FACTORS AFFECTING EGYPTIAN TOUR OPERATORS' ABILITY TO MITIGATE CLIMATE CHANGE

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ABSTRACT

This study delves into the factors shaping the ability of Egyptian tour operators to address climate change impacts, utilizing empirical analysis to identify and assess their influence. Employing quantitative research techniques through an online questionnaire administered to 114 tour operators in Egypt, the study aims to offer practical insights for managers, contributing valuable guidance for decision-making and strategic planning in the tourism industry. The research distinguishes the most and least influential factors, revealing four statistically proven major influences on tour operators' capacity to mitigate climate change: tourists' desires, government policies, climate finance, and Corporate Social Responsibility (CSR). Conversely, mindset exhibits a limited influence, while environmental psychology indicates a moderate effect on tour operators' capacity to address climate change. These findings provide a comprehensive understanding of the intricate dynamics at play in the Egyptian tourism sector, facilitating informed strategies for sustainable practices and environmental responsibility. The study presents theoretical insights, alongside practical implications designed for tour operators, and policymakers involved in tourism businesses.

KEYWORDS: Climate Change- Climate Mitigation- Tour Operators- Mitigation Strategies in Tourism- Mitigation measures.

INTRODUCTION

The United Nations Sustainable Development Goals (UNSDGs) designate Climate Action as Goal 13, emphasizing the urgent need for measures to address climate change. The swift warming of the climate, with a 1.2-degree Celsius increase in global temperatures since 1880, necessitates immediate action (United Nations Development Program, 2023). Atmospheric CO_2 concentration, a primary greenhouse gas responsible for

over two-thirds of global warming, has reached its highest documented level. To meet the goal of limiting global warming to 1.5°-2.0 °C, the tourism industry must align its emission reduction efforts with other sectors, aiming to halve emissions by 2030 and achieve net-zero emissions by mid-century (Gößling et al., 2023).

The global tourism industry, a significant economic contributor, has doubled in the last 25 years, with 2.40 billion arrivals in 2019. In that year, tourism directly or indirectly contributed to 10.3% of global GDP, providing 330 million jobs. Organizations like the WTTC and UNWTO advocate tourism as a tool for poverty reduction and cultural heritage preservation. However, being a highly climate-sensitive sector, tourism contributes approximately 8% of global carbon emissions, mainly from transportation, accommodation, and various activities. Travelers from high-income countries, notably U.S. tourists, are major contributors, and as the number of travelers rises, the environmental impact of tourism is expected to grow. Specifically, transportation emissions in 2020 were 7.10 billion tons, with a concerning percentage increase, as reported by Lee et al. (2021) and Ritchie, Pablo, and Max. (2020). Figure 1 illustrates the distribution of CO_2 emissions by mode of transportation.
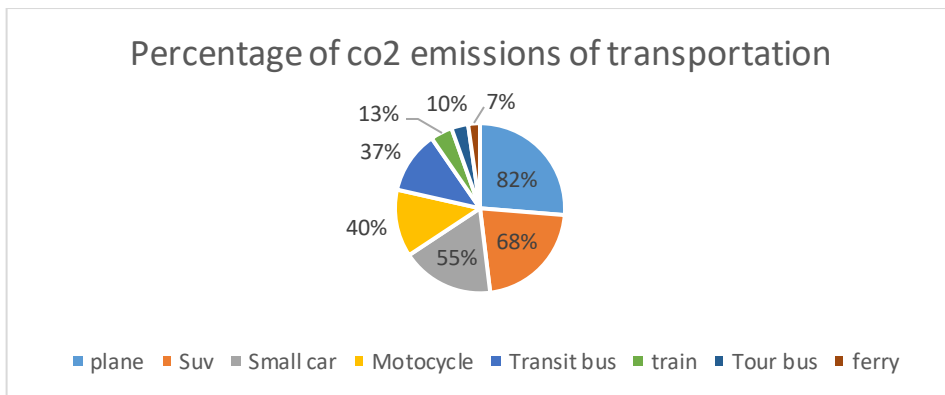

Figure 1: Percentage of CO2 emissions of transportation.
Source: Climate Watch (2023) – data. OurWorldInData.org/co2-and-greenhouse-gas-emissions

In response to challenges of climate change on tourism, Egypt has actively committed to environmental sustainability in tackling climate change challenges in tourism. Key initiatives, including the establishment of the National Council for Climate Change and the introduction of the National Climate Change Strategy 2050, demonstrate a proactive approach for a resilient and ecologically responsible economy. The 2018 reform program by the Egyptian Ministry of Tourism addressed various aspects in

alignment with global trends. Collaborating with the UNDP's Mainstreaming Biodiversity in Egypt's Tourism (MBDT) initiative, Egypt introduced the Green List (GL) in 2022, highlighting environmentally and culturally responsible tourism establishments. The Egyptian Sustainable Tourism Portal (ESTP) launched in the same year marks the country's inaugural effort to promote sustainable tourism. In a significant move, the Ministry of Tourism and Antiquities mandated certification for Sharm El Sheikh hotels and tourist establishments in January 2022, confirming adherence to environmentally friendly practices and sustainable tourism principles (Bhuiyan, Elghoubashy,, Elghamrawi, Salama,, & Shazly,, 2022).

RESEARCH GAP

Despite a plethora of literature on climate change impacts and climate mitigations(Simpson, Gössling, Scott, Hall, and Gladin, 2008, Becken and Hay 2007; Dawson et al. 2010, Shakeela, & Becken, 2015, Diana, & Victor, 2015, Sibitane,, 2022, and Leal, 2023), limited research is done on the factors affecting business organizations' ability to mitigate climate change in general and Egyptian tour operators' ability to mitigate climate change in particular (Paul, et al, 2023, Michailidou et al., 2016; Scott & Gössling, 2018).

PROBLEM STATEMENT

The Egyptian government, along with the Ministry of Tourism and Antiquities, demonstrates a proactive approach by implementing various policies aimed at mitigating the impact of climate change stemming from the operations of travel agencies. These policies likely encompass regulations, incentives, and guidelines to encourage sustainable practices within the tourism sector. The commitment of the government and the ministry reflects a broader recognition of the importance of addressing environmental concerns associated with travel and tourism activities.
However, the effectiveness of these policies is contingent on various factors that can either augment or impede the efforts of Egyptian travel agencies to mitigate the effects of climate change. Understanding these factors is crucial for enhancing the overall sustainability of the tourism industry. It is within this context that the present study assumes significance, serving as an exploratory research endeavor.

OBJECTIVES

This study is an exploratory research aims at achieving the following goals:

1. Investigating primary factors influencing the capacity of Egyptian tour operators to mitigate climate change effects.
2. Identifying and assessing varying degrees of impact of these influential factors on tour operators.
3. Utilizing empirical analysis to distinguish the most and least influential factors.
4. Providing practical insights tailored for tour operators' managers based on the study's findings.
5. Offering valuable guidance for managerial decision-making and strategic planning in the tourism industry by highlighting significant factors in climate change mitigation for Egyptian tour operators.

LITERATURE REVIEW

THE RELATIONSHIP BETWEEN TOURISM AND CLIMATE CHANGE

The relationship between tourism and climate change has been extensively examined in academic literature, revealing two contrasting perspectives. The first perspective characterizes tourism as a significant contributor to climate change, attracting criticism for its adverse environmental effects, particularly considering concerns about 'over-tourism.' Policymakers increasingly recognize the immediate negative impacts of tourism on destinations and residents' well-being (Leal, et al, 2023). The debate on the impact of tourism on climate change has been ongoing since the latter decades of the twentieth century, with recent years witnessing a surge in research dedicated to comprehending this relationship, as evident in studies by Hall et al. (2015), Kajan and Saarinen (2013), Scott (2010), and Scott and Becken (2010).

Conversely, the second perspective focuses on the influence of climate change on tourism, elucidating various dimensions. This impact occurs directly through weather changes, leading to severe weather conditions or reduced snowfall in winter sports destinations. Indirect effects manifest in alterations to landscape aesthetics, biodiversity loss, diminished water availability, and increased disease prevalence. Climate change can also exert societal impacts, potentially resulting in social unrest and political instability. Furthermore, mitigation policies are considered, as they have the potential to alter tourists' travel patterns (Haider, et al., 2021; Gordon, 2023).

DEFINING CLIMATE MITIGATION

Addressing the adverse effects of climate change on the tourism industry has witnessed slight development in the terminology used. Mitigation of climate change impacts first appeared to reduce the sources or enhance the sinks of greenhouse gases (Alsabbag, and Wahee., 2022). Mitigating climate change entails minimizing the release of heat-trapping greenhouse gases into the atmosphere. This process involves reducing the emissions of greenhouse gases from key sources, including power plants, factories, vehicles, and agricultural activities. (European Environmental Agency, 2023). In 2016 The World Bank introduced the Mitigation Action Assessment Protocol (MAAP) to evaluate, compare, and benchmark the effectiveness and risks of climate actions. MAAP consists of four modules designed for project or program-level assessments, focusing on mitigation action design, management entity capacity, financial sustainability of mitigation activities, and development benefits. In May 2021, with the backing of the Partnership for Market Readiness (PMR), two additional versions of MAAP were created and tested. These versions aim to assist countries in assessing, preparing for, and engaging in domestic carbon pricing instruments and international carbon markets.(the World Bank, ND). Leal (2023) identifies three components of the tourism sector(system) that should mitigate the impact of climate change on tourism: destination, travel agencies, and tourists. The responsibility for transitioning to sustainable practices falls on destinations, tour operators, tourist offices, and long-haul transport services, with a particular emphasis on the aviation industry.

Later, the term climate change adaptation appeared to refer to the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities Climate change adaptation aims to diminish the susceptibility of natural, social, economic, built, and institutional systems to the potential risks posed by climate change(ICEM, 2011). According to the International Monetary Fund Adaptation and Mitigation represented the primary responses to climate change, forming two complementary aspects of the same strategy. Mitigation focuses on addressing the root causes of climate change, while adaptation is geared towards managing and addressing the impacts that result from it. Together, these approaches work in tandem to tackle the multifaceted challenges posed by climate change.(IMF, Nd). Amongst the different sub-sectors of the tourism industry, tour operators can play a crucial role in mitigating climate change by bundling comprehensive travel packages for tourists, encompassing transportation, accommodation, and activities. Their influence on

emissions is significant, with the ability to offer energy-efficient transport and environmentally conscious accommodations. Additionally, tour operators contribute by marketing low-carbon packages, and promoting alternatives like rail travel, cycling, and energy-efficient car rentals. Increasing the average length of stay is another key function, effectively reducing the overall carbon footprint of tourism, especially when coupled with a decline in the average number of journeys made by a tourist over a given period.(Simpson, Gössling, Scott, Hall, and Gladin,2008).

FACTORS AFFECTING TOUR OPERATORS' ABILITY TO CLIMATE MITIGATION

Literature review presents six factors that can substantially affect tour operators' ability to mitigate climate change as follows:

THE MINDSET OF TOURISM PRACTITIONERS: The most crucial factor influencing tour operators' ability to engage in climate mitigation is their mindset. Dwyer (2017) notes that the mindset of tourism practitioners often leans towards individualism and short-term orientation, with a prevailing "business as usual" doctrine governing their approach. This mindset translated into many business behaviors that support the rapid expansion and growth of tourism activity at the expense of nature and environment reservation, and the idea of sustainability.(Baloch, Shah, Iqbal, et al., 2023). The industry has witnessed a persistent debate between environmentalists advocating for degrowth and tourism practitioners advocating for growth. Dredge (2022) proposes a shift in mindset towards regenerative tourism, representing a fundamental change in how individuals in the industry understand, approach, and act about travel and tourism. This new mindset aims to ensure that travel and tourism contribute a net positive benefit to people, places, and nature. It emphasizes the long-term renewal and flourishing of social and ecological systems, reflecting a departure from traditional growth-focused approaches to a more sustainable and regenerative perspective.

CORPORATE SOCIAL RESPONSIBILITY(CSR): Weaver (2006) contends that assessing the role of tour operators in climate change mitigation should be viewed within the broader framework of "Corporate Social Responsibility" (CSR). In this context, ethical considerations toward the environment, tourists, and nations serve as catalysts prompting travel agencies to consider and engage in climate mitigation efforts. Recognizing these ethical responsibilities becomes a driving force for tour operators to address their impact on climate change as part of their broader commitment to corporate social responsibility.

ENVIRONMENTAL PSYCHOLOGY: Gifford, et al (2011) goes further by drawing on environmental psychology. For him, four factors have direct

effects on environmental action taken by tour operators: the personal attitude towards the required environmental action; pressure from the close social environment of the person (parents, partner, friends, etc.); perception of feasibility or difficulty of the required environmental action; and past personal experiences with the required environmental action.

TOURISTS' DESIRES: for Zotz A. (2008), the potential of tour operators to engage in mitigation efforts is closely tied to consumers' willingness to support such measures. However, there exists a notable gap between consumers expressing their readiness to back mitigation initiatives and the actual actions they take. This divergence highlights the importance of understanding and addressing the factors influencing consumers' behavior to bridge the gap and encourage tangible support for mitigation initiatives in the tourism industry.

CLIMATE FINANCE: Climate finance refers to the financial resources and instruments allocated to support actions and initiatives addressing climate change. These funds are specifically dedicated to activities and projects aimed at mitigating or adapting to the impacts of climate change (Hess et al, 2017). Climate finance plays a crucial role in facilitating the transition to a more sustainable and climate-resilient future by providing the necessary economic support for environmentally friendly projects, clean energy initiatives, and strategies to cope with the challenges posed by a changing climate.(United Nations Development Program, 2023)

GOVERNMENT POLICIES: Policies aimed at addressing climate change can introduce costs for businesses, particularly those with significant greenhouse gas emissions. This could potentially impact their competitiveness on a global scale. However, such measures can also serve as catalysts for innovation and create growth opportunities. In response to climate policies, companies may develop and adopt more sustainable practices, technologies, and products, positioning themselves for success in a changing economic and environmental landscape. (Muûls, 2022). Generally, government policies can introduce both or wither cost and/or incentives for tour operators. OECD provides some of these policies such as green investment, regulation, taxes, and targeted subsidies, leading by example, and education.

MITIGATION STRATEGIES IN TOURISM

Zotz A. (2008) classifies management strategies used in the tourism industry into five groups: Zotz A. (2008) categorizes management strategies within the tourism industry into five key groups. Firstly, Technological Innovation involves adopting fuel-efficient practices, exploring alternative fuels, incorporating renewable energies, and utilizing

innovative technologies. Secondly, Cultural Change Towards Low-Carbon Traveling seeks to transform social norms, habits, and practices related to travel, emphasizing low-carbon choices. Thirdly, Modal Shift advocates for a transition from carbon-intensive to carbon-efficient transport modes, promoting rail and bus travel over air and car transportation. Additionally, Mobility Management focuses on optimizing transportation systems, coordinating various modes, and promoting sustainable mobility through initiatives like public transportation improvements and traffic demand management. Finally, Carbon Offsetting involves compensating for emissions by investing in projects that reduce or capture an equivalent amount of carbon elsewhere, providing a means for individuals, companies, or organizations to balance their carbon footprint.

MITIGATION MEASURES TO CLIMATE CHANGE OF TOUR OPERATORS

There is a recognized imperative to address emissions in the tourism sector, prompting calls for appropriate policies (Gossling and Hall 2008; Scott et al. 2010). In response, the UNWTO proposed specific mitigation actions in 2008, urging travelers to choose closer destinations, opt for public transportation over aviation, and providing incentives for travel agencies to enhance energy and carbon efficiency (UNWTO, 2008). The tourism industry faces increased scrutiny due to heightened awareness of the carbon footprint associated with travel (Becken and Hay 2007; Dawson et al. 2010). Gössling, et al (2023) emphasize the crucial role of tour operators in climate mitigation by reevaluating destination choices, favoring closer alternatives to diminish the environmental impact. They suggest avoiding the promotion of long-haul destinations, recognizing their disproportionate emissions. Supporting low-carbon holiday options and implementing carbon labeling empower tourists to make eco-conscious choices, fostering a shift towards sustainable tourism. Tour operators are encouraged to develop appealing low-carbon products, such as train-based holidays, capitalizing on the growing interest in eco-friendly travel and potentially attracting a new customer base committed to sustainable choices.

Mitigation measures for climate change within tour operators involve strategies and actions aimed at reducing the environmental impact of their operations. Here are some potential mitigation measures(Shakeela & Becken, 2015, Diana & Victor, 2015, and Sibitane, 2022):

1. **Promoting Sustainable Transportation**: Encourage the use of eco-friendly transportation options for travel, such as electric or hybrid vehicles, and promote public transportation and carpooling.

2. **Energy Efficiency**: Implement energy-efficient practices in offices and facilities, including the use of renewable energy sources and energy-efficient appliances.
3. **Waste Reduction and Recycling**: Minimize waste generation and promote recycling programs in offices and during travel activities.
4. **Offsetting Carbon Emissions**: Offer carbon offset programs to travelers, allowing them to compensate for their carbon footprint by supporting projects that reduce or capture greenhouse gas emissions.
5. **Sustainable Accommodation Partnerships**: Collaborate with and promote partnerships with eco-friendly accommodations that follow sustainable practices.
6. **Education and Awareness**: Educate both staff and clients about the environmental impact of travel and promote responsible and sustainable tourism practices.
7. **Green Certifications**: Obtain and promote certifications or memberships in eco-label programs that recognize environmentally responsible practices within the travel industry.
8. **Support Local Communities**: Encourage the support of local communities by promoting locally owned businesses and engaging in responsible tourism practices that benefit the communities visited.
9. **Digitalization and Paperless Operations**: Reduce paper consumption by adopting digital technologies for communication, documentation, and transaction processes.
10. **Water Conservation**: Implement water-saving measures in offices and promote water conservation practices in destinations.
11. Green building: The concept of green buildings strives to systematically reduce the adverse effects and enhance the beneficial influence that a building exerts on both its natural surroundings and the well-being of its human occupants.

MEASURING CLIMATE MITIGATION

1. Life Cycle Assessment (LCA): Life Cycle Assessment (LCA) serves as a comprehensive methodology for evaluating the environmental implications associated with a product or system throughout its entire life cycle. This rigorous analysis considers a broad spectrum of environmental and health impacts, encompassing crucial aspects such as greenhouse gas emissions contributing to climate change, substances potentially depleting the ozone layer, water-related effects like consumption and pollution, emissions leading to acid rain and their environmental impact,

potential harm to human health due to exposure to toxic substances, impact on ecosystems and wildlife, examination of land-related impacts including changes in land use patterns, and assessment of the depletion of natural resources throughout the product's life cycle. LCA provides a holistic understanding of the environmental footprint of a product or system, aiding in informed decision-making for sustainable practices(Khasreen et al., 2009).

2. Product Carbon Footprints (PCF): A product's carbon footprint refers to the total greenhouse gas (GHG) emissions associated with its entire life cycle, from raw material extraction and production to distribution, use, and disposal. It is a measure of the environmental impact of a product in terms of its contribution to climate change. The carbon footprint is typically expressed in terms of carbon dioxide equivalents (CO2e), a unit that aggregates the different greenhouse gases based on their global warming potential.

It is worth noting that the calculation of a Product Carbon Footprint (PCF) is rooted in the Life Cycle Assessment (LCA) methodology. While an LCA evaluates various environmental impacts of a product or system, such as land use, ozone depletion, and more, a PCF specifically focuses on the product level with a distinct emphasis on the environmental impact category of Greenhouse Gas (GHG) emissions.

MITIGATION APPROACHES IN TOURISM

The following approaches are designed specifically to apply to the tourism sector and sub-sectors including tour operators, Destinations, aviation, accommodation …etc.

1- The Four S Dimensions of Carbon Management: the Four S Dimensions of Carbon Management, developed by Gossling et al. (2023), introduces a comprehensive framework. It focuses on four interconnected dimensions: Scale, Scope, Stakeholder, and Strategy. Scale addresses the level at which emissions are measured and mitigation strategies are devised, ranging from global to business-specific levels. Scope navigates the complexity of defining included and excluded emissions, considering subsectors, visitor segments, supply chain extent, and emission types. Stakeholder delineates accountability for emission reduction, involving policymakers, businesses, and consumers. The Strategy dimension outlines mechanisms for emission reduction, employing principles such as Avoid, Reduce, Substitute, and Remove, providing a holistic approach to carbon management in the diverse realms of the tourism industry.

2- Carbon Neutrality Matrix: Designed by Simpson et al. (2008), the Carbon Neutrality Matrix offers a theoretical framework for analyzing

carbon neutrality within tourism sectors and sub-sectors. This matrix involves a three-part consecutive process, including steps, activity spaces, and questions. The steps encompass four vital strategies for achieving carbon neutrality in tourism-related businesses: elimination, reduction, substitution, and offsetting. These steps guide companies in avoiding emissions-contributing activities, enhancing energy efficiency, replacing high-emission practices with lower-carbon alternatives, and compensating for residual emissions through offset initiatives. When analyzing any business, including tour operators, three distinct activity spaces are identified: internal operations, supply chain, and community/consumers. In the "internal operations" space, a company exercises direct control overachieving carbon neutrality. The "supply chain" space enables the influence of sustainability by selecting eco-friendly partners. In "community/consumers," a company shapes preferences through sustainable initiatives, impacting customer and community choices. The matrix's questions, derived from the combination of steps and activity spaces, offer a practical framework for specific guidelines in each tourism sub-sector. These questions address decision-making on practical measures, advocacy within the supply chain, and the influence a company has on consumer choices to mitigate its carbon footprint.(Simpson et al., 2008), The framework in Figure 2 integrates steps and activity spaces to offer tailored guidelines for each tourism sub-sector, addressing specific questions on carbon neutrality strategies. In Internal Operations, tour operators consider practical decisions for eliminating, reducing, substituting, or offsetting their carbon footprint. In the Supply Chain Activity Space, the focus is on choices that tour operators can advocate within their supply chain to eliminate, reduce, substitute, or offset both individual and collective carbon footprints. The Community/Consumers Activity Space explores the influence that tour operators can have on consumer choices, emphasizing strategies for eliminating, reducing, substituting, or offsetting carbon footprints.
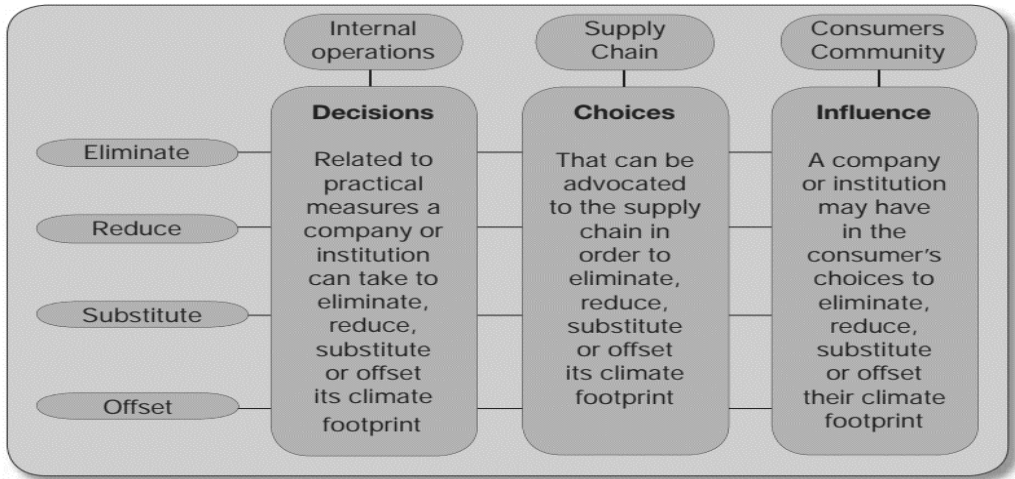
Figure 2: Carbon Neutrality Matrix

CONCEPTUAL FRAMEWORK

Based on the literature review above, the study presents the following conceptual model as in figure 3
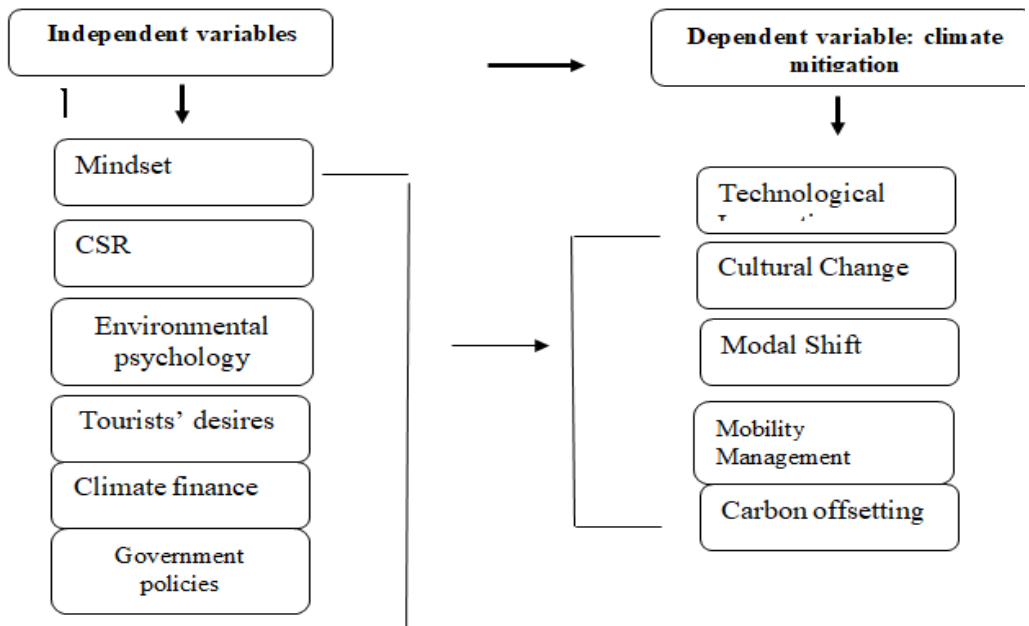

FIGURE 3: CONCEPTUAL FRAMEWORK
SOURCE: DEVELOPED BY THE RESEARCHER

HYPOTHESES

The study's hypotheses, drawn from various literature sources, assert factors influencing tour operators' climate change mitigation efforts. Dredge (2022) suggests a shift towards regenerative tourism, prioritizing a positive impact on people, places, and nature. Weaver (2006) emphasizes the role of Corporate Social Responsibility (CSR) in evaluating tour operators' climate change mitigation. Zotz A. (2008) links tour operators' ability to engage in mitigation to consumers' willingness. Hess et al. (2017) define climate finance for projects combating climate change. Government policies, as per Muûls (2022), may impose costs but also serve as catalysts for innovation and growth in climate change mitigation. Accordingly, the following hypotheses can be proposed:

1- The mindset of tour operators' practitioners has a statistically significant impact on tour operators' ability to mitigate climate change.
2- CSR of tour operators has a statistically significant impact on tour operators' ability to mitigate climate change.
3- The environmental psychology of tour operators' practitioners has a statistically significant impact on tour operators' ability to mitigate climate change.
4- Tourists' desires have a statistically significant impact on tour operators' ability to mitigate climate change.
5- Climate finance has a statistically significant impact on tour operators' ability to mitigate climate change.
6- Government policies have a statistically significant impact on tour operators' ability to mitigate climate change.

METHODOLOGY
SAMPLE AND DATA COLLECTION

The research strategy employs quantitative methods, utilizing an online survey for data collection that incorporates both primary and secondary methodologies. Specifically, a web-based questionnaire is distributed to employees of a selected tour operator in Egypt to gather quantitative data, supplemented by secondary data from reputable sources like peer-reviewed articles and textbooks. The study population encompasses all employees in Egyptian tour operators across categories A, B, and C, totaling 2,268 individuals, according to the Egypt Travel Agents Association. The research employs a combination of random sampling and snowball sampling techniques, optimizing efficiency through digital communication platforms. As per Blumberg et al. (2014), snowball sampling involves

increasing respondents by leveraging existing participant networks like Facebook and LinkedIn. In terms of the planned sample size, guided by Bujang (2017) and the literature citing a minimum of 100 respondents (Anderson & Gerbing, 1984), the study aimed for approximately 130 responses, considering the limitation in generalizability. In practice, from November 2023 to December 2023, 200 questionnaires were distributed to respondents through digital channels . 114 responses were received, constituting 88% of the target(130), with a 12% nonresponse rate. Responses predominantly came from tour operators in Cairo, Giza, and Menoufia governorates, reflecting the online delivery mode of the questionnaire.

DATA PROCESSING AND ANALYSIS

The data gathered through the online questionnaire underwent comprehensive statistical analysis utilizing SPSS (Statistical Package for the Social Sciences) software version 25. Descriptive data analysis within SPSS was employed to offer insights into the background data. For assessing the relationships between independent and dependent variables, the Pearson correlation test was utilized to examine the degree of correlation. Furthermore, the multiple linear regression test, building upon the Pearson correlation findings, was employed to evaluate the impact of statistically correlated independent variables. This test aims to investigate the influence of these variables on tour operators' capacity to mitigate climate change, categorizing them into the highest, middle, and lowest impact categories to determine varying degrees of impact. The use of these parametric tests ensures a rigorous examination of the collected data, providing valuable insights into the factors influencing tour operators' efforts in addressing climate change.

MEASURES

In the context of examining the factors that impact the ability of Egyptian tour operators to mitigate climate change, the questionnaire was meticulously structured into three distinct sections. The initial section focused on gathering demographic data from respondents and consisted of four questions designed to ascertain key characteristics. Subsequently, the second section comprised 30 questions aimed at elucidating the independent variables representing the multifaceted factors influencing the ability of Egyptian tour operators to engage in climate change mitigation efforts. Finally, the third section comprised five questions centered on climate change mitigation, serving as dependent variables in the study. This systematic organization aimed to comprehensively explore and

analyze the intricate factors influencing the climate change mitigation practices of Egyptian tour operators.Statements for section two are derived from various studies (Dredge, 2022; Weaver, 2006; Muûls, 2022). For climate mitigation, research accounts on studies of Kamal et al. (2021) and Sibitane (2022).

VALIDITY, as emphasized by Whiston S. C. (2012), involves ensuring that data aligns with the intended purpose of measurement instruments. In this context, the evaluation of validity becomes crucial to determine if the scale statements effectively measure in alignment with the research objectives. To maintain validity, the researcher incorporated validated scales from prior studies (Gerwing, Carlo, 2016; Bouckenooghe D., Broeck, 2009). Respondents' answers in sections two and three of the questionnaire are assessed using a Likert five-point scale, enabling them to express their agreement or disagreement with each item (Mcleod, 2023).

RELIABILITY: The Cronbach's alpha coefficient test is applied before the statistical analysis of data to ensure the data's reliability as an initial step before proceeding with the statistical analysis. A Cronbach's alpha coefficient test result exceeding 0.7 signifies consistency among variables. The findings of the Cronbach's alpha test are presented in Table 1. All Cronbach's α values are relatively high, ranging from 0.734 to 0.953. This suggests a strong internal consistency among the items within each scale. High α values indicate that the items are measuring the same underlying construct. Additionally, the item-rest correlation values vary across items. For most items, the correlation is high (close to 1), indicating that dropping the item would have a significant impact on the total score.

Table 1: Frequents Scale Reliability Statistics

Estimate	Cronbach's α
Point estimate	0.892
95% CI lower bound	0.851
95% CI upper bound	0.923

Table 2: Frequents Individual Item Reliability Statistics

Item	Item-Rest Correlation	Mean	SD
x1 Mindset	0.782	4.197	0.244
x2 CSR	0.953	4.355	0.233
x3 Environmental psychology	0.942	4.531	0.151

x4 Tourists. desires	0.783	4.458	0.193
x5 Climate Finance	0.734	4.429	0.165
x6 Government policies	0.813	4.424	0.268
Y climate mitigation	0.891	4.521	0.177

FINDINGS

This section provides findings of statistical analysis grouped into three parts: Descriptive Statistics, findings of the correlation test between study variables. and findings of the correlation test between study variables.

DESCRIPTIVE STATISTICS

The following tables provide the findings of the description of the profile of the respondents as in tables 3 to 7.

Table 3: Descriptive Statistics

	Gender	Age	Qualification	Position
Valid	114	114	114	114
Missing	0	0	0	0
Mean	1.632	2.246	1.719	2.833
Std. Deviation	0.485	0.868	0.878	0.459
Minimum	1.000	1.000	1.000	1.000
Maximum	2.000	4.000	4.000	3.000

Table 3 provides descriptive statistics for variables related to gender, age, qualification, and position based on a sample of 114 respondents. The table indicates that there are no missing values for any of the variables. The mean values for gender, age, qualification, and position are 1.632, 2.246, 2.833, respectively. Standard deviations for gender, age, and qualification are 0.485, 0.868, and 0.459, respectively. The minimum value for all variables is 1.000. These statistics offer a snapshot of the central tendency and variability within the sample, providing a foundation for further analysis and interpretation of the data.

FREQUENCY TABLES

Table 4: Frequencies for Gender

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	42	36.842	36.842	36.842
Female	72	63.158	63.158	100.000
Missing	0	0.000		
Total	114	100.000		

As depicted in Table 4, the count of males is 42 participants, constituting 36.842% of valid responses, whereas the count of females is 72 participants, representing 63.158% of valid responses. The table presents a thorough overview of the gender distribution within the sample, and there are no missing values in this variable.

Table 5: Frequencies for Age

Age	Frequency	Percent	Valid Percent	Cumulative Percent
25-34	26	22.807	22.807	22.807
35-44	40	35.088	35.088	57.895
45-54	42	36.842	36.842	94.737
55-60	6	5.263	5.263	100.000
Missing	0	0.000		
Total	114	100.000		

The age distribution among participants, as presented in Table 5, reveals a varied representation. Category 1, encompassing individuals aged 25-34, constitutes 22.807% of the valid responses, with 26 respondents. Participants in Category 2, aged 35-44, make up 35.088% of the valid responses, totaling 40 individuals. Category 3, comprising respondents aged 45-54, represents 36.842% of the valid responses, with 42 participants. Lastly, Category 4, involving participants aged 55-60, constitutes 5.263% of the valid responses, with 6 respondents.

Table 6: Frequencies for Qualification

Qualification	Frequency	Percent	Valid Percent	Cumulative Percent
Bachelor	62	54.386	54.386	54.386
Diploma	24	21.053	21.053	75.439
Master	26	22.807	22.807	98.246
PhD	2	1.754	1.754	100.000
Missing	0	0.000		
Total	114	100.000		

In Table 6, the distribution of qualification reveals that 62 participants, equivalent to 54.386% of the valid responses, hold a bachelor's qualification. Those with a diploma represent 24 respondents, constituting 21.053% of the valid responses. Participants possessing a master's qualification account for 26 individuals, making up 22.807% of the valid responses. Finally, individuals with a Ph.D. qualification make up 1.754% of the valid responses, totaling 2 participants.

Table 7: Frequencies for Position

Position	Frequency	Percent	Valid Percent	Cumulative Percent
Manager	4	3.509	3.509	3.509
General Manager	11	9.649	9.649	13.158
Others	99	86.842	86.842	100.000
Missing	0	0.000		
Total	114	100.000		

In Table 7, the frequency distribution for Position indicates that 4 participants, comprising 3.509% of the valid responses, hold the position of Manager (Category 1). Those in the General Manager position (Category 2) account for 11 respondents, representing 9.649% of the valid responses. The majority of participants, 99 individuals or 86.842%, fall into the "Others" category (Category 3).

FINDINGS OF THE CORRELATION TEST BETWEEN STUDY VARIABLES

This section involves conducting correlation statistical analysis between study variables using Pearson's test. The results of Pearson's coefficient correlation are presented in Table 8.

Table 8: Pearson's Correlations findings

Variable		x1 Mindset	x2 CSR	x3 Environmental psychology	x4 Tourists' desires	x5 Climate Finance	x6 Government policies
Y climate mitigation	Pearson's	0.209	0.867	0.784	0.941	0.934	0.877
	p-value	0.026	< .001	< .001	< .001	< .001	< .001

As in table 8, p-values indicate the statistical significance of the correlation. The p-values being less than 0.05 (in fact, all are less than 0.001) means that these correlations are statistically significant. In this table, r values represent the strength and direction of the linear relationship between each independent variable and the dependent variable (climate mitigation). The positive r values suggest a positive linear relationship between each independent variable and the dependent variable (climate mitigation).All the independent variables (x1 to x6) have statistically significant positive linear correlations with the dependent variable (climate mitigation). The strongest correlation appears to be with x4 Tourists' desires(r = 0.941), followed closely by x5 Climate finance(r

=0.934), x6 Government policies(r =0.877)   x2 CSR (r =0.867), and x3 Environmental psychology(r=0.784**).** However, mindset has a weak positive relationship with climate mitigation.

In summary, the positive and statistically significant correlations indicate that as the values of the independent variables (mindset, CSR, environmental psychology, tourists' desires, climate finance, and government policies) increase, the climate mitigation variable also increases.

FINDINGS OF THE MULTIPLE LINEAR REGRESSION ANALYSIS:

This research uses   stepwise multiple linear regression to predict the impact of each independent variable on tour operator's ability to mitigate climate change as illustrated in table 9:

Table 9: Stepwise multiple linear regression findings

Dependent variable	Independent variable	R2	F	T	P
Climate mitigation	Mindset	0.044	5.105	2.260	0.026
	CSR	0.752	339.356	18.422	< .001
	Environmental psychology	0.614	178.204	13.349	< .001
	Tourists. desires	0.886	870.267	29.500	< .001
	Climate Finance	0.873	768.265	27.718	< .001
	Government policies	0.768	371.358	19.271	< .001

Table 9 outlines the outcomes of a linear regression analysis where several independent variables are utilized to forecast a dependent variable linked to climate mitigation. The R^2 serves as an indicator of the extent to which the variance in the dependent variable is elucidated by the independent variables. Noteworthy R^2 values are evident, spanning from 0.044 to 0.886. Corresponding to the findings in coefficient correlation, x4 (Tourists' desires: 88%), x5 (Climate finance: 87%), x6 (Government policies: 78%), and x2 (CSR: 75%) consecutively emerge as the most influential independent variables in forecasting a tour operator's capacity to mitigate climate change. In contrast, x1 (Mindset: 4%) exhibits a limited impact on the tour operator's ability to mitigate climate change, whereas x3 (Environmental psychology: 61%) signifies a moderate impact.

DISCUSSION

This statistical analysis concludes that tourists' desires and preferences come first as a determinant of the climate change mitigation of the tour operators working in Egypt. As a business-oriented organization, tour operators seek profit and raise financial returns which depend primarily on tourists' preferences. This aligns with the findings of Dwyer, (2017) and Nepal, S. (2020) in which tourism businesses and practitioners' mindsets pay priority to product and price over externalities. Additionally, the study concludes that the role of government policies is a second factor that influences climate change mitigation of tour operators working in Egypt since Egypt has recently demonstrated a strong commitment to addressing climate change translated in the tourism sector in several degrees by the minister of tourism and antiquities. (Bhuiyan., Elghoubashy, Elghamrawi, Salama & Shazly, 2022). Moreover, climate finance represents a substantial factor that affects climate change mitigation of tour operators working in Egypt since this factor imposes costs on cost on companies that require incentives and assistance from the government to help face climate finance challenges such as investment needs, long payback periods, need for collaboration(Janto and Ilan, 2017). Likewise, Corporate Social Responsibility (CSR) plays a role in the tour operator's capacity to address climate change. A noteworthy facet of CSR under scrutiny involves the reduction of anthropogenic-origin greenhouse gases in key sectors of the economy (Sharma, 2014).On the contrary, mindset shows a restricted influence on the tour operator's capacity to mitigate climate change, while Environmental psychology indicates a moderate effect.

CONCLUSION

To explore the factors affecting Egyptian tour operator's ability to mitigate climate change, four factors are statistically proven to be the major factors: tourists' desires and preferences, government policies, and climate finance.

- The statistical analysis of this study **identifies tourists' desires and preferences** as the primary determinant of climate change mitigation for tour operators in Egypt. The pursuit of profit and financial returns, inherent in the business orientation of tour operators, is heavily dependent on meeting tourists' preferences. This finding aligns with previous research by Dwyer (2017) and Nepal (2020), indicating that tourism businesses prioritize product and price considerations over environmental externalities.
- Additionally, the study highlights the role of **government policies** as a second significant factor influencing climate change mitigation among tour operators in Egypt. The commitment demonstrated by

Egypt, particularly in the tourism sector, reflects governmental initiatives to address climate change, as evidenced by the actions of the Minister of Tourism and Antiquities (Bhuiyan et al., 2022).

- Furthermore, **climate finance** emerges as a substantial factor affecting the climate change mitigation efforts of tour operators in Egypt. The financial burden imposed by climate finance necessitates incentives and assistance from the government to help companies face challenges such as investment needs, long payback periods, and the requirement for collaboration (Janto & Ilan, 2017).
- Finally**,** the role of **CSR** in influencing tour operators' capacity to address climate change emerges as a noteworthy implication. Specifically, initiatives focusing on reducing anthropogenic-origin greenhouse gases in key economic sectors offer a potential avenue for tour operators to contribute to broader climate change mitigation efforts.

IMPLICATIONS

Tourist-Centric Approach: Tour operators in Egypt should prioritize understanding and catering to tourists' desires and preferences, recognizing them as crucial determinants not only for customer satisfaction but also for climate change mitigation efforts.

Governmental Support: Recognizing the influence of government policies, tour operators should actively engage with and leverage governmental initiatives addressing climate change. Collaboration with governmental bodies can enhance sustainability efforts.

Climate Finance Strategies: Tour operators need to develop strategies to navigate challenges posed by climate finance, including seeking governmental support and exploring collaborative approaches. This may involve lobbying for incentives and assistance to overcome financial barriers associated with climate change mitigation.

Corporate Social Responsibility: with a specific focus on reducing anthropogenic-origin greenhouse gases, CSR serves as a cornerstone for tour operators aiming to address climate change. The integration of such initiatives not only contributes to environmental sustainability but also enhances the overall social responsibility and reputation of tour operators in the eyes of consumers and the broader community.

Mindset and Environmental Psychology: The study brings attention to the limited influence of mindset and the moderate effect of environmental psychology on climate change mitigation strategies. This calls for a nuanced approach to shaping industry practices, considering both

psychological factors and the need for a mindset shift within the tour operator sector.

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