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Tourism Carbon Emission and Financial Performance: A Comparison Between Developing and developed nations

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Abstract:

While extensive research has explored green practices and firm performance across various disciplines, the causal relationship within this linkage remains insufficiently explored, particularly when moderating roles of governance and culture are considered. This study addresses this essential gap by examining the causal impacts of carbon emissions (CE) on financial performance (FP) using global tourism data from 2004 to 2022. Employing an original empirical approach using OLS and GLM regressions, the findings reveal that an increase in CE leads to a decrease in FP. This is across developing and developed nations, with this effect being more pronounced in the latter. Moreover, the relationship is found to be moderated by governance and cultural factors. The robustness of the results is confirmed through alternative regression models and the control of firm and country-level characteristics. Ultimately, the study suggests that reducing CE with an eye toward FP enhancement should inform the tourism firms' managerial, directorial, and regulatory bodies, advocating for implementing governance codes and guidelines to improve green practices.

Keywords: Carbon Emission, Financial Performance, developed/ing nations, Tourism and Governance.

1. Introduction

Responsible corporate actions, including emissions, have been a leading concept seeking to integrate green practices into business routines (Zhu *et al.*, 2020) and recently into tourism firms' practices (Lin, Yu and Chang, 2018). According to Carroll's, firms should be socially responsible and always within society's expectations, considering economic, legal, ethical, and philanthropic responsibility (Carroll, 1991). These responsibilities explicitly integrate environmental practice and the green market. The available literature, therefore, reflects that green management, which is in the contemporary business climate (Bianco, Bernard and Singal, 2023), and firms are aware of friendly environmental practices and their necessity (Rintala *et al*., 2022). Lee, Chang and Wang (2022) argue that this green can be achieved via policies and inspiration factors such as financial returns might lead to better practices among industries (Naranjo Tuesta, Crespo Soler and Ripoll Feliu, 2021).

The tourism industry, which tends to spread commercial benefits to other sectors (Alatawi *et al.*, 2023), must be within this consideration. This industry (airlines, resorts, restaurants, casinos, and hotels) has extreme environmental impacts and has gained attention regarding environmental management, which could raise stakeholder pressure (Jiang *et al.*, 2021). According to (Lin *et al.*, 2022) issues such as emissions caused by humans cause about seven million human deaths yearly; therefore, in tourism, green has come to the attention of all users. Further, as the United Nations showed, tourism generates 4.8 million tons of waste annually. Thus, encouraging to behave environmentally responsibly might reduce such degradation, which could increase firms' image.

Reducing CE is essential for fostering tourism customer loyalty and subsequently improving FP. Conversely, lower firm performance within the tourism industry is expected. As the tourism industry grows annually at 4%, serving as a significant economic driver for both developed and developing nations, studies highlight its positive impact on global economic growth, underscoring its leadership role (Alatawi *et al.*, 2023). Consequently, the tourism industry holds the potential for fostering international socio-economic development, positively influencing the importance of environmental practices. However, such practices may incur costs, aligning with the agency cost theory (Jensen and Meckling, 1976), suggesting that managers might opt for such practices to serve their interests. Therefore, the focus should be on various aspects of firms' performance, with FP serving as an indicator of the benefits derived from considering CE.

The positive association of CE on FP (Busch and Lewandowski, 2018), mainly, in the tourism industry, which takes a broader responsibility, including green practice (Henderson, 2007; De Grosbois, 2012), requires further investigation. Some studies (e.g., Chang and Liu, 2009; Chan, Jiang and Liu, 2013; Llach *et al*., 2015; Jiang *et al*., 2021 and Xue *et al*., 2021) have examined environmental issues. However, it seems that only (Acquah, Agyabeng-Mensah and Afum, 2021) have focused on green management practices and tourism firms' performance, which barely considered the Chinese context. Consequently, this article tries to fill this gap by investigating the causality relationship between CE and FP in the tourist industry, in particular, comparing developed/ing nations and moderating effects investigation of firm and country-level factors, e.g., governance and culture on this nexus. The most important contribution, thus, is exploring the differences of CE in a comprehensive FP manner

and investigating additional and alternative models and FP variables. Furthermore, this study will improve the theoretical and practical meaning of CE and FP.

2. Literature review and hypotheses development

Although most CE and FP studies have focused on the EU and North America (Lin, Yu and Chang, 2018), various scholars have targeted developing nations or even international firms. Lv and Li (2021) state that economic and financial conditions are necessary to mitigate CE; thus, high financial development might improve a country's CE. Friedman (1970) states that the social responsibility of firms, including emissions and other environmental factors, is only to increase profit, which supports shareholder interests. However, the stakeholder view associated with Freeman believes that the firm's broader responsibility includes social and environmental factors (Freeman, 1990 and Tan *et al.*, 2017). Based on this conflicting view, scholars have studied the relationship between environmental aspects such as CE and firms' FP. Although most available literature covers developed nations, developing context and international evidence have been recognised.

2.1 Carbon emission and financial performance in developing nations.

The attainment of environmental issues, including CE, seems to be a fundamental practice, particularly in tourism firms (Bianco, Bernard and Singal, 2023). In developing nations this fundamentality has been examined (Chang and Liu, 2009; Iwata and Okada, 2011a; Fujii *et al.*, 2013; Lee, Min and Yook, 2015; Ganda, 2018; Lin, Yu and Chang, 2018; Michiyuki and Shunsuke, 2018; Ashraf *et al.*, 2020; Kalyar, Shoukat and Shafique, 2020; Wang, Li and Zhang, 2021; Zhang and Vigne, 2021; Nishitani *et al.*, 2022; Temiz, 2022; Yu *et al.*, 2022; Liu *et al.*, 2023). The outcomes seem to be positive in general.

Recently, Liu *et al.* (2023) have opened the argument that the CE reduction could increase FP. Based on the Chinese context spanning from 2007 to 2020, their investigation affirms a significantly positive influence of the CE policy on the Chinese firms' FP. Although Liu *et al.* (2023) and Yu *et al.* (2022) have offered valuable insights into CE and FP nexus, their positive results have relied on data from the Chinese context, which may not be representative of specific industry characteristics. Then, the results might not be applicable to the tourism sector. Further, it is essential to consider whether the observed regression outcomes truly imply causation instead of reporting only the correlation. Among Japanese firms, this relationship has been confirmed positively by Nishitani *et al.* (2022), who provided valuable insights into the practical implications of sustainable business practices. However, as tourism firms were neglected, further investigation of the tourism context is recommended.

International emerging evidence reflects a positive influence of CE consideration and FP (Temiz, 2022). Temiz (2022) has examined how environmental practices influence the costs of debt and equity performance in emerging markets. Consisting of 4,152 firm-year observations spanning the years 2015 to 2019 across 17 developing countries, the study demonstrates that improved environmental practices lead to financial benefits, including lower financing costs. Furthermore, as confirmed, the performance is only related to emissions. This study, however, is not free from limitations, as it uses data from only 17 emerging countries to apply only OLS. Using fixed or random effects models and extending the data to all possible emerging countries' firms should add to the literature or even conclude contrary results.

Wang, Li and Zhang (2021) have tried to answer, "Does carbon efficiency improve financial performance?". In response to the global imperative of mitigating CE,

employing a fixed-effect model examining CE and FP nexus of Chinese firms Wang *et al.* (2021) demonstrate positivity for both short and long-term FP. Similarly, Kalyar, Shoukat and Shafique (2020), who have targeted Pakistani firms applying institutional theory, have concluded that green practices significantly affect firms' FP. Investigating Taiwanese context (Chang and Liu, 2009 and Lin *et al.* 2018) as well as Japanese' firms (Iwata and Okada, 2011 and Fujii *et al.*, 2013) demonstrated a positive effect of such practice on FP. However, while those studies provide valuable views, they could benefit from addressing a more comprehensive analysis (e.g., causality examination, governance, and potential influence of macroeconomic and cultural factors).

Furthermore, some studies have a negative conclusion of CE and FP nexus (Lee, Min and Yook, 2015; Ashraf *et al.*, 2020; Zhang and Vigne, 2021), and others have proven mixed effects (Ganda, 2018 and Yagi and Managi, 2018). Zhang and Vigne (2021), testing Chinese firms from 2005 to 2013, concluded that financing-emission reduction had a negative impact on firm performance. Also, Lee *et al.* (2015) have aimed to address further evidence by utilising a comprehensive panel dataset encompassing 362 Japanese firms from 2003 to 2010. Their empirical outcomes show a consistent and adverse effect of CE on FP. This negativity is seen internationally, as recently reported by Ashraf *et al.* (2020), who have focused on a developing country context based on data derived from South Asian cement manufacturing firms for the period spanning from 2005 to 2012. It is notable, however, that the available studies regarding CE and FP ignored the context of the tourism industry. Additionally, national economic, governance and cultural factors are disregarded.

Moreover, the developing economic context has been studied by Ganda (2018), who has tested the impact of carbon on the FP of firms listed in the Republic of South Africa and revealed a positive return on equity and return on sales but a negative on return on investment and market value. These outcomes for the sample of 63 companies from 2014 to 2015 using panel data analysis shed light on the significant financial benefits that can be achieved via carbon performance. Nevertheless, tourism firms have not yet been included or mentioned. Also, national governance and cultural variables are still absent either as control or moderating roles. These ultimate results are similar to what has been confirmed by Yagi and Managi (2018), where the Japanese firms' (2011-2015) CE has a positive impact for equity and a negative for the total-assets-turnover and leverage.

H1: CE has a positive relationship with FP in the developing nation tourism firms.

2.2 Carbon emission and financial performance in developed nation

Available literature also shows various studies considering the CE and FP nexus in developed nation firms. Most recent studies have reflected a positive impact of considering CE (Lannelongue, Gonzalez-Benito. J and Gonzalez-Benito. O, 2015; Capece *et al.*, 2017; Brouwers, Schoubben and Van Hulle, 2018; Jayasundara *et al.*, 2019; Hoang *et al.*, 2020; Bătae, Dragomir and Feleagă, 2021; Naranjo Tuesta *et al.* 2021; Tascón, Castro and Ferreras, 2021 and Wedari, Moradi-Motlagh and Jubb, 2023). Nevertheless, other evidence suggests that the consideration of environmental factors such as CE could cost firms (Cordeiro and Sarkis, 1997; Lei, Steven and Simon, 2014; Downar *et al.*, 2021 and Busch *et al.*, 2022).

Wedari *et al.* (2023) extend this debate by focusing on 119 Australian firms from 2009 to 2017. Although their results confirm the desirable effect of CE on FP, they limit their study to those firms subject to the national greenhouse energy reporting. The findings, therefore, have neglected the tourism industry. Similar evidence has been reported by

Capece *et al.* (2017) that Italian companies with green practices achieve better performance. This better performance has also been recognised by Lannelongue *et al.* (2015), who tried to propose new terms of environmental management and concluded a positive impact of green practices on FP. However, as they mentioned, aspects such as 'environmental management productivity' should be considered to achieve clear evidence anong Spanish firms. Nevertheless, considering the service industry, mainly tourism is absent.

Thi-Hong-Van *et al.* (2020) investigated U.S. firms considering the association between environmental performance and, based on panel data, confirmed an improvement in FP due to lower pollution emissions. Although their evidence contributes to the literature, the tourism industry seems to be ignored, and the reported harmful long-term impact was not explained. Within the agriculture sector, similar outcomes have been recognised. Based on Canadian dairy firms, Jayasundara *et al.* (2019) have evidenced that a reduction in the CE can be achieved while increasing the FP simultaneously. Their outcomes suggest that the economic pressure related to FP supports firm-level CE reduction in the absence of emission dairy farms' reduction policies. This, however, supports the need to examine the moderating effect of corporate governance, which again has not been thoroughly investigated, mainly in the tourism industry.

Across EU firms, the CE and FP nexus has been studied by (e.g., Brouwers *et al.* 2018; Bătae *et al.* 2021; Naranjo Tuesta *et al.* 2021 and Tascón *et al.* 2021) and they support the optimistic view. Bătae *et al.* (2021), analysed the relationships between environmental practices and FP covering the period from 2010 to 2019, show a desirable association between emission reductions and FP. Although they have used a multiple-theory view, their sample was limited to financial firms. Therefore, their outcomes might not benefit non-financial firms. Also, the tourism industry has not yet been fully investigated, particularly within CE and FP. Similarly, Tascón *et al.* (2021), employing a multiple regression analysis, confirm the importance of carbon management for EU firms. This importance has also been recognised by (Brouwers *et al.* 2018).

In contrast, some scholars (Cordeiro and Sarkis, 1997; Downar *et al.*, 2021 and Busch *et al.*, 2022) have concluded a negative impact of emission reduction on firms' FP of US, Australia, UK and both EU and US respectively. Others have reported a null effect of CE on FP (Petitjean, 2019) or a mixed influence (Lei *et al.* 2014; Hoang *et al.*, 2020 and Adu, Flynn and Grey, 2023). Although these studies build their argument on decent theories such as Signalling, Stakeholder and Neo-institutional theory, respectively, except Hoang et al's study, they are not free from limitations such as clustering sectors to identify tourism outcomes. However, it is clear that environmental factors such as emission reduction positively impact the firms' FP.

Therefore, the relationship between CE and FP in the tourism industry is worth to be examined. This will be added to the available evidence, particularly, when the sample is split into developed and developing nations.

H2: CE has a positive relationship with FP in the developed nation tourism firms.

2.3 Global evidence and moderating of governance and culture on CE and FP.

The academic discourse concerning the CE and FP nexus continues to lack a conclusive resolution, primarily due to the intricate nature of the relationship, as indicated globally by various scholars (Gallego-Álvarez, García-Sánchez and Silva Vieira, 2014; Sen, Roy and Pal, 2015; Gallego-Álvarez, Segura and Martínez-Ferrero, 2015; Misani and

Pogutz, 2015; Abid, 2017; Lewandowski, 2017; Trinks, Mulder and Scholtens, 2020; Xu *et al.*, 2021; Brahmana and Kontesa, 2021; Ferrat, 2021; Mahapatra, Schoenherr and Jayaram, 2021; Palea and Santhià, 2022 and Bendig, Wagner and Lau, 2023). This debate is indicative of the potential effect of CE on firms' FP. The available literature indicates the positive and negative impacts; however, most studies have reflected a positive (desirable) effect on FP.

Bendig *et al.* (2023) conducted an empirical investigation spanning 2015 to 2020, analysing data from 465 firms across countries, revealing a positive association between CE and FP. Neglecting CE reduction, therefore, appears to diminish FP, primarily affecting returns on sales and capital inefficiency (Palea and Santhià, 2022). Findings from Xu *et al*. (2021) and Trinks *et al.* (2020) have highlighted a positive impact of CE reduction on FP, underlining its significance, especially during economic growth phases. Misani and Pogutz (2015) discovered a peak FP when companies maintained a moderate range of carbon performance, signifying that environmental practices might contribute to enhanced firm performance by aligning with stakeholder interests. However, Lewandowski (2017) reported mixed results, indicating a positive relationship between CE reduction and return on sales but a negative association with Tobin's q. Similarly, Ferrat (2021) found that CE performance negatively impacted short-term FP, yet firms could experience heightened FP in the long run. Nevertheless, the absence of focus on the tourism industry in these analyses suggests a need for further examination in that domain, considering the moderating roles, to enrich the existing literature.

Further evidence was provided by Brahmana and Kontesa (2021), who studied 111 global companies, affirming a link between environmental practice and FP. Their conclusion, however, does not support a direct improvement in FP, aligning with perspectives from neoclassical theory and the resource-based view. Mahapatra *et al.* (2021) also confirmed that reduced emissions did not significantly enhance FP. While initial observations indicate a direct connection, this relationship has proven to be complex and multifaceted (Holden, 2009; Horváthová, 2010; Qi *et al.*, 2014; Coghlan, 2015 and Chen, Singhal and Zhu, 2021). It is hypothesised, thus, that external factors might influence and shape this association. Consequently, this study aims to explore the moderating roles of both firm and national-level governance, along with the impact of national culture, on the correlation between CE and the financial performance of tourism firms.

In the context of green management, several theories elucidate the role of CG. The principal agency theory, highlighted by Eisenhardt (1989), emphasises the board's role in monitoring agents for consistently creating shareholder value, contributing to good firm performance. Stakeholder theory suggests that CG strategies enhancing environmental performance can improve stakeholders' benefits and, consequently, better FP. Additionally, steward theory posits managers as stewards of a company's assets to increase shareholder value, while resource dependence theory suggests directors' provision of critical resources for better management of sustainability.

These theories complement each other regarding CG's role in enhancing firm performance. Effective CG, therefore, can enhance a firm's public image, encouraging ongoing improvement in green practices. Better management of these practices might result in improved social responsibility and subsequently enhances tourism firm performance. While the literature shows a positive impact of CG on the CE and FP nexus, Salo (2008) reported no strong association between CG and environmental practices. Although the available literature has a notable gap in considering the

moderating roles of CG on FP, particularly within the tourism context, Studies such as Ntim, (2016) and Song and Van Hoof and Park, (2017) reported the positive influence of CG features on this nexus.

H3: CG has positively moderated the relationship between CE and tourism FP.

Not only CG has a moderating effect on the relationship between CE and FP, but also national factors such as NG and NC might have a moderating effect. Research suggests that national environmental governance could play a pivotal role and influence a firm's overall governance management (Lattemann *et al.*, 2009). The absence of such frameworks, especially in developing countries, can lead to social irresponsibility (Azmat and Samaratunge, 2009), highlighting the need to analyse the impact of these factors on the sustainability of tourism firms (Dinica, 2017). Weak governance, in turn, might foster unsustainable practices and affect overall performance, emphasising the necessity of robust governance for enhanced environmental practices (Stanford and Guiver, 2016).

Moreover, the drive towards environmental orientation is believed to enhance operational efficiency (Lui *et al*., 2021) and, subsequently, generate greater economic value (Mitchell, Wooliscroft and Higham, 2013). However, governance within the tourism context may vary across public administrative domains (Wang and Ap, 2013), underscoring the importance of understanding its implications. Considering developed and developing countries, the necessity for further public policies to proactively address climate change concerns is stressed (Jamaliah and Powell, 2018). Such policies might have been influencing social and environmental responsibilities. Consequently, the impact of NG on environmental practices emerges as potentially significant, prompting the need for a deeper understanding of NG patterns among tourism firms considering economic condition.

Unfortunately, empirical studies examining environmental NG's influence on CE-FP relationships in the tourism industry remain scarce. Existing research, such as that by Liang and Renneboog (2017), underscores the correlation between NG and firms' environmental activities, suggesting the importance of stakeholders' involvement in environmental governance for improved CE. Thus, based on this view, this study aims to investigate the role of NG and proposes hypotheses accordingly.

H4: NG has positively moderated the relationship between CE and tourism FP.

Culture, a pivotal element in shaping social behaviour, aligns with institutional theory, emphasising its role in conferring legitimacy upon firms within their institutional environment (DiMaggio and Powell, 1983). Hofstede's framework, highlighting six cultural dimensions, is a widely used tool for investigating NC's influence, yet its impact on environmental practices within the tourism industry remains relatively understudied (Filimonau *et al*., 2018). Filimonau *et al*. (2018) explored NC's effect on environmental attitudes among Polish tourists, revealing a noticeable correlation between cultural factors and environmental reactions. This underscores the necessity of considering NC as a critical aspect in policy-making, particularly concerning sustainability efforts. Notably, cultural factors delineated by Hofstede potentially influence environmental elements such as CE through managerial and employee attitudes and behaviours (Ostroff and Bowen, 2016). Among tourist firms, Kang, Lee and Yoo (2016) highlight the significant impacts of culture on CSR activities within the US. The existing research reveals a research gap in understanding the moderating effect of NC on the association between CE and tourism firm performance, including FP.

H5 NC has positively moderated the relationship between CE and tourism FP.

3. Study method

3.1 Sample and description of data

Quantitative data was built and examined in order to explore the impact of CE on FP among both developed and developing nations. This is to compare the outcomes of the developed tourism firms with the developing ones. The dataset of tourism firms obtained from the ASSET4 on Refinitiv Eikon encompasses a collection of firms within the tourism industry. This dataset spans the years 2004 to 2022 and consists of all available sub-sectors of this industry: hotels, restaurants, casinos, airlines, and travel and leisure companies. Following the removal of duplicate entries, the final dataset comprises 2,386 unique firms. This comprehensive dataset offers a rich landscape for potential analysis and exploration. Its breadth across various sectors and countries provides an opportunity to delve into trends, patterns, and nuanced insights within the realm of the tourism industry during the specified timeframe.

Table 1: Global tourism sample overview

Nations	Countries	No. of countries
Developed nations	Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Japan, Lithuania, Malta, Netherland, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland UK, and US	31
Developing nations	Bahrain, Brazil, Chile, China, Colombia, Egypt, Hong Kong, India, Indonesia, Jordan, Kuwait, Malaysia, Mexico, Morocco, Nigeria, Oman, Pakistan, Philippines, Russia, Saudi Arabia, Singapore, South Africa, South Korea, Sri Lanka, Taiwan, Thailand, Turkey, UAE and Vietnam	29
Total		**60**

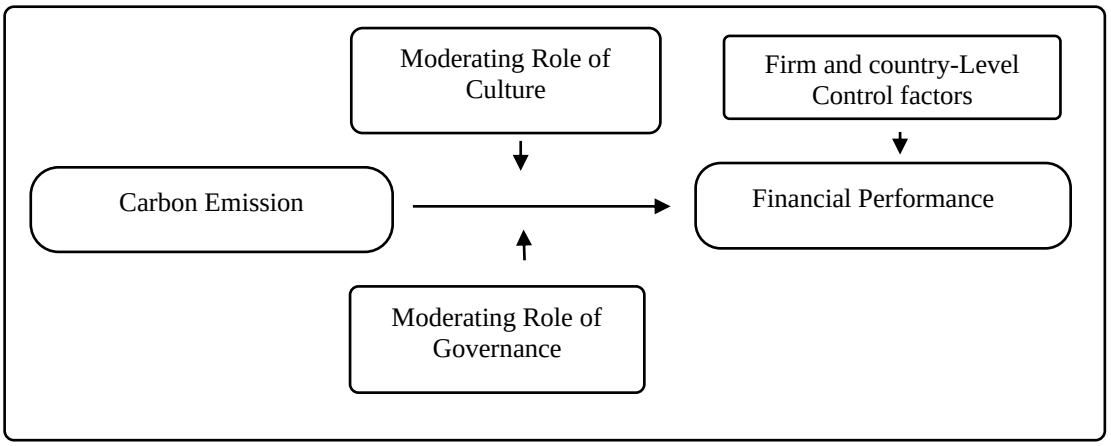
The study's sample (Table 1) encompasses 31 developed and 29 developing countries, collectively representing 20,381 firms' observations of tourism companies. These entities are classified into five distinct tourism sub-sectors: travel and leisure agents (6655), hotels (5583), airlines (5579), casinos (1349), and restaurants (1215).

3.2 Regression model

In accordance with the sustainable development goals advocated by the United Nations, this study introduces a model, displayed in Figure 1, to investigate the immediate influence of CE t-1 on FP within the global tourism industry. This is in the consideration of developed and developing nations. Notably, this model is a novel introduction to this particular research. Reflecting the notion posited by Hang Song *et al*. (2017) that the implementation of environmental practices may have a delayed impact, the study assumes an association between the current year's FP and the previous year's CE. A one-year lagged variable for FP is employed to counter potential issues of reverse causality between CE and FP, restricting the analysis period to 2005 to 2022.

The study factors in firm and country-level variables and incorporates moderating factors such as CG, NG, and NC. The principal regression models utilised in this study are detailed below.

Figure 1: Cognitive map of the CE and PF study model



Model 1: To examine the impact of CE on FP among develop/ing nation tourism industry:

$$FP_{i,t} = B_0 + B_1 CE_{i,t-1} + B_2 Controls$$

Model 2: Moderating roles of CG, NG and NC among develop/ing nation tourism industry:

$$FP_{i,t} = B_0 + B_1 CE_{i,t-1} + B_2\, CG_{i,t} + B_3(\, CE * CG) + B_4\, Controls$$

$$FP_{i,t} = B_0 + B_1 CE_{i,t-1} + B_2\, NG_{i,t} + B_3(\, CE * NG) + B_4\, Controls$$

$$FP_{i,t} = B_0 + B_1 CE_{i,t-1} + B_2\, NC_{i,t} + B_3(CE * NC) + B_4\, Controls$$

The utilised dependent variables (FP) encompass Return on Assets (ROA), indicating accounting-based financial performance, and Tobin's Q, reflecting market-based financial performance. Higher values for both variables signify enhanced performance. Furthermore, the independent variable CE, as reported by companies and available in environmental, social, and governance (ESG) data, represents firms' emissions level. Lower values in this context indicate improved performance. Therefore, an increase in CE is regarded as a cost for firms. Both dependent and independent variables are sourced from the Refinitiv platform. However, the platform does not directly measure these variables; rather, it aggregates and presents available data related to financial performance, carbon emissions, and other ESG metrics for integration into research. For the sake of consistency in the study's panel data, Generalized Linear Models (GLM) are used in addition to Ordinary Least Squares (OLS).

Moderating role variables have been defined and incorporated into the comprehensive dataset of the global tourism context. These variables include CG, found within the aforementioned platform. National governance (NG), available in the Worldwide Governance Indicators, provides rankings of countries based on six governance dimensions, including voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. A high percentage for both CG and NG dimensions represents better performance. National culture dimensions, developed by Hofstede, are used to explore the moderating effects on the CE and FP nexus. These dimensions are power distance, uncertainty avoidance, individualism-collectivism, masculinity-femininity, and long-term orientation.

The applied model has incorporated influential factors at both firm and country levels. Firm-specific characteristics observed over discrete periods, typically year-over-year, are pivotal indicators of a company's performance and capacity for market expansion.

For instance, the metric of "change in sales" (Growth) signifies the percentage fluctuation in a company's sales across a given timeframe. Moreover, "debt to total assets" (Leverage) gauges the ratio of a company's debt-financed assets, potentially indicating the extent of a more cautious financial structure. Utilising the logarithm of total assets (Size) aids in presenting a more distinct depiction of a company's scale, acknowledging the distinct operational dynamics between larger and smaller enterprises. These firm-level metrics are accessible through ASSET4, which is provided by Refinitiv Eikon.

At the country level, the inclusion of the gross domestic product (GDP) assumes a pivotal role as a foundational marker of a nation's economic vitality and performance. Furnished by the International Monetary Fund (IMF), this data contributes to comprehending the broader economic context within which these firms operate.

4. Results and discussion

The results of the applied model analysis and the discussion of the outcomes mainly highlight the main differences between developing and developed nation outcomes, which will add to the CE and FP fields. This is by elucidating empirical findings and their broader significance, aiming to enhance comprehension of the research objectives and their implications.

Table 2: Descriptive results of the tourism firms' variables

Variables	Developing Nation				Developed Nation				Global Tourism Nation			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
FP	0.03	0.07	-0.27	0.26	0.04	0.07	-0.25	0.33	0.04	0.07	-0.27	0.33
CE	0.56	0.24	0.02	0.99	0.56	0.30	0.02	0.99	0.56	0.28	0.02	0.99
CG	0.46	0.34	0.01	0.99	0.53	0.27	0.00	1.00	0.51	0.29	0.00	1.00
Size	16.04	1.07	12.29	17.65	15.95	1.22	11.31	18.30	15.98	1.18	11.31	18.30
Growth	15.31	1.26	9.69	16.92	15.46	1.32	10.24	17.39	15.42	1.30	9.69	17.39
leverage	0.35	0.17	0.00	1.39	0.33	0.22	0.00	2.48	0.34	0.20	0.00	2.48
PD	0.70	0.12	0.49	1.00	0.44	0.12	0.22	0.93	0.52	0.17	0.22	1.00
Individualism	0.28	0.11	0.17	0.65	0.74	0.17	0.35	0.91	0.60	0.26	0.17	0.91
Masculinity	0.56	0.13	0.34	0.86	0.64	0.17	0.08	0.95	0.62	0.16	0.08	0.95
UA	0.45	0.20	0.29	0.85	0.62	0.21	0.35	1.00	0.57	0.22	0.29	1.00
LTO	0.54	0.23	0.14	1.00	0.47	0.26	0.21	0.88	0.49	0.25	0.14	1.00
Indulgence	0.37	0.19	0.17	0.68	0.58	0.13	0.20	0.75	0.52	0.18	0.17	0.75
VAA	0.50	0.23	0.06	0.89	0.87	0.09	0.18	1.00	0.76	0.22	0.06	1.00
PSNV	0.51	0.25	0.09	0.96	0.71	0.15	0.11	0.99	0.65	0.21	0.09	0.99
GE	0.77	0.17	0.35	0.99	0.90	0.05	0.45	1.00	0.86	0.12	0.35	1.00
GDP (BIL)	9.62	0.82	7.56	10.85	10.80	0.27	9.23	11.81	10.45	0.74	7.56	11.81
N	2386											

Table 2 illustrates the descriptive statistics pertaining to various variables. Analysing the distribution and background statistics of key variables such as FP, CE, Corporate and national governance and NC via mean and standard deviation reveals several insights. Firstly, the mean of FP appears similarly among both developed (4%) and developing (3%), with no fluctuation in standard deviation (0.07). Likewise, the mean statistics of both samples exhibit about 56%, with a small divergence in their standard deviations. Thirdly, the CG, which reflects management score, for developed nations

stands notably higher at 53% in contrast to 46% for the developing countries sample. Overall, the means slightly surpass their corresponding standard deviations, suggesting a relatively uniform distribution of FP, CE, and CG variables, satisfying the minimum model requirements. Lastly, the mean values of the rest country-level factors—PD, Individualism, Masculinity, UA, LTO, Indulgence, VAA, PS and GE- reflect a variance comparing developed with developing nations samples.

4.1 Multicollinearity and correlation outcomes

To ascertain the stability of the analysis, an examination for multicollinearity was conducted utilising the VIF (Variance Inflation Factor) assessment. The outcomes of this evaluation, as displayed in Table 3, demonstrate that none of the major variables exhibit a VIF exceeding 10. This suggests that the degree of multicollinearity among the variables under scrutiny is minimal. Consequently, it indicates that the integrity of the regression analysis remains intact (Myers, 1990), affirming that the employed regression models are not adversely impacted by multicollinearity.

Table 3: Variance Inflation Factor (VIF) for multicollinearity check.

Variable	VIF	1/VIF
CE	1.46	0.683632
CG	1.12	0.893341
Size	5.33	0.187716
Growth	4.85	0.206370
leverage	1.11	0.903912
PD	3.69	0.270999
Individualism	5.23	0.191266
Masculinity	1.47	0.682306
UA	2.63	0.380770
LTO	5.29	0.189206
Indulgence	5.05	0.197859
VAA	5.03	0.198668
PSNV	4.36	0.229149
GE	5.47	0.182982
GDP	6.34	0.157807
Mean VIF	3.89	

Table 4 displays the correlation matrix detailing the relationships between the study variables, reflecting a modest level of correlation among the explanatory variables. These correlation outcomes are instrumental in determining the criteria for including or excluding variables within the models, thereby mitigating potential issues related to multicollinearity. Of particular importance are the crucial variables. Specifically, the negative correlation (-0.21) between CE and FP suggests that overlooking the carbon emission matter could substantially impact tourism firms' performance. This current study is limited to variables where the highest accepted correlation among independent variables is less than 80%; any correlations exceeding this limit were excluded.

Table 4: Correlation matrix across the applied global tourism variables[1]

	FP	CE	CG	Size	Growth	Leverage	PD	Individualism	Masculinity	UA	LTO	Indulgence	VAA	PS	GE	GDP
FP	1.00															
CE	-0.21***	1.00														
CG	0.0012	0.08***	1.00													
Size	-0.21***	0.40***	-0.12***	1.00												
Growth	-0.11***	0.41***	-0.08***	0.87***	1.00											
Leverage	-0.09***	-0.01	0.03	0.02	-0.05*	1.00										
PD	-0.16***	0.14***	-0.16***	0.19***	0.13***	0.03	1.00									
Individualism	0.16***	-0.09***	0.15***	-0.20***	-0.10***	0.01	-0.74***	1.00								
Masculinity	0.03	-0.09***	0.09***	0.17***	0.13***	-0.03	-0.16***	-0.03	1.00							
UA	-0.15***	0.25***	-0.02	0.08***	0.15***	0.02	0.09***	-0.03	0.14***	1.00						
LTO	-0.18***	0.23***	-0.15***	0.36***	0.34***	-0.08***	0.40***	-0.53***	0.28***	0.53***	1.00					
Indulgence	0.14***	-0.16***	0.22***	-0.32***	-0.23***	0.11***	-0.62***	0.74***	-0.01	-0.11***	-0.72***	1.00				
VAA	0.05*	0.06**	0.12***	-0.10***	-0.00	-0.08***	-0.71***	0.66***	0.15***	0.20***	-0.18***	0.52***	1.00			
PSNV	0.06**	-0.09***	0.02	0.01	-0.00	-0.17***	-0.46***	0.20***	0.36***	0.02	0.14***	0.07***	0.63***	1.00		
GE	0.08***	0.01	-0.05*	0.14***	0.10***	-0.18***	-0.43***	0.36***	0.18***	-0.09***	0.04*	0.07***	0.57***	0.75***	1.00	
GDP	0.07***	-0.00	0.06**	0.06**	0.05**	-0.07***	-0.66***	0.64***	0.15***	0.00	-0.15***	0.32***	0.69***	0.63***	0.81***	1.00

[1] FP: financial performance (ROA); CE: Carbon Emission (lower % is desirable); CG: corporate governance (Management Score); PD: power distance; UA: uncertainty avoidance; LTO: long term orientation; VAA: voice and accountability; PSNV: political stability and no violences; GE: government effectiveness.

4.2 Regression outcomes

4.2.1 The main regression analysis

Table 5: The OLS regression of the effect of CE on FP

Variables[2]	Tourism FP			
	Developing nation		Developed nation	
	(1)	(2)	(1)	(2)
Main Independent				
CE	-0.0305***	-0.0244*	-0.0621***	-0.00889
	(-3.75)	(-2.04)	(-12.46)	(-1.25)
Firm-level Control Variables				
CG		0.0109		-0.0190**
		(1.23)		(-2.96)
Size		-0.00790		-0.0356***
		(-1.36)		(-11.58)
Growth		0.0134***		0.0310***
		(3.40)		(10.69)
leverage		-0.191***		0.0237**
		(-10.87)		(3.19)
Country-level Control Variables				
PD		0.0272		-0.0227
		(0.65)		(-0.51)
Individualism		0.0693		-0.0643*
		(1.18)		(-2.16)
Masculinity		-0.0569		0.0780***
		(-1.56)		(4.07)
UA		0.0338		-0.0304
		(1.00)		(-0.58)
LTO		0.0190		-0.129***
		(0.97)		(-3.99)
Indulgence		-0.00643		0.00526
		(-0.19)		(0.11)
VAA		0.0153		-0.0969*
		(0.63)		(-2.23)
PSNV		0.0240		0.00768
		(0.98)		(0.36)
GE		0.0349		0.104*
		(0.81)		(2.05)
GDP		-0.0226**		-0.0313**
		(-3.23)		(-3.17)
Constant	0.0450***	0.169*	0.0823***	0.545***
	(9.06)	(2.18)	(25.22)	(4.10)
Observations	1019	677	2481	1513
R^2	0.014	0.256	0.059	0.234
Adjusted R^2	0.013	0.240	0.059	0.226
F	14.03	15.20	155.3	30.45

*t statistics in parentheses * p < 0.05, ** p < 0.01, *** p < 0.001*

Table 5 presents the main regression results of Model 1, where (1) CE is, solo, regressed over FP and (2) both firm and country-level control variables are accounted for, considering a possible variety between tourism developing and developed nation

[2] ***FP***: financial performance (ROA); ***CE***: Carbon Emission score (environmental degradation); ***CG***: corporate governance; ***PD***: power distance; ***UA***: uncertainty avoidance; ***LTO***: long term orientation; ***VAA***: voice and accountability; ***PSNV***: political stability and no violences; ***GE***: government effectiveness.

samples. The results show a significant negative linkage between CE and FP, thus confirming Hypothesis 1 and 2. Therefore, an increase in the CE significantly costs about (-0.0305) for tourism firms in developing countries. However, the cost for the developed nation firms prior to the consideration of control variables was higher (-0.0621). In general, the non-green practice will decrease the accounting FP of tourism firms. These outcomes also align with previous studies such as those (Gallego-Álvarez *et al*., 2014; Gallego-Álvarez *et al.*, 2015; Misani and Pogutz, 2015; Sen *et al.*, 2015; Trinks, Mulder *et al.*, 2020; Brahmana and Kontesa, 2021; Xu *et al.*, 2021; Mahapatra *et al.*, 2021; Palea and Santhià, 2022; Bendig *et al.*, 2023; Wedari *et al.*, 2023; Liu *et al.*, 2023). Nevertheless, the effect of CE dropped to -0.0244 for developing nations and became not significant for developed ones after controlling for firm and country-level factors such as CG, NG and NC. The explanations of aligning with previous studies that the tourism industry seems to be a leading to other industries, as it influences others' return via the correlations on variety of services and products (Alatawi *et al.*, 2023).

Furthermore, the findings of this study indicate that CG appears to impose higher costs on tourism firms in developed countries yet lacks significance in others. An increase in CG leads to a decrease in FP by approximately 2%. However, this aligns with agency cost theory, particularly within the developed context. The governance, which seems to have a moderating role that will be discussed in the next section, is needed to an extant but not over a level that benefits firms. Therefore, its recommended to evaluate the need-level of transactions controlling. Regarding control variables, growth, contrary to size, positively influences tourism FP. Leverage also demonstrates a positive effect on developed firms (0.0237) but a negative impact on developing tourism firms (-0.191). These variations among control variables have been observed when country-level control variables are considered, which support the valued of comparison studies considering developed and developing nations.

Furthermore, the findings of this investigation suggest that CG seems to exert greater financial burdens on tourism firms in developed nations, while its impact is less pronounced in other nations. A rise in CG correlates with a decrease in FP by approximately 2%, a trend consistent with the principles of agency cost theory, particularly within the developed nations firms. The role of governance, which appears to act as a moderator factors, is necessary for all industries. However, it is imperative to note that governance is necessary up to a certain level but not beyond a level that yields benefits to firms. Consequently, it is advisable to assess the requisite level of transaction control. Further moderating effects of CG will be elaborated upon in subsequent sections. In terms of control variables, contrary to size, growth positively influences the FP of tourism firms, and leverage exhibits a positive impact on developed firms (0.0237) but a negative effect on those in developing stages (-0.191). These inconsistencies in the effects of control variables are evident when country-level control variables are taken into account, underscoring the importance of comparative studies encompassing both developed and developing nations.

Moreover, the dimensions of NC, such as individualism, masculinity, and LTO, have been identified as crucial determinants affecting the relationship between CE and FP. These dimensions carry substantial economic importance, particularly within tourism firms in developed nations. Notably, individualism and LTO demonstrate a negative impact on tourism FP, with decreases of 6% and 13%, respectively. Conversely, masculinity exerts an opposing influence on this examined correlation, with an increase of 8%. Likewise, NG emerges as a pivotal mechanism in moderating this investigated association. It is noteworthy that VAA displays significant negative effects in tourism firms of developed countries, while showcasing positive effects in those of developing

nations, although lacking economic significance. These findings further underscore the influential role of national factors in shaping transactions and performance within the tourism industry. Similarly, GE significantly impacts developed nations by 10%, yet does not wield a significant influence on developing ones, thereby positively reinforcing the examined relationship. Lastly, GDP appears to exert a notable sway on the relationship between CE and FP, a facet that will be explored in greater depth in subsequent discussions.

In conclusion, the ultimate evidence obtained from the applied model supports the majority of available studies that confirm a decreased effectiveness of CE on FP. However, this is against what has been reported by (e.g., Ashraf *et al.*, 2020; Downar *et al.*, 2021; Ferrat, 2021; Zhang and Vigne, 2021 and Busch *et al.*, 2022). These results of the causal relationship warrant attention, particularly when a comparison between developing/ed nations has taken place. The novel model yields $\boldsymbol{R^2}$ and Adjusted $\boldsymbol{R^2}$ values of 26% and 24%, respectively, in the context of developing nations and 23% in developed countries. These figures strengthen the credibility and acceptance of the employed model, indicating its reliability for generalisation and trustworthiness. Nonetheless, future studies should prioritise increasing the sample observations to boost the potential for generalising the findings. The study, further, believes that this relationship can be moderated by firm and national governance as well as NC.

4.2.2 Moderating roles analysis for CE and FP

In order to widen the discussion and clarify the relationship between CE and FP of developing and developed nations, this section reports the moderating effects of three factors—CG, NG, and NC—on the mentioned relationship. As bellow, Table 6 exhibits the findings of a test investigating the moderating influence of those three factors within the tourism industry considering developing nations. The regression analysis for moderation effects reveals that the interaction term CE*CG demonstrates a positive impact of 0.0413 while the main impact of CE on FP is still negative -0.0450*. However, this moderating impact is not notably substantial, suggesting that CG diminishes the effect of CE on FP in developing nations. Consequently, these results align with Hypothesis 3, indicating that CG moderates the link between CE and FP. The results (Table 6) show that the association between CE and FP of developing nations tourism firms also seems to be moderated by NG variables such as VAA, PSNV and GE. Although the results reflect some moderating role impact, none of the examined dimensions is significant, which is not as hypothesised by Hypothesis 4. However, NC dimensions, particularly individualism and indulgence, significantly moderate the CE and FP nexus. These outcomes, nevertheless, are within the tourism firms in developing countries.

Finally, as suggested by Hypothesis 5, national cultural factors serve as moderators in the relationship between CE and FP, displaying a substantial impact. Notably, the interaction terms created with NC dimensions—Indi, Indu and UA exhibit significant factor loadings of 0.395*, -0.132* and 0.0748, respectively. However, upon the application of these specified moderating variables, the consequences of disregarding CE change to -0.122** (-2.82), 0.0287 (1.12) and -0.0628* (-2.10) correspondingly. This underscores the influential role of culture in moderating the relationship, particularly as UA alters the direction of impact from negative to positive for the primary factors (CE and FP). In essence, this signifies that national governance and cultural factors wield a crucial moderating influence on the association between CE and FP within the context of developing tourism firms. The exact moderating roles for the developed tourism firms will be examined and reported.

Table 6: Regression outcomes of moderating effects of firm and country-level on CE-FP nexus (developing nation)

Developing nation tourism firms' FP										
Variables	**CG**	**NG**			**NC**					
CE	-0.0450*	-0.0131	-0.0350	-0.0212	-0.0110	-0.122**	0.00243	-0.0628*	-0.0489	0.0287
	(-2.19)	(-0.48)	(-1.28)	(-0.35)	(-0.17)	(-2.82)	(0.06)	(-2.10)	(-1.76)	(1.12)
CG	-0.0129	0.0110	0.0115	0.0108	0.0108	0.00856	0.0112	0.00896	0.0123	0.0137
	(-0.60)	(1.23)	(1.28)	(1.19)	(1.20)	(0.96)	(1.25)	(0.99)	(1.37)	(1.53)
Size	-0.00860	-0.00759	-0.00800	-0.00790	-0.00780	-0.00817	-0.00770	-0.00799	-0.00834	-0.00738
	(-1.48)	(-1.30)	(-1.38)	(-1.36)	(-1.34)	(-1.42)	(-1.33)	(-1.38)	(-1.44)	(-1.28)
Growth	0.0135***	0.0132***	0.0134***	0.0134***	0.0133***	0.0124**	0.0134***	0.0134***	0.0141***	0.0133***
	(3.43)	(3.33)	(3.40)	(3.39)	(3.37)	(3.15)	(3.39)	(3.40)	(3.52)	(3.38)
Leverage	-0.189***	-0.192***	-0.190***	-0.191***	-0.191***	-0.187***	-0.192***	-0.188***	-0.191***	-0.193***
	(-10.68)	(-10.84)	(-10.76)	(-10.86)	(-10.86)	(-10.62)	(-10.88)	(-10.63)	(-10.87)	(-11.02)
PD	0.0223	0.0289	0.0270	0.0271	0.0361	0.0269	0.0260	0.0196	0.0200	0.0160
	(0.53)	(0.69)	(0.65)	(0.65)	(0.61)	(0.65)	(0.62)	(0.47)	(0.47)	(0.38)
Indi	0.0784	0.0656	0.0692	0.0693	0.0702	-0.132	0.0694	0.0797	0.0697	0.0660
	(1.32)	(1.10)	(1.17)	(1.18)	(1.19)	(-1.27)	(1.18)	(1.34)	(1.18)	(1.12)
Mas	-0.0617	-0.0526	-0.0572	-0.0570	-0.0570	-0.0413	-0.0281	-0.0547	-0.0564	-0.0380
	(-1.68)	(-1.40)	(-1.57)	(-1.56)	(-1.56)	(-1.12)	(-0.49)	(-1.50)	(-1.55)	(-1.02)
UA	0.0282	0.0362	0.0346	0.0335	0.0337	0.0522	0.0320	-0.0119	0.0262	0.0442
	(0.82)	(1.05)	(1.02)	(0.97)	(0.99)	(1.50)	(0.94)	(-0.25)	(0.75)	(1.29)
LTO	0.0231	0.0196	0.0176	0.0192	0.0187	0.0181	0.0171	0.0154	-0.00555	0.0146
	(1.17)	(1.00)	(0.89)	(0.96)	(0.95)	(0.93)	(0.86)	(0.78)	(-0.17)	(0.75)
Indu	-0.00420	-0.00691	-0.00684	-0.00640	-0.00680	-0.0120	-0.00436	-0.00405	-0.00287	0.0653
	(-0.12)	(-0.20)	(-0.20)	(-0.19)	(-0.20)	(-0.35)	(-0.13)	(-0.12)	(-0.08)	(1.43)
VAA	0.0126	0.0278	0.0135	0.0155	0.0152	0.0162	0.0174	0.0159	0.0115	0.00569
	(0.51)	(0.76)	(0.54)	(0.63)	(0.62)	(0.67)	(0.70)	(0.65)	(0.47)	(0.23)
PSNV	0.0220	0.0244	0.0145	0.0236	0.0244	0.0230	0.0217	0.0166	0.0252	0.0411
	(0.90)	(1.00)	(0.44)	(0.92)	(0.99)	(0.94)	(0.88)	(0.66)	(1.03)	(1.61)
GE	0.0396	0.0345	0.0349	0.0371	0.0339	0.0669	0.0356	0.0406	0.0296	0.0325
	(0.92)	(0.80)	(0.81)	(0.64)	(0.79)	(1.49)	(0.83)	(0.94)	(0.69)	(0.76)
GDP	-0.0219**	-0.0228**	-0.0224**	-0.0225**	-0.0225**	-0.0267***	-0.0221**	-0.0206**	-0.0225**	-0.0267***
	(-3.12)	(-3.25)	(-3.20)	(-3.20)	(-3.22)	(-3.71)	(-3.13)	(-2.88)	(-3.22)	(-3.71)
Moderating Roles of CG, NG and NC										
Mod.Variables	**CE # CG**	**CE # VAA**	**CE # PSNV**	**CE # GE**	**CE # PD**	**CE # Indi**	**CE # Mas**	**CE # UA**	**CE # LTO**	**CE # Indu**
	0.0413	-0.0227	0.0208	-0.00413	-0.0191	0.395*	-0.0507	0.0748	0.0451	-0.132*
	(1.23)	(-0.46)	(0.43)	(-0.05)	(-0.21)	(2.35)	(-0.65)	(1.40)	(0.98)	(-2.34)
Constant	0.184*	0.160*	0.175*	0.167*	0.162	0.238**	0.148	0.176*	0.189*	0.167*
	(2.35)	(2.00)	(2.22)	(2.00)	(1.95)	(2.88)	(1.76)	(2.27)	(2.36)	(2.16)

Note: t statistics level of significance. * **p** < 0.05, ** **p** < 0.01, *** **p** < 0.001. **Observations**: 677; R^2 26%; Adjusted R^2 24% and **F**: 14

Furthermore, tourism firms within developed nations have been examined exploring the moderating roles of corporate and national governance and NC. Table 7 summarises an examination of how CG, NG and NC moderate the CE and FP nexus in the tourism sector of developed nations. Unlike in developing nations, the analysis of moderation effects reveals that in developed nations, the interaction term CE*CG shows a negative influence of -0.00682, while the direct impact of CE on FP is -0.0152. However, this moderation effect seems less significant in developed nations, suggesting that CG might alleviate the negative impact of CE on FP in the tourism industry. Without robust CG, CE negatively influences FP with a coefficient of -0.00546. These findings support Hypothesis 3, indicating that CG moderates the connection between CE and FP. Moreover, FP appears dependent on effective CG practices, suggesting that robust CG might enhance FP more in developing nations than in developed ones, despite potential governance implications.

Like tourism firms in developing nations, the findings presented in Table 7 indicate that the relationship between CE and developed nation tourism firms' FP is subject to moderation by NG variables, for instance, VAA, PSNV and GE. Like the examination conducted in developing nations, focusing on developed tourism is constrained to these variables due to high intercorrelations, exceeding 80%, among the independent variables, as revealed in the correlation matrix. Despite the results indicating some moderating impacts, only VAA (-0.00546) and PSNV (-0.0955*) of the assessed dimensions exhibit significance. These results support the critical roles of NG in the examined relationship, as reflected in Hypothesis 4. Also, the NC dimensions, particularly masculinity, play a noteworthy moderating role in the nexus between CE and FP.

According to Hypothesis 5, CE and FP are significantly influenced by cultural factors. However, these influences vary in tourism firms between developing and developed nations. Notably, masculinity only moderates the nexus significantly, loading it to 0.133***. This underlines the influential role of NC, particularly masculinity, which has an impact on the primary factors (CE and FP). In essence, this signifies a crucial moderating influence on the association between CE and FP within the context of developed tourism firms. Finally, CG holds more significance in shaping the CE-FP link in developing economy tourism firms than in developed nations. Factors like "voice and accountability" and "political stability" are crucial in managing CE in developed countries. Cultural aspects like individualism, indulgence and uncertainty avoidance (for developing nations) and masculinity (for developed nations) also play a significant role in moderating the CE-FP relationship in the tourism industry.

Table 7: Regression outcomes of moderating effects of Firm and country-level on CE-FP Nexus (developed nation)

	Developed nation tourism firms' FP									
Variables	**CG**	**NG**			**NC**					
CE	-0.00546	0.287***	0.0582*	-0.152	0.0387	-0.0348	-0.0985***	0.00702	-0.0157	0.0103
	(-0.44)	(4.03)	(2.00)	(-1.23)	(1.45)	(-1.36)	(-4.30)	(0.37)	(-1.18)	(0.34)
CG	-0.0152	-0.0174**	-0.0167*	-0.0190**	-0.0195**	-0.0182**	-0.0207**	-0.0187**	-0.0193**	-0.0192**
	(-1.16)	(-2.73)	(-2.57)	(-2.96)	(-3.04)	(-2.83)	(-3.24)	(-2.91)	(-3.00)	(-2.99)
Size	-0.0354***	-0.0372***	-0.0367***	-0.0352***	-0.0360***	-0.0361***	-0.0346***	-0.0359***	-0.0352***	-0.0352***
	(-11.45)	(-12.08)	(-11.82)	(-11.41)	(-11.70)	(-11.60)	(-11.31)	(-11.60)	(-11.29)	(-11.32)
Growth	0.0309***	0.0326***	0.0318***	0.0306***	0.0317***	0.0313***	0.0309***	0.0313***	0.0307***	0.0308***
	(10.51)	(11.19)	(10.90)	(10.47)	(10.84)	(10.74)	(10.70)	(10.72)	(10.46)	(10.55)
Leverage	0.0237**	0.0234**	0.0240**	0.0237**	0.0243**	0.0240**	0.0244***	0.0240**	0.0236**	0.0235**
	(3.20)	(3.17)	(3.24)	(3.20)	(3.28)	(3.23)	(3.30)	(3.23)	(3.17)	(3.16)
PD	-0.0232	-0.0731	-0.0457	-0.0206	0.0839	-0.0238	-0.0149	-0.0106	-0.0271	-0.0266
	(-0.52)	(-1.58)	(-1.00)	(-0.46)	(1.15)	(-0.53)	(-0.33)	(-0.22)	(-0.60)	(-0.59)
Indi	-0.0649*	-0.0320	-0.0461	-0.0662*	-0.0825**	-0.0854*	-0.0608*	-0.0709*	-0.0622*	-0.0619*
	(-2.17)	(-1.04)	(-1.50)	(-2.22)	(-2.63)	(-2.38)	(-2.05)	(-2.31)	(-2.07)	(-2.06)
Mas	0.0781***	0.0853***	0.0825***	0.0744***	0.0723***	0.0772***	0.0153	0.0764***	0.0784***	0.0794***
	(4.08)	(4.46)	(4.30)	(3.83)	(3.73)	(4.03)	(0.63)	(3.97)	(4.09)	(4.12)
UA	-0.0304	0.0317	-0.00923	-0.0313	-0.0607	-0.0304	-0.00559	-0.0272	-0.0238	-0.0245
	(-0.58)	(0.58)	(-0.17)	(-0.59)	(-1.10)	(-0.58)	(-0.11)	(-0.51)	(-0.44)	(-0.46)
LTO	-0.129***	-0.130***	-0.126***	-0.130***	-0.131***	-0.130***	-0.154***	-0.129***	-0.138***	-0.130***
	(-3.99)	(-4.04)	(-3.92)	(-4.04)	(-4.05)	(-4.03)	(-4.71)	(-4.01)	(-3.86)	(-4.03)
Indu	0.00555	0.00367	0.00695	0.000854	0.00192	0.00109	-0.0116	0.000972	0.00775	0.0266
	(0.11)	(0.07)	(0.14)	(0.02)	(0.04)	(0.02)	(-0.23)	(0.02)	(0.15)	(0.44)
VAA	-0.0969*	0.128	-0.106*	-0.0984*	-0.0918*	-0.0979*	-0.0524	-0.0957*	-0.0974*	-0.0976*
	(-2.23)	(1.85)	(-2.44)	(-2.26)	(-2.11)	(-2.25)	(-1.18)	(-2.20)	(-2.24)	(-2.25)
PSNV	0.00797	-0.0169	0.0626*	0.00749	0.0130	0.00580	-0.00864	0.00852	0.00757	0.00862
	(0.38)	(-0.77)	(2.00)	(0.35)	(0.61)	(0.27)	(-0.40)	(0.40)	(0.36)	(0.41)
GE	0.104*	0.115*	0.107*	0.0172	0.0956	0.109*	0.110*	0.104*	0.104*	0.104*
	(2.05)	(2.28)	(2.12)	(0.19)	(1.88)	(2.14)	(2.18)	(2.05)	(2.06)	(2.05)
GDP	-0.0316**	-0.0242*	-0.0287**	-0.0321**	-0.0311**	-0.0316**	-0.0325***	-0.0318**	-0.0311**	-0.0309**
	(-3.19)	(-2.44)	(-2.90)	(-3.25)	(-3.16)	(-3.20)	(-3.31)	(-3.22)	(-3.15)	(-3.12)
	Moderating Roles of CG, NG and NC									
Mod.Variables	**CE # CG**	**CE # VAA**	**CE # PSNV**	**CE # GE**	**CE # PD**	**CE # Indi**	**CE # Mas**	**CE # UA**	**CE # LTO**	**CE # Indu**
	-0.00682	-0.349***	-0.0955*	0.158	-0.108	0.0357	0.133***	-0.0257	0.0140	-0.0332
	(-0.34)	(-4.18)	(-2.38)	(1.16)	(-1.85)	(1.05)	(4.12)	(-0.89)	(0.60)	(-0.64)
Constant	0.547***	0.244	0.466***	0.642***	0.533***	0.570***	0.557***	0.552***	0.541***	0.522***
	(4.11)	(1.62)	(3.41)	(4.09)	(4.01)	(4.22)	(4.21)	(4.14)	(4.07)	(3.79)

Note: t statistics level of significance. * **p** < 0.05, ** **p** < 0.01, *** **p** < 0.001. **Observations**: 1513; R^2 23%; Adjusted R^2 23% and **F**: 29

4.2.3 Additional analysis and robustness

The earlier regression analysis focused on how CE impacts FP measured by ROA, showing a negative effect. In this follow-up, we aim to explore CE, along with CG, NG and NC, and their influence on another metric. Specifically, we seek to understand differences in costs for tourism firms neglecting CE, which is evident in accounting (ROA) and market financial performance (TOBIN'S Q). Also, this study uses Generalized Linear Models (GLM) as an alternative regression method for greater robustness, examining the exact relationship between CE and FP.

Table 8 shows differences in how CE relates to Tobin's Q versus ROA. Tobin's Q is not significantly influenced by CE, unlike ROA. Despite CE negatively affecting accounting-based financial performance in tourism, this doesn't hold for market-based performance. This trend appears in both developing and developed nations. In developing nations, CE has a factor of -0.0244 in ROA, compared to 0.157 in Tobin's Q. Similarly, in developed nations, CE has a factor of -0.00889 in ROA compared to 0.0374 in Tobin's Q. These findings contrast with Inoue and Lee (2011) and Yadav et al. (2016), suggesting that firms with higher green rankings see improved market value. This study confirms CE's negative impact solely on accounting-based financial performance, necessitating further investigation.

Corporate governance generally boosts market-based FP in the tourism industry, particularly in developing nations (0.275**). However, a different impact surfaces in developed countries, suggesting conflicts between principals and agents as per agency theory. The agency cost affects accounting-based FP but not market-based FP, which might be absent or beneficial. Variables like firm size exhibit conflicting effects, shifting significantly from negative to positive impacts in developing and developed nations. Larger firms positively influence TOBIN'S Q, likely due to their perceived reputation. Additionally, national factors such as LTO negatively affect TOBIN'S Q in developing countries, aligning with trends in ROA and TQ in developed nations. Similarly, PSNV shows adverse effects when comparing accounting-based and market-based FP.

Table 8: The main differences between ROA and Tobin's Q (TQ) regarding the relationship.

Variables[3]	Tourism FP			
	Developing nation		Developed nation	
Main Independent	(TQ)	(ROA)	(T Q)	(ROA)
CE	0.157	-0.0244*	0.0374	-0.00889
	(1.08)	(-2.04)	(0.39)	(-1.25)
Firm-level Control Variables				
CG	0.275**	0.0109	0.0494	-0.0190**
	(2.60)	(1.23)	(0.57)	(-2.96)
Size	0.505***	-0.00790	0.475***	-0.0356***
	(7.41)	(-1.36)	(12.06)	(-11.58)
Growth	-0.0302	0.0134***	0.186***	0.0310***
	(-0.66)	(3.40)	(4.99)	(10.69)
leverage	-1.533***	-0.191***	0.349***	0.0237**
	(-7.83)	(-10.87)	(4.60)	(3.19)
Country-level Control Variables				
PD	1.597**	0.0272	0.889	-0.0227
	(3.19)	(0.65)	(1.47)	(-0.51)
Individualism	-0.635	0.0693	-0.995*	-0.0643*
	(-0.89)	(1.18)	(-2.50)	(-2.16)
Masculinity	-1.190**	-0.0569	2.869***	0.0780***
	(-2.78)	(-1.56)	(11.30)	(4.07)
UA	-0.470	0.0338	-0.650	-0.0304
	(-1.19)	(1.00)	(-0.91)	(-0.58)
LTO	-0.951***	0.0190	-1.864***	-0.129***
	(-3.90)	(0.97)	(-4.33)	(-3.99)
Indulgence	-1.552***	-0.00643	0.324	0.00526
	(-3.76)	(-0.19)	(0.49)	(0.11)
VAA	2.280***	0.0153	-0.103	-0.0969*
	(7.89)	(0.63)	(-0.18)	(-2.23)
PSNV	-0.627*	0.0240	-0.896**	0.00768
	(-2.16)	(0.98)	(-3.19)	(0.36)
GE	0.415	0.0349	0.153	0.104*
	(0.81)	(0.81)	(0.23)	(2.05)
GDP	-0.0732	-0.0226**	0.234	-0.0313**
	(-0.90)	(-3.23)	(1.76)	(-3.17)
Constant	1.289	0.169*	-4.478*	0.545***
	(1.38)	(2.18)	(-2.48)	(4.10)
Observations	632	677	1489	1513
R2	0.513	0.256	0.537	0.234
Adjusted R2	0.501	0.240	0.532	0.226
F	43.27	15.20	113.8	30.45

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Considering the Hausman test, Table 9 presents the outcomes from the 'generalised linear model' (GLM) and ordinary least squares (OLS) regression in developing and developed nations. This serves as a robustness check. The GLM, used in the tourism context, handles multiple continuous variables effectively. The table indicates that both OLS and GLM produce similar results, confirming an inverse relationship between CE and FP variables. All GLM variables align with OLS findings, including firm and country-level

[3] **ROA**: return on assets; **TQ**; Tobin's Q, Due to the complexity (Inoue and Lee, 2011) of the formula by (Tobin, 1969) this study use a simplified formula (MV) available in DataStream; **CE**: carbon emission; **CG:** corporate governance; **PD:** power distance; **UA**: uncertainty avoidance; **LTO**: long term orientation; **VAA**: voice and accountability; **PSNV**: political stability and no violence; **GE**: government effectiveness.

factors impacting tourism firms' financial performance. These analyses consolidate the study's key findings, employing various regression techniques like pooled OLS and GLM to reinforce and validate outcomes.

Table 9: GLM and OLS regression's outcomes for both nations

Variables	Tourism FP			
	Developing nation		Developed nation	
Main Independent	(GLM)	(OLS)	(GLM)	(OLS)
CE	-0.0244*	-0.0244*	-0.00889	-0.00889
	(-2.04)	(-2.04)	(-1.25)	(-1.25)
Firm-level Control Variables				
CG	0.0109	0.0109	-0.0190**	-0.0190**
	(1.23)	(1.23)	(-2.96)	(-2.96)
Size	-0.00790	-0.00790	-0.0356***	-0.0356***
	(-1.36)	(-1.36)	(-11.58)	(-11.58)
Growth	0.0134***	0.0134***	0.0310***	0.0310***
	(3.40)	(3.40)	(10.69)	(10.69)
leverage	-0.191***	-0.191***	0.0237**	0.0237**
	(-10.87)	(-10.87)	(3.19)	(3.19)
Country-level Control Variables				
PD	0.0272	0.0272	-0.0227	-0.0227
	(0.65)	(0.65)	(-0.51)	(-0.51)
Individualism	0.0693	0.0693	-0.0643*	-0.0643*
	(1.18)	(1.18)	(-2.16)	(-2.16)
Masculinity	-0.0569	-0.0569	0.0780***	0.0780***
	(-1.56)	(-1.56)	(4.07)	(4.07)
UA	0.0338	0.0338	-0.0304	-0.0304
	(1.00)	(1.00)	(-0.58)	(-0.58)
LTO	0.0190	0.0190	-0.129***	-0.129***
	(0.97)	(0.97)	(-3.99)	(-3.99)
Indulgence	-0.00643	-0.00643	0.00526	0.00526
	(-0.19)	(-0.19)	(0.11)	(0.11)
VAA	0.0153	0.0153	-0.0969*	-0.0969*
	(0.63)	(0.63)	(-2.23)	(-2.23)
PSNV	0.0240	0.0240	0.00768	0.00768
	(0.98)	(0.98)	(0.36)	(0.36)
GE	0.0349	0.0349	0.104*	0.104*
	(0.81)	(0.81)	(2.05)	(2.05)
GDP	-0.0226**	-0.0226**	-0.0313**	-0.0313**
	(-3.23)	(-3.23)	(-3.17)	(-3.17)
Constant	0.169*	0.169*	0.545***	0.545***
	(2.18)	(2.18)	(4.10)	(4.10)
Observations	677	677	1513	1513
R2		0.256		0.234
Adjusted R2		0.240		0.226
F		15.20		30.45

*t statistics in parentheses * p < 0.05, ** p < 0.01, *** p < 0.001*

5. Conclusion

The study aims to investigate the impact of CE on the FP of tourism firms, while concurrently examining the moderating effects of both firm-specific and national-level

governance and cultural factors. The novelty of this applied model lies in its exploration of causality relationships by integrating national controls and moderating factors, a combination yet unexplored. Moreover, it compares outcomes between tourism firms in developing and developed nations. Employing an innovative regression model, the analysis revealed several significant findings. Primarily, the findings corroborate that an increase in CE leads to a decrease in FP of tourism firms. This indicates that firms emphasising environmental practices, including green management, tend to witness improvements in FP. Notably, this observed cost is more pronounced for tourism firms in developing nations, with a coefficient of 2% compared to their counterparts in developed nations, after adjusting for firm and national-level variables. Both firm-specific and national governance factors exert substantial influences on the FP of tourism firms. While CG demonstrates significance in the developing context, NG alongside NC holds importance in developed nation tourism firms.

This nexus, mentioned above, is notably affected by the level of national economic development for both types of nations, and the impact CG on CE is particularly significant within developing nations. This underscores the importance of governance frameworks and enforcement mechanisms for environmental regulations within the tourism industry of developing economies. Conversely, within developed nations, the relationship between CE and FP seems to be moderated by national governance, focusing particularly on variables such as VAA and PSNV, rather than primarily being influenced by CG. Cultural elements also play a role in moderating the connection between CE and FP in both nation samples. However, within the developed nations, only masculinity significantly moderates the examined relationship, while within developing countries, only individualism and indulgence exhibit significant moderation.

Despite its contributions, this study is not without limitations. For instance, due to data availability, it is confined to data from tourism firms in 60 countries. Moreover, the dataset could be extended to include observations until 2023, considering the impact of Covid-19 on this relationship, especially given the disparities between developing and developed nations. Additionally, it suggests further refinement of the tourism sample by categorizing developing countries into specific groups such as the Middle East, MENA, and Arab countries, to better understand possible variations and reasons thereof. Nevertheless, in addition to paving the way for future research in the tourism industry domain, this study offers insights to regulatory bodies and standard-setting organizations to reform green management practices. Moreover, these ultimate outcomes support policymakers and practitioners in emphasizing the consideration of national governance and culture while formulating policies and practices to promote CE and subsequently enhance firm performance.

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