizations for business related air travel?

This research was able to identify major challenges in adaption .The findings reveal that majority of respondents perceive a lack of transparency in carbon offsetting platforms, highlighting a need for clearer communication, data accessibility, and third-party verification to build trust. User dissatisfaction with verification and certification processes further underscores the necessity of improving these mechanisms to align costs with perceived value.

The quality of existing carbon offset applications also emerged as a significant concern, with most users indicated need towards enhancements in usability, comprehensive information, and technical performance.

A promising insight is the strong alignment between project costs and organizational budgets, reflecting growing financial integration of sustainability into corporate planning. However, skepticism about the effectiveness of carbon offsetting remains high, with nearly

60% of respondents expressing doubts, suggesting that stronger global standards and better education are crucial for enhancing trust.

Moreover, while some businesses have successfully integrated carbon offset platforms with other systems, a substantial number have not, posing challenges related to data accuracy and efficiency. Addressing these through technological investments and training can improve platform performance. Additionally, the study identifies a lack of incentives as a significant barrier, with 67.44% of respondents emphasizing the need for governments and organizations to create financial rewards and simplify access to programs to encourage adoption.

6.1.2 Do these challenges vary across countries and cultures ?

The research also reveals geographical and industry-specific variations in the perception of challenges, stressing the importance of tailored, region-specific strategies to overcome barriers such as cost, awareness, and regulatory environments. Despite these challenges, larger organizations are more likely to adopt carbon platforms, though significant barriers still exist even within this group.

6.1.3 Do these challenges differ across industries?

Lack of Awareness was evidently differed across categories of the industries as new age industries working in digital space seems to be more aware than compared to others.

6.1.4 Does this challenge relate to size and type of business organization?

The data suggests that the likelihood of adopting a carbon platform increases with the size of the organization. However, there is still a substantial proportion of large organizations that have not adopted the platform, indicating potential challenges or areas for targeted intervention. Understanding the specific reasons behind the non-adoption and addressing those could help in increasing the overall adoption rates across all organization sizes.

Organizations face unique challenges in implementing carbon offsetting solutions through platforms. Public sector organizations face challenges in transparency, standards, and integration, while private sector companies, particularly technology companies, may seek quicker integration. Non-profit organizations may adapt easily, but still face limitations in transparency and integration.

6.1.5 Does the organizational practice and procedure impact adoption of carbon offsetting platform?

The responses concerning the processes of the organizations for the adaptation of the carbon offset platform reveals the organizations' willingness to adopt measures towards environmental sustainability. Of the majority of organizations, most of them are willing to adopt climate change actions, however, the concerns of the minority who are struggling are important in order to facilitate the use of carbon offset platforms by everyone. The restructuring of business processes, the strengthening of the internal organizational culture of sustainability, and the development of the organization's non-financial resources allow

increasing the effectiveness of business in the solution of the global climate change problems.

6.2 Implications

On September 13, 1970, when Friedman published his landmark piece, "The social responsibility of business is to increase its profits," in the New York Times, he wrote: "In a free-enterprise, private-property system, a corporate executive is an employee of the owners of the business. He has direct responsibility to his employers. That responsibility is to conduct the business in accordance with their desires, which generally will be to make as much money as possible while conforming to their basic rules of the society, both those embodied in law and those embodied in ethical custom*."* (Friedman,1970).

The findings from this research offer several important implications for both practitioners and policymakers seeking to improve the adoption and effectiveness of carbon offsetting platforms for business-related air travel. These implications highlight the need for strategic interventions and targeted efforts to address the identified challenges.

6.2.1 Enhancing Transparency:

The perception of a lack of transparency in carbon offsetting platforms poses a significant barrier to their adoption. This underscores the importance of platform developers and policymakers focusing on creating more open, verifiable, and accessible communication channels. Transparent reporting, including the provision of detailed project data,

certification standards, and outcomes, can enhance user trust and drive greater participation in carbon offset initiatives.

6.2.2 Improving Verification and Certification Processes:

Dissatisfaction with current verification and certification processes implies that improving these systems will be crucial to increasing user satisfaction and trust. Engaging third-party verifiers, simplifying certification protocols, and aligning costs with the value perceived by businesses can lead to higher adoption rates. Policymakers may need to consider regulations that standardize verification procedures globally to ensure credibility and consistency across platforms.

6.2.3 Addressing Quality and Usability of Carbon Offset Applications:

Concerns about the quality of existing carbon offset applications indicate a need for platform providers to prioritize user feedback, improve usability, and resolve technical issues. Addressing these aspects through continuous upgrades and user-centric designs will not only improve satisfaction but also contribute to the overall effectiveness of carbon offset efforts.

6.2.4 Alignment of Costs and Budgets:

The strong alignment between carbon offset project costs and long-term sustainability budgets highlights the potential for further integration of sustainability into corporate financial planning. This suggests that businesses are increasingly willing to invest in sustainability, but ongoing efforts should be made to demonstrate the financial and

environmental benefits of carbon offsetting to ensure continued support. Governments and organizations could also explore financial incentives to lower barriers for smaller businesses.

6.2.5 Building Trust in Verification:

Despite strong user belief in the verification processes, skepticism remains among a minority. To mitigate this, further emphasis on transparency and user education is essential. Policymakers and platform developers should consider initiatives to better communicate the environmental impact of carbon offset projects and the effectiveness of verification mechanisms to build sustained trust.

6.2.6 Promoting Integration of Platforms with Business Systems:

The lack of integration between carbon offset platforms and existing travel or business management systems highlights a need for investment in technical solutions that can automate data capture and carbon tracking. Addressing integration challenges will enhance efficiency, reduce manual effort, and improve the accuracy of emissions data, ultimately making carbon offset platforms more appealing to businesses.

6.2.7 Fostering Organizational Processes and Culture:

While many organizations have adopted carbon offset platforms, those facing internal barriers require targeted support. The research implies that enhancing organizational processes and embedding sustainability into core business practices will facilitate wider

adoption. Capacity-building efforts, such as training, knowledge sharing, and fostering a culture of sustainability, can further support this transformation.

6.2.8 Addressing Regional and Industry-Specific Challenges:

The regional and industry-specific variations in the challenges perceived indicate the need for tailored approaches. Policymakers and platform developers should consider region-specific regulations, awareness campaigns, and incentive structures to address diverse barriers across geographic contexts. Similarly, industry-specific strategies, especially in sectors with low awareness, can help target educational efforts and promote broader adoption.

6.2.9 Mitigating Skepticism through Education and Global Standards:

The significant skepticism about the effectiveness of carbon offsetting requires concerted efforts to educate users and standardize processes globally. Establishing and promoting globally recognized standards will be key to reducing skepticism and improving user confidence in carbon offset projects. Educational campaigns aimed at explaining how carbon offsetting works, its benefits, and the impact of various projects will be essential to changing perceptions.

6.2.10 Incentive Structures to Accelerate Adoption:

The research highlights a critical need for robust incentive structures to promote wider adoption of carbon offset platforms, particularly among organizations that have yet to engage. Policymakers, businesses, and platform developers must collaborate to design

incentives, such as tax breaks, subsidies, or regulatory benefits, that encourage participation. Financial rewards or simplifications in accessing incentive programs will help accelerate the adoption of carbon offset platforms and enhance sustainability outcomes.

These implications point to the need for a multi-faceted approach that includes transparency, better communication, enhanced certification processes, integration of technology, and industry-specific strategies. Addressing these areas through collaboration between governments, businesses, and platform developers will improve the adoption and effectiveness of carbon offsetting platforms, ultimately supporting global climate change mitigation efforts

6.3 Recommendations

To address these challenges and promote the effective adoption of carbon offsetting for business air travel, a comprehensive framework should be proposed. This framework should encompass guidelines for accurate emissions measurement, offset project selection, stakeholder communication, and the integration of carbon offsetting into broader sustainability strategies.

When asked for the wish-list the survey respondents if they would like to have Transparency of offsetting emissions, verification and certification of carbon credits, quality and verify reduction of emissions as the must have features in carbon offset platforms.

Figure 6.1:
Wish list of features to be in carbon offset platforms

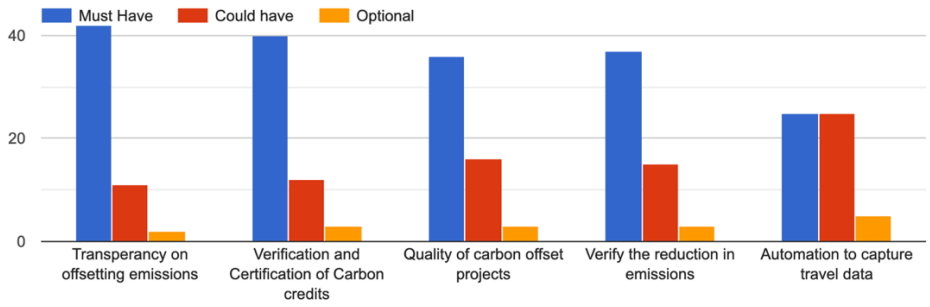


Image Source: Created by the Author

Based on the conclusions of this research, the following recommendations are proposed to improve the adoption and effectiveness of carbon offsetting platforms for business-related air travel:

6.3.1 Enhancement in Transparency of Carbon Offset Platforms:

Provide detailed, accessible information on the environmental impact of carbon offset projects. Implement third-party verification and publish independent audit results to build credibility. Foster stakeholder engagement by involving users, industry experts, and environmental organizations in the development and evaluation of platform processes.

6.3.2 Improvement in Verification and Certification Processes:

Streamline certification process to make them more efficient and user-friendly. Ensure that certification costs are as per perceived value of the platform to the users. Continuously engage with users for feedback on verification processes and incorporate changes to

enhance satisfaction. Promote global standards for certification to create consistency across platforms and regions.

6.3.3 Focus on Enhancing the Quality of Carbon Offset Applications:

Capture User feedback to identify pain points and improve the usability of applications. Provide comprehensive, real-time data on the impact and effectiveness of offset projects. Investing in robust, scalable technological infrastructure to address technical issues to ensure the seamless operation of platforms.

6.3.4 Aligning Carbon Offset Costs with Organizational Budgets:

Flexible Cost models to accommodate the varying financial capabilities of organizations. Promote the integration of sustainability into long-term financial planning, showing the return on investment for adopting carbon offset programs. Encourage financial incentives from governments or international bodies to lower the cost burden for businesses.

6.3.5 Strengthen Trust in Verification Processes:

Develop educational resources that clearly explain the verification process, addressing common concerns and misconceptions. Ensure that transparency in verification mechanisms is prioritized to maintain user confidence. Promote verified success stories and case studies demonstrating the positive environmental impacts of carbon offset projects.

6.3.6 Invest in Platform Integration with Business Systems:

Prioritize technical integration of carbon offset platforms with existing business travel and emissions tracking tools to reduce manual data entry and improve accuracy. Provide training and technical support to help organizations seamlessly integrate these platforms. Partner with software providers to ensure that carbon offset platforms are compatible with widely used business applications.

6.3.7 Support Organizational Change for Carbon Offset Platform Adoption:

Provide capacity-building programs to help organizations embed sustainability into their core processes. Encourage leadership to champion sustainability by fostering a culture of environmental responsibility within the organization. Address internal barriers by offering flexible solutions that cater to the specific needs of organizations facing adoption challenges.

6.3.8 Development of Region - and Industry-Specific Strategies:

Tailor awareness and education campaigns as per needs of specific regions and industries, addressing local challenges such as cost barriers or regulatory differences. Incentives that are adapted to region-specific economic and regulatory environments to foster greater adoption. Regional collaboration between governments, businesses, and platform developers to overcome localized challenges.

6.3.9 Address Skepticism through Education and Standardization:

Plan and execute training initiatives to raise awareness about the effectiveness of carbon offset projects. Establish global standards for carbon offsetting, focusing on transparency, consistency, and credibility across platforms. Environmental organizations to be engaged to advocate the effectiveness of carbon offsetting as a meaningful strategy to combat climate change.

6.3.10 Create Robust Incentive Structures:

Collaboration with governments and respective international bodies to design financial incentives (e.g., tax breaks, subsidies) that can reduce the cost of participating in carbon offsetting initiatives. Corporate sustainability reporting standards that promote and recognize and reward businesses for offsetting their carbon emissions. Simplify the process for accessing incentive programs by reducing bureaucratic hurdles and ensuring clear communication of benefits.

By considering these recommendations, carbon offsetting platforms can become more transparent, effective, and widely adopted, contributing significantly to cleaner environment.

6.4 Conclusion

This is now or never moment for climate change efforts , “According to the Intergovernmental Panel on Climate Change’s report 2025 is our ‘Now or Never’ cut-off

point to reduce greenhouse emissions if we want to save the future of the planet". (Harvey, 2022)

Based on the Survey results and the case studies it can be safely concluded that there is need to take measures by all stakeholders to improve adoption of carbon offsetting platforms with respect to business related air travel.Even with the limited resources and reach this research was able identify key challenges that should be addressed to improve adaptibilty and push towards offsetting the greenhouse gases (GHG) for better environment and achieving UN environmental goals.

Organizations like carbon offsetting plaform and relavent agencies need to be brought together to come up to rasise awareness as well as setting up standards, guidelines, and certification processes that are strong enough to cover shortcomings in existing product standards as applicable to carbon offsetting ecosystem.

Offering incentives is critical to encourage the businesses to embrace carbon offsetting platforms. This requires building an incentive structure that should foster carbon reduction efforts. Policymakers, industry stakeholders as well as organizations must therefore devise and implement incentive frameworks that should incentivize carbon reduction efforts. More studies need to be done to investigate whether or not such approaches are worthwhile or the ways to alter their efficacy to sustain such endeavors in future.

Cost effectiveness also plays a very critical role in scaling up the use of carbon offsetting platforms. Advanced technology and Artificial Intelligence(AI) can be leveraged to enhance the carbon offsetting procedures that may help to reduce the economic costs.

This Research identified Skepticism as a major challenge and it is more of a bottleneck in enhancing organizational trust, cooperation and effectiveness. It is suggested that business organizations need to focus and target the inbuilt lack of trust among the stakeholders as a way forward. It can also be possible to tackle skeptism through a healthy culture of openness and collaboration and by making sure that organizational values are consistent with stakeholders' expectations. More studies are needed to investigate skepticism further especially where trust is absent due to structural elements in organizations and to test the success of strategies developed to increase trust and reduce skepticism.

The research identified actions for businesses, carbon offsetting platforms and regulatory bodies that can help in avoiding or reducing the level of challenges faced in adaption of carbon offsetting platforms

6.4.1 Suggested Actions for Businesses and their sustainability teams:

Enhance Communication: Preparation of a communication strategy aimed at making it possible for information concerning the sustainability programs to be communicated to the employees on a routine basis without fail.

i. Better Training: Prepare such training programs that are specific to the management and the employees to be able to operate sustainably at varying levels because everybody is important.

ii. Encourage Sustainability: In every tier of the organization commitment to bring all employees to the integration of Sustainability initiatives is important to establish a culture where sustainability becomes a way of doing business in ever organization.

iii. Realization: Since there is a challenge that people need to accept in adaption, a realization, it would be necessary to determine every target audiences level of awareness. this will enable assessing the efficacy of communication and training strategies used in organization.

6.4.2 Suggested Actions for Carbon offset platforms:

Avoid Complicated Computation: It is possible to make a suggestion to carbon offset platforms to remove complicated computations. Instead various calculators and simulators should be provided to make it easier for users to understand the process. This is to assist companies to ascertaining their carbon footprint accurately and what carbon offset amount is needed.

i. Economize: The carbon offset platforms should look to sustain the costs of carbon offsetting importantly by reduction in prices, hence discounting or offering volume rates to the businesses and apply modern technologies in reducing operational costs.

ii. Improve Credibility: In handling the emissions situation, businesses have found it essential to improve their credibility and have sought certification and applied verification procedures to ensure that their offsetting efforts have been effective. This may increase the confidence level of companies in utilizing these platforms. Providers of carbon offsetting platforms need to retain independent third-party auditors to test and endorse the tenants of claims regarding reductions in carbon appropriations.

Use of officially recognized accreditation organisations, who may carry out third party monitoring, evaluation and learning of to enhance trustworthiness, including making third party evaluations publicly available to enhance trust.

iii. Establish Standards: The implementation of co or self regulation in carbon offsetting requires the development and adoption of relevant industry standards which reduce conflicts in carbon offsetting.

iv. Educational Initiatives: people comprehension toward the carbon offsetting system will be raised due to the actions to mend the relevant stakeholders attaching importance to the conducting of education webinars workshops and campaigns.

v. Continuous Improvement: Through obtaining user feedback and conducting periodic reviews. Carbon offsetting platforms can become more effective in meeting the needs of the user and in improving their satisfaction over an extended period of time.

6.4.3 Suggested Actions for Government and regulatory bodies:

Establish and enforce Compliance Standards: In order to build trust and effectiveness , there is need for indusry wide compliance and certification process to Audit and certify the cabon offsetting projects and its effectiveness.

i. Build incentive structure: As with advent and ease of air travel in emerging economies it is a right oppurtunity to provide incentives to encourage wide spread use of carbon offsetting.

ii. Make Carbon offset as part environment policy: Policy makers should consider carbon offsetting as a long term measure in fighting pollution and also as enabler to get capital for enironmental projects that have positive impact on environment.

iii. Mandatory reporting of green house gases emission : As part of ESG report the disclosure on the over all emission of scope 1 , 2 and 3 GHG should be made mandotory and business should own the extend of carbon offet needed of their operations.

It can be concluded that there are several challenges associated with the adoption of carbon offset platforms for business-related air travel. . However, by increasing awareness, simplifying calculation, reducing cost, improving credibility, and establishing standards, these challenges can be overcome, and businesses can make a significant contribution to reducing their carbon footprint.

APPENDIX A

SURVEY COVER LETTER

The cover letter is part of online survey distributed via social platforms such as LinkedIn, WhatsApp groups, Survey Circle etc. depending on where the researcher made initial contact with the participant.

“Dear Participant,

I am Agya and currently pursuing Doctoral research to find out challenges in adaptation of Carbon trading platform for business related air travel. Business related air travel is a major contributor of Green House Gases (GHG) as flights account for about 90% of business travel emissions. That makes it the lowest-hanging fruit for companies setting reductions targets.

By clicking the consent checkbox, you are providing your consent to take part in this online survey. This survey will not store your email and personal data unless you agree and provide that in the relevant section of this survey.

Under no circumstances would any information obtained from you be revealed to someone. Your information would be kept confidential for this research only, and no names, or identity would be revealed. Everything would be anonymous. After the investigation is done, your information would be destroyed. Nonetheless, in case further studies are to be done, I would seek your further consent first, but then the same rules governing the confidentiality would be applied.

Your valuable insights will help to identify challenges and help stakeholders to find means of reducing and offsetting Greenhouse gases due to business related air travel.

Please provide your feedback and responses to the following questionnaire as your feedback may help to shape the results of this research.

For further information and details, you can reach me at:

agyapal.singh@gmail.com."

APPENDIX B

SURVEY QUESTIONAIRE

The online survey was divided in following sections to collate the information from the respondents :

SECTION 1 – General

Sr. No.	Type	Question
1	Informed consent	By clicking this checkbox, I agree to participate in the Survey
2	Demographic information	Where are you located?
3	Organizational Information	What is the type of organization you are working with?
4	Sustainability Awareness	Does your organization have Net Zero goal?
5	Organizational Information	How many employees work in your organization?
6	Organizational Information	What is the overall Annual Revenue in million USD?
7	Organizational Information	Which industry are you from?
8	Travel information	Approximately how many air miles do you travel during one year?

SECTION 2 – For users of Carbon offset platform for offsetting Air travel

Sr. No.	Type	Question
9	Carbon offset platform Information	Are you currently using Carbon offset platform in your Organization for Offsetting emissions from Air Travel?
10	Carbon offset platform Information	The existing Carbon offsetting platform is transparent in providing information about effectiveness of carbon reduction efforts.
11	Carbon offset platform Information	Are you satisfied by the Verification and certification provided by your existing carbon trading platform
12	Carbon offset platform Information	Are you satisfied by the Quality of carbon offset projects?
13	Carbon offset platform Information	Are the carbon offset project costs being as per your long-term budget allocations?
14	Carbon offset platform Information	Are you able to verify the reduction in emissions as claimed by the carbon offset platform?

15	Carbon offset platform Information	Is your current carbon offset platform integrated with other applications to capture the business-related travel data?
16	Carbon offset platform Information	Is your organizational processes enables adaption of carbon offset platform
17	Carbon offset platform Information	Please mention if there any other challenges faced in using carbon offsetting platforms

SECTION 3– For Non users of Carbon offset platform

Sr. No.	Type	Question
18	Carbon offset platform Information	In your opinion what are reasons for not using Carbon offset platforms to offset the Green-House Gasses emissions due to air travel: [Lack of awareness]
19	Carbon offset platform Information	In your opinion what are reasons for not using Carbon offset platforms to offset the Green-House Gasses emissions due to air travel: [Cost factor-financial constraints]
20	Carbon offset platform Information	In your opinion what are reasons for not using Carbon offset platforms to offset the Green-House Gasses emissions due to air travel: [Skepticism on effectiveness of carbon offsetting]
21	Carbon offset platform Information	In your opinion what are reasons for not using Carbon offset platforms to offset the Green-House Gasses emissions due to air travel: [Inadequate Standards]
22	Carbon offset platform Information	In your opinion what are reasons for not using Carbon offset platforms to offset the Green-House Gasses emissions due to air travel: [Lack of Incentives]
23	Carbon offset platform Information	In your opinion what are reasons for not using Carbon offset platforms to offset the Green-House Gasses emissions due to air travel: [Regulatory environment]
24	Carbon offset platform Information	Reasons that are not mentioned in above list

SECTION 4– Wishlist for Carbon offset platform

Sr. No.	Type	Question
25	Carbon offset platform Information	In your opinion what are features you would wish to be in the Carbon offset platforms to be used to offset the Green-House Gasses emissions due to air travel: [Transparency on offsetting emissions]
26	Carbon offset platform Information	In your opinion what are features you would wish to be in the Carbon offset platforms to be used to offset the Green-House Gasses emissions due to air travel: [Verification and Certification of Carbon credits]
27	Carbon offset platform Information	In your opinion what are features you would wish to be in the Carbon offset platforms to be used to offset the Green-House Gasses emissions due to air travel: [Quality of carbon offset projects]
28	Carbon offset platform Information	In your opinion what are features you would wish to be in the Carbon offset platforms to be used to offset the Green-House Gasses emissions due to air travel: [Verify the reduction in emissions]
29	Carbon offset platform Information	In your opinion what are features you would wish to be in the Carbon offset platforms to be used to offset the Green-House Gasses emissions due to air travel: [Automation to capture travel data]
30	Carbon offset platform Information	Must have features that are not included in above mentioned list:
31	Carbon offset platform Information	Could Have features that are not included in above mentioned list:
32	Carbon offset platform Information	Optional features that are not included in above mentioned list:

SECTION 5– Survey related information

Sr. No.	Type	Question
33	Survey related information	Do you wish to share any comments or feedback regarding to this survey?
34	Survey related information	In case you would like to get future updates please provide your email address:

APPENDIX C

INTERVIEW CONSENT FORM

Interview Consent Form

Research project title: CHALLENGES IN ADAPTATION OF CARBON OFFSETTING APPS BY COMPANIES FOR BUSINESS RELATED AIR TRAVEL

Research investigator: Agya Pal Singh

Research Participants name:

The interview will take 30 minutes. We don't anticipate that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

Thank you for agreeing to be interviewed as part of the above research project. Ethical procedures for academic research require that interviewees explicitly agree to being interviewed and how the information contained in their interview will be used. This consent form is necessary for us to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation. Would you therefore read the accompanying **information sheet** and then sign this form to certify that you approve the following:

- the interview will be recorded and a transcript will be produced
- you will be sent the transcript and given the opportunity to correct any factual errors
- the transcript of the interview will be analysed by (name of the researcher) as research investigator
- access to the interview transcript will be limited to (name of the researcher) and academic colleagues and researchers with whom he might collaborate as part of the research process
- any summary interview content, or direct quotations from the interview, that are made available through academic publication or other academic outlets will be anonymized so that you cannot be identified, and care will be taken to ensure that other information in the interview that could identify yourself is not revealed
- the actual recording will be (kept or destroyed state what will happen)

- any variation of the conditions above will only occur with your further explicit approval

Or a quotation agreement could be incorporated into the interview agreement

Quotation Agreement

I also understand that my words may be quoted directly. With regards to being quoted, please initial next to any of the statements that you agree with:

	I wish to review the notes, transcripts, or other data collected during the research pertaining to my participation.
	I agree to be quoted directly.
	I agree to be quoted directly if my name is not published and a made-up name (pseudonym) is used.
	I agree that the researchers may publish documents that contain quotations by me.

All or part of the content of your interview may be used;

- ☐ In academic papers, policy papers or news articles
- ☐ On our website and in other media that we may produce such as spoken presentations
- ☐ On other feedback events
- ☐ In an archive of the project as noted above

By signing this form I agree that;

1. I am voluntarily taking part in this project. I understand that I don't have to take part, and I can stop the interview at any time;
2. The transcribed interview or extracts from it may be used as described above;
3. I have read the Information sheet;
4. I don't expect to receive any benefit or payment for my participation;
5. I can request a copy of the transcript of my interview and may make edits I feel necessary to ensure the effectiveness of any agreement made about confidentiality;
6. I have been able to ask any questions I might have, and I understand that I am free to contact the researcher with any questions I may have in the future.

_____
Printed Name

_____
Participants Signature **Date**

_____
Researchers Signature **Date**

Contact Information

This research has been reviewed and approved by the Edinburgh University Research Ethics Board. If you have any further questions or concerns about this study, please contact:

Agya Pal Singh
Gurgoan, India
Tel: +91 8373911509
E-mail: agyapal.singh@gmail.com

You can also contact Agya Pal Singh's supervisor:

Dr. Hrvoje Volarević
E-mail: hrvoje@ssbm.ch

What if I have concerns about this research?
If you are worried about this research, or if you are concerned about how it is being conducted, you can contact SSBM by email at contact@ssbm.ch.

Add names of any associated funding bodies and their logos

APPENDIX D

ETHICS APPLICATION FORM

Section 1: Applicant Details	
First Name	Agya Pal
Last Name	Singh
Faculty	Choose an item.
Co-researcher Names (internal and external) Please include names, institutions and roles. If there are no co-researchers, please state N/A.	Click or tap here to enter text. N/A
Is this application for a staff or a student?	Student
Student Course details	Postgraduate Research
Name of Director of Studies / Supervisor	Dr. Hrvoje Volarević
Comments from Director of Studies / Supervisor *For student applications, supervisors should ensure that all of the following are satisfied before the study begins:* • *The topic merits further research;* • *The student has the skills to carry out the research;* • *The participant information sheet is appropriate; and procedures for recruitment of research participants and obtained informed consent are appropriate.* *The supervisor must add comments here. Failure to do so will result in the application being returned*	
Click or tap here to enter text.	

Section 2: Project	
Section 2:1 Project details	
Full Project Title	
CHALLENGES IN ADAPTATION OF CARBON OFFSETTING APPS BY COMPANIES FOR BUSINESS RELATED AIR TRAVEL	
Project Dates These are the dates for the overall project, which may be different to the dates of the field work and/or empirical work involving human participants.	
Project Start Date	20/07/2022
Project End Date	19/07/2025
Dates for work requiring ethical approval	

You must allow **at least 6 weeks** for an initial decision, plus additional time for any changes to be made.	
Start date for work requiring ethical approval	31/03/2024
End date for work requiring ethical approval	31/03/2025
How is the project funded? (e.g. externally, internally, self-funded, not funded – including scholarly activity) Please provide details.	
Self-Funded	

Is external ethics approval needed for this research?	No
If Yes please provide the following: For NHS Research please provide a copy of the letter from the HRA granting full approval for your project together with a copy of your IRAS form and supporting documentation, including reference numbers. Where review has taken place elsewhere (e.g. via another university or institution), please provide a copy of your ethics application, supporting documentation and evidence of approval by the appropriate ethics committee.	
Click or tap here to enter text.	
Section 2:2 Project summary	
Please provide a concise summary of the project, including its aims, objectives and background. (maximum 400 words) Please describe in non-technical language what your research is about. Your summary should provide the committee with sufficient detail to understand the nature of the project, its rationale and ethical context.	
With this research we intend to know the key challenges in adopting the Carbon offset applications for business related air travel. With this study we can improve our understanding on the challenges faced by various stakeholders in effectively using carbon offsetting platforms.	
What are the research questions the project aims to answer? (maximum 200 words)	
1. What are key challenges for adopting carbon offsetting platform by business organizations for business related air travel? 2. Do these challenges vary across countries and cultures? 3. Do these challenges differ across industries? 4. Does this challenge relate to size and type of business organization? 5. Does the organizational practices and procedure impact adoption of carbon offsetting platform?	
Please describe the research methodology for the project. (maximum 250 words)	
The primary research will be done to build the conceptual model based on the relevant data collected by primary data methods of Survey and interviews. Secondary sources existing studies and reports will also be studied pertaining to Challenges in adoption of Carbon offset platforms.	

Section 3: Human Participants	
Does the project involve human participants or their data? *If not, please proceed to Section 5: Data Collection, Storage and Disposal, you do not need to complete sections 3-4.*	Yes

Section 3.1: Participant Selection	
Who are your participants?	
Data will be collected through a questionnaire and interviews from employees and sustainability officers	
Will you be recruiting students as research participants who are from outside your faculty and/or from multiple faculties? If you plan to recruit student participants from across UWE (rather than solely from your home faculty) your ethics application will be reviewed by UREC instead of the FREC.	No
Please explain the steps you will take to select your participant sample.	
An internet based survey using various professional, academic, and personal channels available. Participants completing the survey and meeting the criteria will then be used for quantitative analysis	
Please explain how you will determine the sample size.	
It is not possible to calculate the sample size based and target group of 100 participants was approached whereas 60 has responded to online survey	
Please tell us if any of the participants in your sample are vulnerable, or are potentially vulnerable and explain why they need to be included in your sample. NB: Please do not feel that including vulnerable, or potentially vulnerable participants will be a bar to gaining ethical approval. Although there may be some circumstances where it is inappropriate to include certain participants, there are many projects which need to include vulnerable or potentially vulnerable participants in order to gain valuable research information. This particularly applies to projects where the aim of the research is to improve quality of life for people in these groups. Vulnerable or potentially vulnerable participants that you **must** tell us about: • Children under 18 • Adults who are unable to give informed consent • Anyone who is seriously ill or has a terminal illness • Anyone in an emergency or critical situation • Anyone with a serious mental health issue that might impair their ability to consent, or cause the research to distress them • Young offenders and prisoners • Anyone with a relationship with the researcher(s) • The elderly	
N/A	
Section 3.2: Participant Recruitment and Inclusion	
How will you contact potential participants? Please select all that apply.	
☐ Advertisement ☒ Emails ☒ Face-to-face approach	

☐ Post ☒ Social media ☐ Telephone calls ☐ Other If Other, please specify: Click or tap here to enter text.
What recruitment information will you give potential participants? Please ensure that you include a copy of the initial information for participants with your application.
Copy of Information sheet is attached.
How will you gain informed written consent from the participants? Please ensure that you include a copy of the participant information sheet and consent form with your application.
Copy of Participant information sheet and consent form is attached.
What arrangements are in place for participants to withdraw from the study?
The data related to participant will be deleted in case participant decide to withdraw from study any point before completion of study and will be intimated in writing.

Section 4: Human Tissue	
Does the project involve human tissue?	No

If you answer 'No' to the above question, please go to Section 5

Please describe the research methodology that you will use.

This should include an explanation of why human tissue is required for the project and a description of the information that you and the research team will have access to about the participants/donors.

Click or tap here to enter text.

Please describe how you propose to obtain/collect, process, securely store and dispose of the human tissue.

Click or tap here to enter text.

Please explain if and how samples will be anonymised.

Where samples are not anonymised, please explain how confidentiality will be maintained, including how this information will be securely and appropriately stored and disposed of.

Click or tap here to enter text.

Section 5: Data Collection, Storage and Disposal

Research undertaken at SSBM by staff and students must be GDPR compliant. guidance see

☒Please confirm that you have included the SSBM Privacy Notice with the Participant Information Sheet and Consent Form

☒ By ticking this box, I confirm that I have read the Data Protection Research Standard, understand my responsibilities as a researcher and that my project has been designed in accordance with the Standard.

Section 5.1 Data Collection and Analysis

Which of these data collection methods will you be using? Please select all that apply.

☒ Interviews
☒ Questionnaires/surveys
☐ Focus groups
☐ Observation
☒ Secondary sources
☐ Clinical measurement
☒ Digital media

☐ Sample collection ☐ Other If Other, please specify: Click or tap here to enter text. Please ensure that you include a copy of the questionnaire/survey with your application.
What type of data will you be collecting?
☐ Quantitative data ☒ Qualitative data
Please describe the data analysis and data anonymisation methods.
No Personal sensitive information is collected and stored.
Section 5.2 Data Storage, Access and Security
Where will you store the data? Please select all that apply.
☐ H:\ drive on UWE network ☐ Restricted folder on S:\ drive ☐ Restricted folder on UWE OneDrive ☒ Other (including secure physical storage) If Other, please specify: Data will be stored on the researcher's secured physical drive and a backup on a secured cloud drive.
Please explain who will have access to the data.
Only the researcher and mentor will have access to the data.
Please describe how you will maintain the security of the data and, where applicable, how you will transfer data between co-researchers.
The data will be stored in a secured online cloud drive with two factor authentication enabled on the account. Any attempt at access will require a code from a device that only the researcher will possess.
Section 5.3 Data Disposal
Please explain when and how you will destroy personal data.
There is no personal data collected and stored and collected information will be deleted from cloud drive after one year of completion of research.

Section 6: Other Ethical Issues
What risks, if any, do the participants (or donors, if your project involves human tissue) face in taking part in the project and how will you address these risks?
None
Are there any potential risks to researchers and any other people as a consequence of undertaking this project that are greater than those encountered in normal day-to-day life?

None
How will the results of the project be reported and disseminated? Please select all that apply.
☐ Peer reviewed journal ☐ Conference presentation ☐ Internal report ☒ Dissertation/thesis ☐ Written feedback to participants ☐ Presentation to participants ☐ Report to funders ☐ Digital media ☐ Other If Other, please specify: Click or tap here to enter text.

Does the project involve research that may be considered to be security sensitive? For further information	No

Please provide details of the research that may be considered to be security sensitive.
N/A

Does the project involve conducting research overseas?	No
Have you received approval from your Head of Department/Associate Dean (RKE) and is there sufficient insurance in place for your research overseas?	Not applicable

Please provide details of any ethical issues which may arise from conducting research overseas and how you will address these.
Click or tap here to enter text.

Section 7: Supporting Documentation
Please ensure that you provide copies of all relevant documentation, otherwise the review of your application will be delayed. Relevant documentation should include a copy of: • The research proposal or project design. • The participant information sheet and consent form, including a UWE privacy notice. • The questionnaire/survey. • External ethics approval and any supporting documentation.

Please clearly label each document - ensure you include the applicant's name, document type and version/date (e.g. Joe Bloggs - Questionnaire v1.5 191018).

Section 8: Declaration

☒ By ticking this box, I confirm that the information contained in this application, including any accompanying information is, to the best of my knowledge, complete and correct. I have attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my obligations and the right of the participants.

Name: Agya Pal Singh
Date: 15/02/2024

This form should be submitted electronically to the Mentor/Supervisor/Director of Studies where applicable, together with all supporting documentation (research proposal, participant information sheet, consent form etc).
Please provide all the information requested and justify where appropriate.

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