Research article

Employees' behavioural action towards corporate environmental performance: The moderating effect of moral reflectiveness

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A B S T R A C T

The evolution of the hotel industry's corporate environmental performance cannot be realized without employees acting in an environmentally friendly manner, such as low carbon behaviour. However, a thorough analysis of the factors influencing employees' low-carbon behaviour and hotels' corporate environmental performance has not yet been done. To overcome this literature gap and envision the social identity theory, this study evaluated how employees' green self-efficacy, environmental awareness, and perceived corporate environmental responsibility facilitate staff low carbon behaviour. Also, the study explored the moderation role of employees' moral reflectiveness. Through a purposive sampling technique, data was collected from 455 employees in the hotel industry in South Africa. The partial least squares structural equation model method examined the proposed hypothesis. The empirical findings revealed that: (1) employees' green self-efficacy, environmental awareness, and perceived corporate environmental responsibility positively influence their low carbon behaviour. (2) Employees' low carbon behaviour directly and positively affected hotels' corporate environmental performance. (3) The outcome supported the moderation effect of employees' moral reflectiveness on the linkage between green self-efficacy and low-carbon behaviour. The practical and theoretical implications are discussed. The limitations and areas of future research are further outlined.

1. Introduction

Human-caused environmental degradation threatens global society, affecting health and social and economic development [1]. Hence, to limit the adverse effects of climate change, the globe needs to focus on achieving carbon neutrality. The present study concentrates on the Republic of South Africa's hospitality industry [2]. noted that South Africa's excessive dependence on fossil fuels has made it the world's 14th-highest emitter of CO_2. The country is prone to environmental pollution challenges, for which proper mechanisms must be implemented to curb this menace. In addition, business activities and human behaviours are critical underlying causes of ecological and climate change challenges [3]. Therefore, it requires actions and effort from people to avert these environmental challenges significantly. However, many studies have explored the impact of green self-efficacy, environmental knowledge and moral reflectiveness on firms' environmental performance. Thus, this has created a literature gap that needs to be addressed.

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In recent decades, the hospitality industry's activities have contributed significantly to higher environmental dilapidation. For instance Ref. [4], indicated that the hotel or hospitality industry is contentious and generates immense pollution. In addition, the hospitality industry disproportionately uses power, soft refreshments and water, contributing to higher levels of environmental destruction and climate change. In a more practical view [5], argued that today's clients are more intricate and have more demands and expectations than before when they visit hotels. Thus, these customers anticipate receiving the best possible services from hotel staff to feel comfortable staying in their accommodations. This calls for hotels to use more energy and improvise hot water and food. These demands result in significant routine waste in lodging facilities and hotels, which results in higher ecological pollution. Likewise [6], indicated that the hotel industry is regarded as one of the most high energy consumption industries. This is because of the significant amount of waste they generate, which causes an upsurge in carbon emissions. Hence, there has been a call for previous studies that hospitality activities cause an enormous increase in environmental pollution.

For the hospitality industry to improve ecological stability, the concept of corporate environmental performance (CEP) has been championed by environmental scholars, stakeholders and prior studies [7]. Corporate environmental performance is defined in this study as the key decisions, strategies, and policies consistent with protecting the environment through firms' environmental management framework [8]. In this study, we call for the need of the hotel industry to focus on employees' behavioural concepts, such as low carbon behaviour, in dissipating environmental degradation in South Africa. Some erstwhile studies describe low carbon behaviour as "pro-environmental behaviour"- [9], green behaviour"- [10] and "environmentally friendly behaviour" [11]. Therefore, this research argues that hotels should be interested in promoting low-carbon behaviour among employees since it can enhance their brand image, attract eco-conscious customers, lower firms' expenses, secure environmental-related certifications, and promote corporate environmental performance [12].

Employees contribute enormously to corporate environmental performance by engaging in environmentally friendly initiatives such as low-carbon behaviour. Scanty studies have examined the causes of employees' low-carbon behaviour, especially in emerging economies such as South Africa. The study applied the social identity theory (SIT) proposed by Ref. [13] to evaluate how employees' green self-efficacy, environmental awareness, and perceived corporate environmental responsibility influence employees' low-carbon behaviour at the workplace. In addition, the study explores the impact of low-carbon behaviour on corporate environmental performance and the moderation of employees' moral reflectiveness on the low-carbon behaviour-corporate environmental performance nexus. The study addresses three key questions;

(1) Do employees' green self-efficacy, employee environmental awareness, and perceived corporate environmental responsibility affect their engagement in low-carbon behaviour in the hotel industry?
(2) To what extent does employees' low carbon behaviour affect corporate environmental performance in the hotel industry?
(3) What moderation role does employees' moral reflectiveness play in the interplay between green self-efficacy and employees' low-carbon behaviour?

The following discussion briefly introduces the variables and the theoretical gaps this research seeks to address. Self-efficacy is an individual assessment of one's capability to develop resources and identify the rationale, motivation, and required behaviour to cope with foreseeable challenges. Similarly [14], defined self-efficacy as a person's confidence and ability to control their behaviour, motivation, and social environment. As indicated by Ref. [15], a higher level of individual self-efficacy allows an individual to exhibit a positive attitude towards protecting the environment. Another employee behavioural concept that this study focused on is employee environmental awareness. Personal awareness of the essence of protecting and sustaining the environment (i.e., an individual attitude that indicates concern for and understanding ecological outcomes) has recently been recognized in the literature as a necessary initiative in improving environmental challenges [16]. Individuals with a higher level of environmental awareness are much more likely to involve themselves in low-carbon behaviour, which will affect the Sustainability of the environment. Moreover, perceived corporate environmental responsibility refers to an enterprise's commitment, plans and initiatives to mitigate climate change. Hence, the study suggests that if an organization recognizes perceived corporate environmental responsibility as a top priority by management, it will encourage employees to also engage in low-carbon behaviour, ultimately enabling hotel industries to achieve a higher level of corporate environmental performance.

Advancing literature on low-carbon behaviour, the research further examined the moderating impact of moral reflectiveness on the interplay between green self-efficacy and low-carbon behaviour [17,18]. Recent literary works have also shown that people's moral reflectiveness strongly determines their low-carbon behaviour [19]. Thus, employees' moral reflectiveness affects individuals only when they are aware of the consequences of (not) acting morally and also when they believe they are responsible for the consequences of their actions. As [20] indicated, a literature gap exists on the moderating role of employees' moral reflectiveness in shaping the interaction between low-carbon behaviour and corporate environmental performance. As a result, the current study provides an empirical analysis to resolve this ` critical question in behavioural and environmental research.

The discussion so far has revealed that it is imperative to analyze the influence of employees' green self-efficacy, perceived corporate environmental responsibility, employee environmental awareness and low-carbon behaviour on corporate environmental performance. Thus, prior studies generally assess these concepts through public interaction, leadership symposiums, and business ethics and mainly focus on external stakeholders, customers, government and investors. However, few studies have investigated how individual psychological concepts, perceptions, behaviour, and awareness affect corporate environmental performance. Hence, how employees' self-efficacy, environmental awareness, and perceived corporate environmental responsibility affect their low carbon behaviour and corporate environmental performance is still lacking, especially from the context of hotel industries. Therefore, applying the SIT, this study presents a theoretical model that evaluates how individual factors such as awareness, perception and self-

efficacy can influence corporate environmental performance.

The contributions of the present study are as follows. First, based on SIT and prior studies, four essential variables have been identified to explain how employees can contribute to corporate environmental performance: green self-efficacy, environmental awareness, perceived corporate environmental performance and low-carbon behaviour. As a result, this study adds to the body of knowledge in SIT literature by examining how this variable contributes to promoting corporate environmental performance in the hospitality industry [21]. Second, the employees' narrative about their self-efficacy, environmental awareness, and perceived corporate environmental responsibility is an emerging discussion among environmental scientists, and conclusions on how it affects low carbon behaviour and corporate environmental performance are beginning to take shape conceptually [22,23]. Given that perceived corporate environmental responsibility reveals an employee's authenticity, opinion, perception and commitment to the firm's environmental responsibility action, it is imperative to discuss how it can enhance low-carbon behaviour and corporate environmental performance. Third, this research advances stakeholders' and hotel managers' understanding of how low-carbon behaviour might influence corporate environmental performance. Fourth, the study contributed to understanding how employees' moral reflectiveness moderates the linkage between green self-efficacy and low-carbon behaviour. Lastly, this research provides practical policy directions to help reduce the adverse impact of activities of the hotel industry on the environment.

This paper consists of six main sections. Section 1 focuses on the study's background, objectives, and contribution to entrepreneurship development. Section 2 examines the theoretical framework and hypothesis development. Section 3 introduces the methodology adopted. Section 4 expounds on the findings based on PLS-SEM analysis. Section 5 will present this work's interpretation, leading to practical and theoretical consequences, and section 6 furnishes the conclusion and future research.

2. Theoretical underpinning and hypothesis development

2.1. Social identity theory

The underlying assumption of the SIT is that individuals develop and associate themselves with a specific group to have a positive self-concept [24,25]. According to Ref. [13], an individual's societal standing may influence their self-concept. Thus, as stipulated by the SIT, people appreciate being a part of respected groups since doing so improves their sense of self-efficacy and assurance over their members in the group [26,27]. The interaction between an enterprise and its employees is better understood in the SIT context. Moreover, this study contends that several social elements may influence how an individual establishes their social identity, resulting in behavioural actions such as low-carbon behaviour driven by their willingness and ideas to act following them. Hence, when individuals attach themselves to a specific group, they inculcate the contents and standards of this group. Thus, the individual goals, values, norms and objectives align with those of the identified group. Therefore, when employees find out that their firms engage in initiatives that promote low-carbon behaviour and perceived corporate environmental responsibility at the workplace, it will influence them to contribute to corporate environmental performance.

Envisioning the SIT, this study developed and tested a structural framework detailing the psychological and social dynamics in which employees' green self-efficacy, employee environmental awareness, and perceived corporate environmental responsibility affect their low carbon behaviour and overall corporate environmental performance. For the current analysis, SIT is an appropriate theoretical perspective. First, SIT focuses on individual perception, awareness and goals that align with the outcome of a group they are associated with, influencing them to engage in specific actions or behaviours. Hence, this assumption enables the study to theorize how employees' green self-efficacy, moral reflectiveness, employee environmental awareness and perceived corporate environmental responsibility affect their low-carbon behaviour at the workplace. Second, the SIT posits that an individual's self-efficacy, goals and orientation are improved when they discover that they are identified with a specific group with the same objectives or goals. Therefore, this study proposes that with the proper mechanisms, employees can engage in low-carbon behaviour at the workplace, which might influence corporate environmental performance. Lastly, extant research has proved that this theory can be used to evaluate the effect of the psychological association between groups and individuals on sustainable behaviour, such as low carbon behaviour [4,21,28,29].

2.2. Hypothesis development

2.2.1. Green self-efficacy and low carbon behaviour

Self-efficacy has been long established to be domain-specific or task-oriented in psychological studies. As postulated by Ref. [30], self-efficacy can be enhanced by considering four main variables: social persuasion, learning, mastery, and the physical and emotional state of the individual. Mastery is the most powerful tool for understanding self-efficacy. As suggested by the SIT, a higher level of self-efficacy can result in life satisfaction and improve individuals' well-being. Thus, a person can accomplish a set of targets or goals through self-efficacy, improving their psychological and social well-being [31]. Green self-efficacy can help employees identify and capitalize on opportunities and influence the degree of the perceived difficulty of targeted goals and the proficiency level to achieve those goals [32]. The body of studies suggests that green self-efficacy opinions and suggestions of individuals can influence a variety of low-carbon behaviours in the hotel industry, including recycling actions [33], usage of eco-friendly products [[34]] and energy-saving initiatives [35,36]. However [14], explored the interplay between green self-efficacy and low carbon behaviour among 84 staff in Malaysia; their research analysis proved that green self-efficacy has an insignificant connection with employees' low carbon behaviour.

An empirical analysis by Ref. [36] in the hospitality industry in Pakistan revealed that green self-efficacy is strongly associated with the level of confidence in performing an assigned activity. Therefore, employees' high levels of green self-efficacy result in high effort

and persistence in engaging in low-carbon behaviour. Hence, green self-efficacy provides confidence for employees to perform their workplace jobs in an environmentally friendly manner. As stipulated by the SIT, people do not engage in certain actions for their gains. They sometimes gain aspects of their identity from the emotions and knowledge they attach to a particular group. Extant studies have also reported a positive interaction between green self-efficacy -low carbon behaviour [6,37]. From the above discussion, this research argues that a higher level of green self-efficacy will directly affect employees engaging in low-carbon behaviour in the hotel sector. Therefore, this study proposes that:

H1. Employees with a higher level of green self-efficacy positively influence their level of low-carbon behaviour.

2.2.2. Employee environmental awareness and low carbon behaviour

Employee environmental awareness (employee environmental awareness) is a multi-dimensional phenomenon that impacts a person's attitude, information, knowledge, tendencies, actions, and attempts [38]. Employee environmental awareness relates to the intention of an employee to carry out a series of activities related to the environment, which is enhanced by the emotional and psychological factors articulated by the SIT. An environmentally mindful employee engages in various actions, attitudes, and values that can increase the firm's corporate environmental performance [39]. Environmental awareness can also describe employees understanding of the natural ecological system and their intended plans and actions to save the environment. As a result, employee environmental awareness is an integral part of the learning process. It enables employees to concentrate more and commit to making the planet safer for future generations. A higher level of employee environmental awareness and related issues leads to a greater comprehension of the significance of ecological preservation for the well-being of society [39]. Employee environmental awareness is a critical construct in this study because the core idea of Sustainability and environmental initiatives can improve and serve as a strategic tool for enhancing low-carbon behaviour among society and organizations [40]. investigated the impact of employee environmental awareness on low-carbon behaviour among 497 hotel staff in Turkey. The outcome of their research proved that employee environmental awareness directly influences staff's low-carbon behaviour. In line with the SIT theory, this research argues that low-carbon behaviour involves conscious efforts made by workers to lessen the adverse effect of pollution on the ecological system. Accordingly, workers with higher knowledge and awareness about climate change and emission issues will engage in actions and behaviours that benefit the enhancement of environmental stability. Thus, this study posits that:

H2. Employees with a higher level of employee environmental awareness positively influence their level of low carbon behaviour.

2.2.3. Perceived corporate environmental responsibility and low carbon behaviour

The environmentally friendly hotel industry is dedicated to its compliance with laws, business ethics, and social responsibilities to protect the natural ecological system while making economic gains [28]. The hospitality industry seeks to develop a business plan with sustainable long-term factors, including minimum environmental damages and economic and social benefits to society [41]. Perceived corporate environmental responsibility is thus associated with multiple organizational, institutional, and individual outcome expectations. The current research portrays perceived corporate environmental responsibility as a set of specific behaviours and actions taken by the hotel industry to ensure the Sustainability of the environment while maintaining long-term economic gains. Based on this understanding, perceived corporate environmental responsibility is described as the degree of employees' perception of the needed support provided by their firm to environmental protection-related activities. Employees are regarded as the crucial aspect of a firm stakeholder [42,43]. Hence, their perceived corporate environmental responsibility is significant in enhancing the corporate environmental performance.

Employees' observation of their firm's perceived corporate environmental responsibility initiative significantly improved engagement and generally embraced low-carbon behaviour at the workplace. A study by Ref. [44] applied the SIT, and their analysis indicated that forming a person's social identity facilitates their level of pro-environmental actions. Likewise [28], used the SIT, and their outcome revealed that staff perceived corporate environmental responsibility positively influences their low carbon behaviour at the workplace. Prior studies have also indicated that perceived corporate environmental responsibility positively impacts low-carbon behaviour and corporate environmental performance in the hotel industry [45,46]. Hence, employees perceived corporate ecological responsibility can be fostered through their firm's actions that improve environmental stability. Drawing upon the SIT, the study contends that the formation of a higher perception of a firm's ecological responsibility can enhance employees' low-carbon behaviour. Hence, this study proposes that:

H3. Perceived corporate environmental responsibility positively influences employees' low-carbon behaviour.

2.2.4. Low carbon behaviour and cooperate environmental performance

Low carbon behaviour is among the strategies the hotel industry considers to achieve higher corporate environmental performance and ecological Sustainability. Hence, some of these hospitality industry players have to devise proactive steps to help staff engage in low-carbon behaviour to protect the environment and natural environmental system and neutralize the negative impact of their business operations on the environment. Low carbon behaviour can be described as eco-friendly, including material conservation, energy conservation, recycling used products, and promoting green initiatives. Few studies have examined the association between low carbon behaviour-corporate environmental performance in the hotel industry. However, the limited studies that evaluated this relation revealed that low-carbon behaviour positively influences corporate environmental performance. For instance Ref. [47], espoused that low-carbon behaviour has a positive connection to the small tourism industry in Egypt.

Similarly [48], empirical findings revealed that employees' low carbon behaviour is essential in improving hotel corporate

environmental performance among Pakistan firms. Likewise, other studies have also proved that developing employees' green, low-carbon, and pro-environmental behaviour significantly enhances hotel environmental performance [49,50]. The SIT proposed that firms' sustainable practices significantly influence staff low carbon behaviour, improving corporate environmental performance. In addition, several erstwhile studies have indicated that staff low carbon behaviour can substantially contribute to higher corporate environmental performance in the hotel industry [4]. Therefore, low-carbon behaviour efforts among employees can foster or improve corporate environmental performance. Hence, based on these arguments, this research posits that:

H4. Employees' low carbon behaviour positively influences corporate environmental performance.

2.2.5. Moderation role of employee moral reflectiveness

The moderation effect is a statistical interaction between two or more variables influencing their relationship. In the connection between green self-efficacy and low-carbon behaviour, moderation can help us understand how certain factors might strengthen or weaken the relationship between these variables. Employees' moral reflectiveness prompts employees to focus on moral values that can trigger positive workplace behaviour. This indicates that employees with higher moral values choose to involve themselves in morally correct actions and behaviour. Employees' moral reflectiveness refers to individuals' morally facilitated reflection regarding their life routine and the magnitude to which they contemplate moral matters in their daily decisions and experiences. In addition [51], indicated that employees' moral reflectiveness at the workplace is subject to individual moral norms because it affects behaviour significantly. For instance, if an employee switches their light after work to save energy or does not use the elevator but instead the stairs, they will not receive any economic benefits. However, as a result of engaging in such activities, it enhances their low-carbon behaviour. Therefore, it is asserted by Ref. [51] that employees' moral reflectiveness can motivate employees to engage in low-carbon behaviour. When individuals feel a moral responsibility toward executing a specific task (for instance, confronting low-carbon behaviour), they believe it conforms to their expected outcome. The SIT offers a basis for understanding how workers behave in the workplace [52]. Hence, applying the SIT in this study, the researcher argues that employees with a higher sense of moral reflectiveness moderate the association between green self-efficacy and low-carbon behaviour. Accordingly, this study posits that:

H5. Employees' moral reflectiveness positively moderates the association between green self-efficacy and low-carbon behaviour.
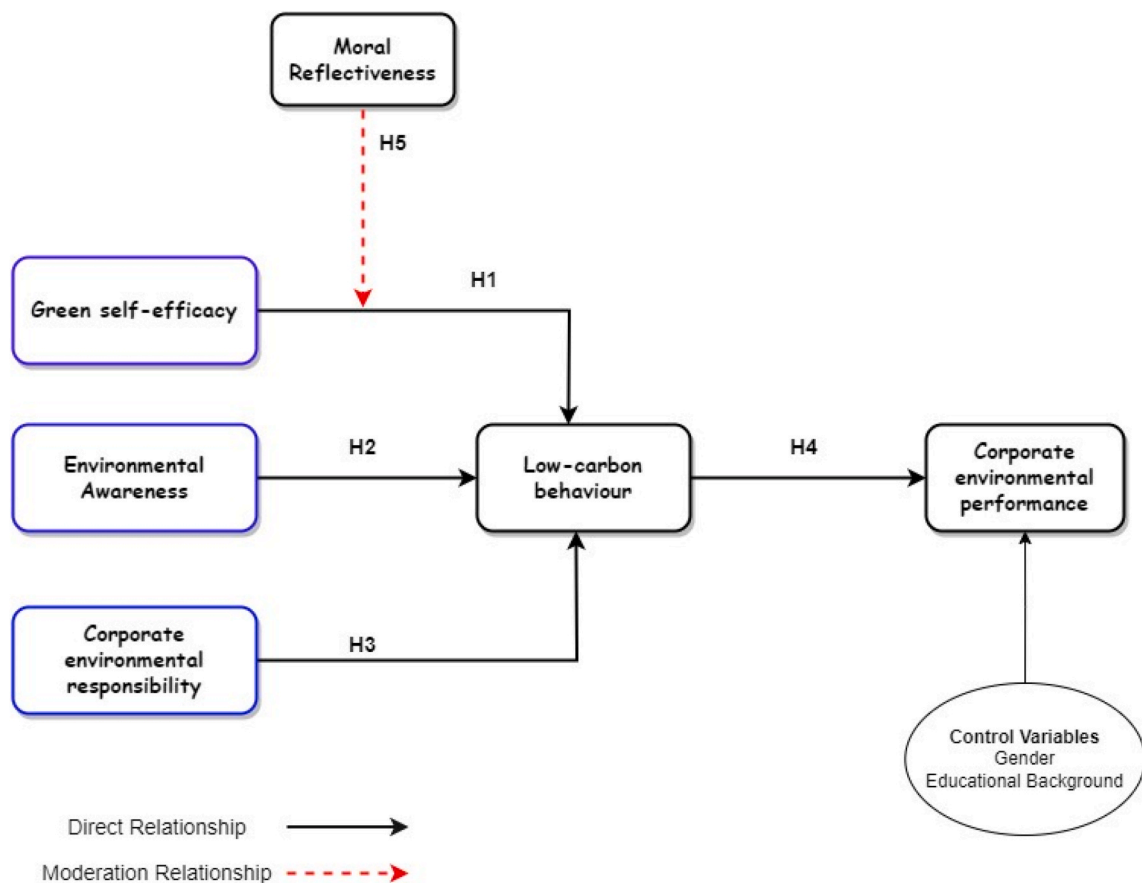

Fig. 1. Theoretical model.

2.3. Conceptual framework

Fig. 1 indicates the theoretical framework of this study. Exploring the SIT, the research proposes that employees' low carbon behaviour is affected by green self-efficacy, environmental awareness, and perceived CER (H1-H3). In addition, the study examines the effects of low-carbon behaviour on corporate environmental performance (H4). Lastly, the study evaluates the impact of employees' moral reflectiveness on the interplay between the association between green self-efficacy and low carbon behaviour (H5).

3. Methodology

3.1. Study area and data collection approach

The hotel industry in South Africa is expanding as more travellers come there for job opportunities and pleasure. South Africa is regarded as one of the most populous tourist destinations on the African continent. The country received more than 10.5 million visitors in 2018, a 1,7% rise over 2017. A recent by Ref. [53] as of July 2022 indicated that more than 2 million visitors have passed through the South African ports of entry and exist. Out of these travellers, more than 1.3 million were foreign travellers. The hospitality sector in South Africa is increasing, and most hotels are establishing innovative approaches to make customers feel more welcome in the country. A report by Ref. [54] revealed that as of February 2022, revenue accumulated from the hospitality industry in South Africa amounted to more than 165 million U.S. dollars. Moreover, it is expected that between 2022 and 2026, the hotel industry in South Africa will increase by 9.2%, equivalent to 1.3 billion U.S. dollars.

Nonetheless, the environment is endangered by this sector's propensity to expand. These enterprises must adopt distinct decarbonization measures to ensure that this industry thrives and growth does not coincide with the rise of carbon emissions in South Africa. Prior studies have indicated that the activities in the hotel sector adversely influence the ecosystem through various activities. In addition [36], asserted that the hotel industry is among the most prominent service sectors with the highest ecological footprint impact due to its 24-h and seven-day operations. Hence, environmental scientists believe that by encouraging sustainable lifestyle, action, low carbon behaviour and green practices among its workforce, the hotel sector may improve its corporate environmental performance. This demonstrates the reason behind surveying the hotel industry in South Africa. In this regard, the study gathered data from Cape Town and Durban. The study selected Cape Town and Durban because these two famous cities have tourist attractions and many top-star hotels. Moreover, many national and international hotels are situated in these cities. In addition, recent climate change has dramatically affected these two cities [55].

The unit of analysis of the current study is staff working in the sampled hospitality industry. Questionnaires were developed with the help of two experts with knowledge and experience in the hospitality sector. Moreover, two practitioners were invited to analyze the validity of the questionnaires. The revised questionnaire was conducted, which was used to investigate the projected linkages. The study applied the purposive sampling design to collect data from four- and five-star hotels in South Africa. The purposive sampling approach increased the likelihood of choosing the optimal size for quantitative studies [56]. During the data collection process, we sent emails to the management of the hotels to solicit their involvement in the study. The research's target audience was hotel managers, deputy managers, and supervisors with adequate knowledge about their enterprise environmental strategies. Moreover, the authors believe that hotel managers and supervisors are directly involved in reporting and managing environmental issues within the firm [57]. The managers who consented to participate in the research were then provided with a cover letter explaining the study's objectives and the survey questionnaires.

Data were gathered to analyze this study via structured questionnaires adapted from existing studies. The study applied 5-point Likert scale-based questionnaires created to quantify the research parameters. During the data collection process, 32 hotels were contacted through email. A total of 670 questionnaires were distributed, of which 455 (68% response rate) were received after final evaluation and thorough screening. The sample size of 455 aligns with the threshold suggested by Ref. [58], who assert that the sample size should exceed 10 times the highest number of structural paths that lead to a given parameter in the structural model.

Moreover, the sample size is comparable to the previous studies examining these constructs [16]. Since the study relied upon individual attitudes and behaviour, this might result in social desirability bias. In addition, the researcher assured the participants of their anonymity and confidentiality in answering the questionnaires. The questionnaires were structured to avoid leading questions that may suggest a preferred response. Instead, the study used neutral language, and we also avoided using words that could be interpreted as socially desirable or undesirable in this study.

3.2. Research methodology

Research methodology aids in analyzing the various steps a researcher takes to investigate their research topic and the justifications for each one. This study used a quantitative approach to answer the research questions, making it easier to comprehend the study related to this subject. The current paper utilized the quantitative approach to evaluate how employees' green self-efficacy, environmental awareness, and perceived corporate environmental responsibility influence low-carbon behaviour and corporate environmental performance. The rationale for selecting this research approach is that extant studies have shown that using a quantitative approach improves the reliability of the findings [59,60].

3.3. Demographics analysis

This section of the study focuses on the demographic characteristics of the survey participants. A total of 455 responses were used for the analysis of this study. The outcome of the investigation revealed that out of the 455 respondents, 310 (68%) were males, and 145 (32%) were females. Most respondents aged 216 (47%) fall between 31 and 45 years. In addition, 158 (35%) accounted for employees aged 20–30 years, and the remaining 81 (18%) fall within the age category of 46–60. With regards to educational background, 304 (66%) of the respondents had a bachelor's degree, while 105 (23%) had a master's degree, and the rest, 46 (11%), had a PhD degree. According to the findings on work experience, 288 (63%) had worked between 1 and 5 years in their current workplace. While 23(27%) had worked between 6 and 10 years, the remaining 44 (10%) had more than 10 years of working experience in the hospitality industry in South Africa. The job positions outcome from the study revealed most participants were supervisors 170 (37%), followed by middle-level 145 (32%), and senior managers 140 (31%).

3.4. Measurement of variables

The construct of green self-efficacy was quantified using a 6-item scale derived from Ref. [26]. The Cronbach's alpha statistical value for this parameter was $\alpha = 0.838$. The parameter of employee environmental awareness was assessed using a 6-item scale adapted from Ref. [61]. The items of these constructs produced a Cronbach's alpha statistical value of $\alpha = 0.883$. In addition, the perceived corporate environmental responsibility variable was measured using a 6-item scale retrieved from Ref. [62]. The components of this parameter yielded a Cronbach's alpha statistical value of $\alpha = 0.878$. The low carbon behaviour scale was explored with a 6-item scale developed by Ref. [63]. The components of this parameter yielded a Cronbach's alpha statistical value of $\alpha = 0.815$. The 6-item scale was modified from Ref. [34] to evaluate the employees' moral reflectiveness variable. The components of this parameter yielded a Cronbach's alpha statistical value of $\alpha = 0.896$. The 6-item scale, modified from Ref. [64], was used to evaluate the corporate environmental performance variable. The construct had a Cronbach's alpha statistical value of $\alpha = 0.843$. To measure the control

Table 1
Descriptive information of the study questionnaire.

Scales/Measurement	Mean	Std. Dev	Kurtosis	Skewness
Green Self-Efficacy				
I think I can succeed in protecting the environment	4.064	0.930	−0.713	0.270
I could find out creative solutions to environmental problems	3.824	0.771	−1.072	−0.488
I can achieve most environmental goals	4.254	0.808	−1.008	1.125
I feel competent in dealing effectively with environmental tasks	4.236	0.825	−1.411	0.903
I think I can overcome the environmental problems	4.417	0.803	−0.466	1.819
I can perform effectively on the environmental missions of my firm	3.825	0.933	−0.507	−0.327
Employees Environmental Awareness				
People should live in harmony to achieve sustainable development	4.112	0.789	−0.541	0.341
I am willing to control my consumption patterns to ensure sustainable development	3.922	0.868	−0.556	−0.078
I think every individual has a responsibility to play their role in protecting the environment	3.888	0.917	−0.530	−0.268
I am concerned about energy scarcity	4.034	0.824	−0.870	−0.171
I am worried about future environmental quality	4.235	0.822	−0.729	0.202
Individuals should be informed about the environment through media (TV, newspapers, magazines, and others)	4.293	0.740	−0.795	−0.073
Perceived Corporate Social Responsibility				
Our firm encourages its employees to participate in voluntary activities	4.339	0.750	−0.860	1.110
Our firm targets sustainable growth, which considers future generations	4.064	0.930	−0.713	0.270
Our firm encourages its employees to adopt eco-friendly behaviour	3.824	1.171	−1.072	−0.488
Our organization respects and promotes the protection of biodiversity	4.254	0.808	−1.008	1.125
Our organization invests in clean technologies and renewable energies	4.236	0.825	−1.411	0.903
Employees' Moral Reflectiveness				
I often reflect on the moral aspects of my decisions	4.825	0.933	−0.507	−0.327
I think about the morality of my actions almost every day	3.965	0.834	−0.678	−0.054
I often find myself pondering ethical issues	4.112	0.789	−0.541	0.341
I have good morals regarding environmental safety	3.922	0.868	−0.556	−0.078
I like to think about ethics regarding the protection of the environment	3.813	0.917	−0.530	−0.268
Low carbon Behavior				−0.171
I feel a sense of duty to support my firm in protecting the environment	4.235	0.822	−0.729	0.202
I love conserving energy and engaging in recycling activities	4.293	0.740	−0.795	−0.073
I love the effort and time it takes to engage in pro-environmental behaviour	4.312	0.722	−1.060	0.260
I love remembering to turn off electronic gadgets to conserve energy	4.339	0.750	−0.860	1.110
I volunteer for environmental activities in my firm	4.064	0.930	−0.713	0.270
I perform tasks that are expected of me in environmentally friendly ways	4.824	1.171	−1.092	−0.488
Corporate Environmental Performance				
Our firm reduced the environmental impacts of its products/service	4.236	0.825	−1.072	0.903
Our firm has conserved source of energy consumption	4.254	0.808	−1.008	1.125
Our firm is very concerned about pollution mitigation strategies	4.236	0.825	−1.411	0.903
My company has significantly reduced its solid waste generation	4.417	0.803	−0.860	1.819
Our company is keen on the economic utilization of resources	4.064	0.630	−0.713	0.210
Our company is committed to recycling efficiency	4.824	1.081	−1.032	−0.498

variables of the study, the study applied this approach: Gender $0 = male, 1 = female$ and educational background (1 = bachelor degree, 2 = Master degree, 3 = Ph.D). Previous studies also used some of these control variables in their research [6]. It is important to note that all the variables explored in this study are from individual-level indicators. Thus, the study asks questionnaires seeking employees' opinions and perceptions about their firms' actions and approaches towards corporate performance. This perception can help shape their commitment towards low carbon behaviour, ultimately influencing firms' environmental goals.

3.5. Data analytical approach

The research analysis was evaluated using the partial least squares structural equation model (PLS-SEM) technique. This approach first evaluates the constructs' reliability and validity and the discriminant validity. Moreover, the SMART-PLS approach also helps assess the structural model's direct, indirect, and moderation effects on the proposed hypothesis [65]. In addition, it provides information that can be used to measure the goodness of fit and the saturation model performance [66]. Lastly, various researchers consistently have employed the PLS-SEM to assess employees' low-carbon behaviour and corporate environmental performance, demonstrating the robustness of this statistical methodology [67,68].

Ethical approval

The study ensured anonymity, confidentiality and verbal informed consent from all the survey participants. In addition, the research design was approved and reviewed by the ethical standards committee of the School of Management, Jiangsu University. The research does not violate the rights of the respondents.

4. Results

4.1. Descriptive statistics of measurement variables

Table 1 captures the statistics of the mean, standard deviation, skewness and kurtosis for this paper's five Likert scale

Table 2
Convergent validity outcome.

Constructs	Items	Loadings	CA	CR	AVE	VIF
Green Self-efficacy	GSE1	0.750	0.838	0.852	0.571	1.884
	GSE2	0.880				1.378
	GSE3	0.898				1.124
	GSE4	0.873				2.730
	GSE5	0.854				2.421
	GSE6	0.780				2.813
Employees' Environmental Awareness	EEA1	0.820	0.883	0.905	0.618	2.877
	EEA2	0.853				1.812
	EEA3	0.863				1.773
	EEA4	0.858				1.578
	EEA5	0.717				1.842
	EEA6	0.893				2.950
Perceived CER	PCER 1	0.757	0.878	0.804	0.571	3.209
	PCER 2	0.801				3.491
	PCER3	0.796				1.895
	PCER4	0.732				1.396
	PCER5	0.821				2.010
	PCER6	0.701				2.148
Low Carbon Behaviour	LCB1	0.867	0.815	0.813	0.557	1.070
	LCB2	0.875				1.000
	LCB3	0.703				2.424
	LCB4	0.757				2.441
	LCB5	0.863				2.260
	LCB6	0.744				2.725
Employees' Moral Reflectiveness	EMR 1	0.700	0.896	0.912	0.660	2.345
	EMR2	0.745				2.643
	EMR3	0.791				3.030
	EMR4	0.867				3.430
	EMR5	0.873				1.893
	EMR6	0.881				1.378
Corporate environmental performance	CEP1	0.809	0.843	0.907	0.682	1.884
	CEP2	0.818				1.378
	CEP3	0.823				3.024
	CEP4	0.716				3.730
	CEP5	0.897				2.421
	CEP6	0.794				2.625

questionnaires. The survey findings indicated that the constructs' mean values range from 4.825 to 3.813. The standard deviation values also range from 1.171 to 0.722. The skewness coefficient values ranged were lower than 3, and the coefficient values of the kurtosis were also lower than 10. These statistics indicate that the study data meets the standard distribution requirement for data analysis.

4.2. Measurement model assessment

4.2.1. Internal consistency and reliability

To evaluate the measurement model of the research model, the researchers initially assessed the factor loadings of all the constructs, Cronbach's alpha (CA) and composite reliability (CR), average extracted variance (AVE), and discriminant validity. The factor loadings, as indicated in Table 2, show an acceptance level (>0.70) for all the constructs [65]. Following this, we analyzed the parameters' reliability and validity through the CA and CR tests, which were higher than the threshold of 0.70 [65]. Moreover, the findings proved that AVE for each parameter was above the recommended cut-off of 0.50, as presented in Table 3. The present outcome provides evidence of convergent validity for the research measurement tools [65].

4.2.2. Common method bias (CMB)

The probability that CMB can affect the research data analysis could not be ruled out. The CMB test should then be evaluated to check for multicollinearity issues when using PLS-SEM to assess the research data [70]. [71] proposed that a construct lacks CMB issues when a single latent parameter accounts for less than 50% of the variance inflation factor (VIF). The research proved that only 37.3% of the variance could be assigned to a single latent parameter. In addition, as captured in Table 2, the statistical co-efficient of VIF for all the parameters did not exceed 5.0, which is the threshold suggested by extant studies [70,72].

4.3. Discriminant validity

Discriminant validity is crucial in research and measurement, particularly in psychology, social sciences, and other applied sciences. It is a statistical property used to assess whether two or more constructs, variables, or measures are distinct and do not overlap significantly. As [73] reported, this study applied three approaches to address the discriminant validity. These tests include the Fornell-Larcker Criterion, Heterotrait-Monotrait Ratio (HTMT) and cross-loading of the constructs. This [69] criterion compares the square root of the average variance extracted (AVE) for each construct with the correlations between constructs. If the AVE for each construct is higher than the correlations between constructs, it indicates discriminant validity. As captured in Table 3, the outcome indicates that the discriminant factors of the indicators presented in the measurement model meet the threshold Hair et al. recommended. As further indicated in Table 3, all the values for the HTMT were less than the 0.90 thresholds [74]. Values below the diagonals are inter-parameter correlation coefficients, whereas the bold values in the diagonals are the squared AVE statistical values. Hence, it can be concluded that there is evidence of discriminant validity in the research model.

4.4. Cross loadings

The cross-loading test is conducted by examining the pattern of loadings obtained from the factor analysis. Researchers pay particular attention to the magnitude of factor loadings for each indicator across the extracted factors. If an indicator has high loadings

Table 3
Results of discriminant validity.

Fornell Larcker [69] Criteria						
	CEP	EEA	EMR	GSE	LCB	PCER
CEP	0.826					
EEA	0.280	0.804				
EMR	0.300	0.862	0.812			
GSE	0.952	0.453	0.440	0.756		
LCB	0.671	0.845	0.720	0.820	0.719	
PCER	0.733	0.653	0.825	0.789	0.788	0.697
HTMT Criteria						
	CEP	EEA	EMR	GSE	LCB	PCER
CEP						
EEA	0.313					
EMR	0.322	0.602				
GSE	0.548	0.486	0.470			
LCB	0.720	0.614	0.765			
PCER	0.750	0.772	0.631	0.403	0.757	

Note: CEP: Corporate environmental performance; GSE: green self-efficacy; EEA: employees' environmental awareness; LCB: low carbon behaviour; PCER: perceived corporate environmental responsibility.

on multiple factors, it may suggest that it is not sufficiently specific to a single construct, potentially indicating problems with discriminant validity. As presented in Table 4, each latent indicator loading (bolded) surpasses the cross-loading (with other scale items).

4.5. Predictive relevance and effect size

To evaluate the predictive relevance of the research model, the study employed the (R^2) coefficient determination, an essential indicator that shows the strength of a link between the regressors and the explanatory variable. R^2 testing is used in this study to determine whether an endogenous variable has predictive value. The R^2 value represents the forecast's accuracy [37]. As revealed by Ref. [66], a statistical value of (R^2) of 0.19 (minor), 0.33 (medium) and 0.67 (substantial) effects. Findings from the study as presented in Table 4 revealed that green self-efficacy (81.0%), employee environmental awareness (67.9%), and PCER (52.2%) can be explained by the explanatory parameters of corporate environmental performance. As a result, all endogenous components should be greater than zero, which shows the model has a strong capacity for prediction [37]. In addition, to determine the significance of f^2 values must pass three main criteria: under 0.02 as small, below 0.15 as average, and 0.35 and above as large. The f^2 offers an evaluation technique to measure practical significance in testing the magnitude of the effect among research models. The finding of the study indicates a larger f^2 effect for the variables explored in this research. To evaluate the goodness of fit of the saturated model [74], suggested that the model's standardized root means square (SRMR) values should not exceed 0.08. The results of our investigation show that the model is sufficiently fit, with an SRMR of 0.033. Last but not least, the normed fit index (NFI) demonstrated by Ref. [75] argued that the NFI should of the saturated model exceed 0.90. The NFI value of 0.984 indicates that the study data is suitable for empirical analysis.

4.6. Structural model

The study applied a bootstrapping technique to evaluate the proposed hypothesis of this study. The tested indicators include the beta (path coefficient), statistical significance (p < 0.005), and the t-statistics of the constructs, as provided in Table 5 and Fig. 2. The study initially assessed the control variables, followed by the proposed model's direct association and iteration relationship.

Table 4
Findings from cross-loadings.

	CEP	EEA	EMR	GSE	LCB	PCER
CEP1	**0.809**	0.219	0.233	0.750	0.485	0.632
CEP2	**0.818**	0.110	0.082	0.580	0.328	0.421
CEP3	**0.823**	0.284	0.317	0.898	0.651	0.701
CEP4	**0.716**	0.266	0.289	0.873	0.667	0.634
CEP5	**0.897**	0.420	0.710	0.597	0.847	0.597
CEP6	**0.794**	0.432	0.680	1.018	0.730	0.594
EEA1	0.238	**0.820**	0.626	0.420	0.757	0.501
EEA2	0.258	**0.853**	0.707	0.385	0.763	0.587
EEA3	0.232	**0.863**	0.674	0.363	0.744	0.516
EEA4	0.234	**0.858**	0.700	0.408	0.711	0.498
EEA5	0.204	**0.717**	0.745	0.306	0.525	0.514
EEA6	0.172	**0.893**	0.791	0.276	0.506	0.571
EMR1	0.234	0.858	**0.700**	0.408	0.711	0.498
EMR2	0.204	0.717	**0.745**	0.306	0.525	0.514
EMR3	0.172	0.693	**0.791**	0.276	0.506	0.571
EMR4	0.237	0.687	**0.867**	0.355	0.594	0.757
EMR5	0.298	0.646	**0.873**	0.391	0.579	0.801
EMR6	0.279	0.651	**0.881**	0.381	0.586	0.796
GSE1	0.809	0.219	0.233	**0.750**	0.485	0.632
GSE2	0.618	0.110	0.082	**0.880**	0.328	0.421
GSE3	0.923	0.284	0.317	**0.898**	0.651	0.701
GSE4	0.916	0.266	0.289	**0.873**	0.667	0.634
GSE5	0.795	0.283	0.326	**0.854**	0.675	0.639
GSE6	0.235	0.708	0.570	**0.780**	0.703	0.459
LCB1	0.916	0.266	0.289	0.873	**0.867**	0.634
LCB2	0.795	0.283	0.326	0.854	**0.875**	0.639
LCB3	0.235	0.708	0.570	0.480	**0.703**	0.459
LCB4	0.238	0.820	0.626	0.420	**0.757**	0.501
LCB5	0.258	0.853	0.707	0.385	**0.863**	0.587
LCB6	0.232	0.863	0.674	0.363	**0.744**	0.516
PCER1	0.237	0.687	0.867	0.355	0.594	**0.757**
PCER2	0.298	0.646	0.873	0.391	0.579	**0.801**
PCER3	0.279	0.651	0.881	0.381	0.586	**0.796**
PCER4	0.809	0.219	0.233	0.750	0.485	**0.732**
PCER5	0.618	0.110	0.082	0.580	0.328	**0.821**
PCER6	0.923	0.284	0.317	0.898	0.651	**0.701**

4.6.1. Control variables

In the analysis phase, we controlled staff gender and educational background on corporate environmental performance. As captured in Table 6, the outcome revealed that all the control parameters positively affect CEP. Thus, gender ($\beta = 0.614, t = 15.185, p = 0.000$) and educational background $\beta = 0.316, t = 17.304, p = 0.000$) had a direct influence on corporate environmental performance which is similar to the outcome of [[6,76,77]].

4.6.2. Direct path analysis

Hypothesis 1, which posited a positive connection between green self-efficacy and employees' low carbon behaviour, was supported ($\beta = 0.684, t = 35.585, p = 0.000$). In addition, hypothesis 2, which stipulated that employee environmental awareness will exert a positive impact on employees' low-carbon behaviour, was proven ($\beta = 0.807, t = 49.696, p = 0.000$). Similarly, the empirical finding supported the assertion that employees perceived corporate environmental responsibility ($\beta = 0.343, t = 19.468, p = 0.000$) has significantly influenced low carbon behaviour in the hotel industry. Hypothesis 4 of the study proposed that low carbon behaviour will positively affect CEP; the empirical outcome affirms this proposition ($\beta = 0.979, t = 34.220, p = 0.000$).

4.6.3. Moderation analysis

The study uncovered the moderating role of employees' moral reflectiveness between green self-efficacy and low-carbon behaviour, a novel addition to the literature since most studies had ignored this relationship [10,14]. As a result, this study enunciated that employees' moral reflectiveness ($\beta = 0.393, t = 10.266, p = 0.003$) has a substantial effect on the interaction between green self-efficacy and low-carbon behaviour. The iterative process visualization of employees' moral reflectiveness between green self-efficacy and low-carbon behaviour is further demonstrated in Fig. 3. The graph indicates that employees with higher moral reflectiveness in their actions and behaviour can be harnessed to strengthen the interplay between green self-efficacy and low-carbon behaviour in the hotel industry.

5. Discussion

This study sought to explore the nexus between green self-efficacy, environmental awareness, perceived corporate environmental responsibility, and employees' low-carbon behaviour through quantitative research in the hotel industry in South Africa. The key findings of this research are discussed below:

First, the empirical outcome of this study revealed that employees with a higher level of green self-efficacy positively influence their engagement in low-carbon behaviour in the hotel industry. The implication of this finding indicates that respondents in this survey have learned enough to feel confident in themselves, affecting their low-carbon behaviour. In line with the SIT, this outcome further demonstrates that a high green self-efficacy or greater level of conviction that an individual possesses can influence events in their environment, which may, therefore, tend to increase the engagement in a behavioural pattern such as low carbon behaviour at their workplace [14]. In addition, the implication of this outcome also suggests that staff members' confidence in their capacities to overcome ecological problems will steer their likelihood to establish innovative concepts to accomplish sustainable targets. In addition, a higher level of green self-efficacy will cause them to propagate, stimulate and generate eco-friendly ideas and devise appropriate strategies to implement them. The outcome of this study is consistent with extant studies that suggest that green self-efficacy positively influences low-carbon behaviour [37,78]. However, this research analysis coincides with [14] findings that green self-efficacy has an insignificant influence on staff members' low-carbon behaviour.

Second, regarding the effect of employee environmental awareness on low-carbon behaviour, the empirical outcome unveiled that employee environmental awareness has a positive connection with staff's low-carbon behaviour. The intuition from this finding is that employees who are aware of issues relating to the environment and are concerned about them will be more drawn to encouraging environmentally friendly behaviour and more dedicated to nurturing their co-workers to do so. As stipulated by the SIT, people's awareness affects their actions and behaviour; hence, hotel management must recruit staff committed to promoting ecological stability [79]. Another inference from this result is that employee environmental awareness empowers staff members to conduct themselves in a manner that makes them equipped to safeguard the environment, ultimately improving their low-carbon behaviour. In addition [36], indicated that employee environmental awareness could help transform individuals' mindsets and ideas to engage in actions that promote ecological Sustainability. This study's findings do not support the results of [52] asserted that employee environmental awareness has an insignificant association with green behavioural outcomes. Thus, their findings concluded that employee

Table 5
Outcome of the saturated model.

Constructs	(R^2)	(f^2)	Q^2	SRMR	NFI
GSE	0.810	0.703	0.110	–	–
EEA	0.679	0.775	0.318	–	–
PCER	0.582	0.641	0.226	–	–
EMR	0.847	0.673	0.287	–	–
CEP		0.897	0.238	0.033	0.984

Note: CEP: Corporate environmental performance; GSE: green self-efficacy; EEA: employees' environmental awareness; LCB: low carbon behaviour; PCER: perceived corporate environmental responsibility.
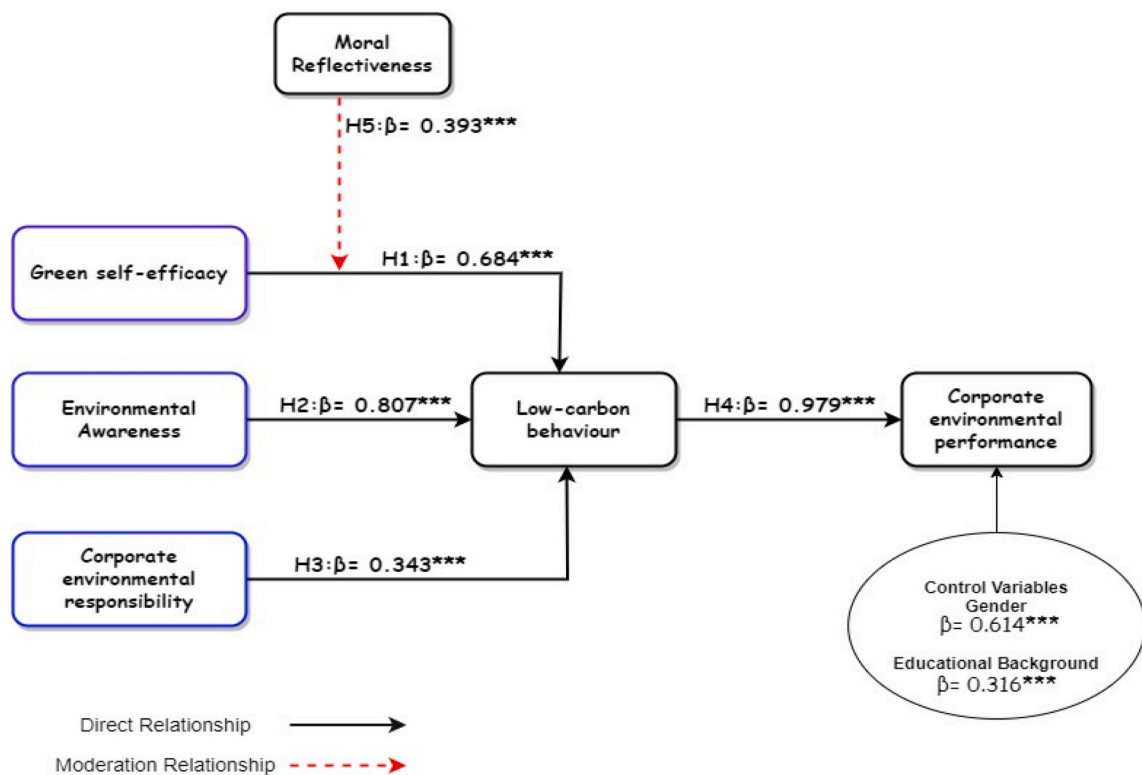
Fig. 2. Outcome of the structural model.

Table 6
Summary of the path analysis.

Hypothesis	Path coefficient	t-value	P-value	Decision
Control Variables				
Gender	0.614	15.185	0.000	Significant
Educational Background	0.316	17.304	0.000	Significant
Direct Relationship				
H1: GSE → LCB	0.684	35.585	0.000	Supported
H2: EEA → LCB	0.807	49.686	0.000	Supported
H3: PCER → LCB	0.343	19.468	0.000	Supported
H4: LCB → CEP	0.979	34.220	0.000	Supported
Moderation effect				
H5: EMR * → LCB → CEP	0.393	10.266	0.003	Supported

Note: CEP: Corporate environmental performance; GSE: green self-efficacy; EEA: employees' environmental awareness; LCB: low carbon behaviour; PCER: perceived corporate environmental responsibility.

environmental awareness does not influence employee low-carbon behaviour. Nevertheless, this study agrees with these studies [16].

Third, the current research results highlight a positive interaction between perceived corporate environmental responsibility and low-carbon behaviour in the hotel industry in South Africa. This study's results implied that staff's perception of their enterprise's environmental responsibilities positively influences and encourages them to show low-carbon behaviour at the workplace. The findings show that undertaking perceived corporate environmental responsibility efforts improves staff members' green behaviour [80]. found a similar outcome and concluded that perceived corporate environmental responsibility reinforces employees to engage in low-carbon behaviour at the workplace. Moreover, following the SIT, the hotel industry's perceived corporate environmental responsibility activities can inculcate positive and robust feelings among employees who identify that their firms are trying to protect the environment. As enunciated by Ref. [81], perceived corporate environmental responsibility indicates the interplay between enterprises, citizens, society, and ecology, consistent with the SIT theory. Hence, the output of enterprises towards perceived corporate environmental responsibility would be the reflection of employees' low carbon behaviour at the workplace.
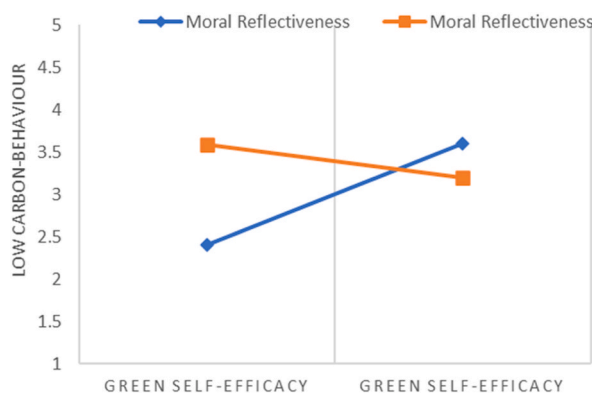
Fig. 3. Iteration diagram of employees' moral reflectiveness.

Interestingly, this research's outcome supports erstwhile studies that revealed that employees perceived corporate environmental responsibility directly impacts their low-carbon behaviour. For instance, Refs. [7,82]. Moreover, the findings contribute to these hospitality sector studies that concluded that perceived corporate environmental responsibility is essential in promoting employees' sustainable, pro-environmental, and low-carbon behaviour [83]. The findings of this research further extend prior studies that concluded that perceived corporate environmental responsibility significantly influences the low-carbon behaviour of employees working in the hospitality industry [36,84].

Fourth, the current study further investigated the link between low-carbon behaviour and corporate environmental performance in the hotel industry. The outcome disclosed that low carbon behaviour substantially influences corporate environmental performance. The possible reason for such an exciting revelation is that when corporate guidelines and policies reinforce an enterprise's low-carbon behaviour strategies, it will stimulate employees to engage in low-carbon behaviour at the workplace, leading to higher corporate environmental performance in the hotel industry. The findings of this study backed up the argument that low-carbon behaviour corresponds positively with corporate environmental performance. This indicates that low carbon behaviour could catalyze employees to help a firm achieve higher corporate environmental performance. The SIT posits that employees can develop a sense of what it means to work for socially conscious firms and are proud to be connected with the hotel industry. Thus, employees work arduously to build a positive reputation for their firm to be involved in low-carbon behaviour that can stimulate corporate environmental performance. Moreover, this study builds on prior research that found that employees' low-carbon behaviour considerably influenced corporate environmental performance [85].

Lastly, the study findings demonstrated that employees' moral reflectiveness positively moderates the interaction between low-carbon behaviour and corporate environmental performance. Employees' moral reflectiveness may drive employees to think beyond self-benefits by caring for the ecosystem, clean environment, and future generations. The SIT suggests that employees' moral reflectiveness helps people value others' welfare when connected with moral matters. Therefore, this research concludes that green self-efficacy may prompt employees' moral reflectiveness, alerting their moral values towards environmental sustainability activities that can enhance their low-carbon behaviour. In other words, the connection between green self-efficacy and low-carbon behaviour can be strengthened through a high level of employees' moral reflectiveness. This result supports the findings of these studies [37,86, 87]. In addition, if individuals with high GSE receive strong support from their organization to participate in LCB, their GSE nay translate into more frequent LCB. Understanding the moderation effect is crucial for designing effective interventions and policies to promote sustainable behaviour. By identifying factors that enhance the link between green self-efficacy and low-carbon behaviour, we can better encourage and support individuals adopting environmentally friendly practices.

6. Conclusion, implications, and future research directions

6.1. Conclusion

The current study enriches our knowledge and insight regarding low-carbon behaviour and corporate environmental performance in the hotel industry. Building upon the social identity theory, this study generates a new understanding of how employees' moral reflectiveness moderates the nexus between low-carbon behaviour and corporate environmental performance. The empirical findings of this study conclude that (1) employees' behavioural concepts, such as green self-efficacy, environmental awareness, and perceived corporate environmental responsibility, have a positive and significant connection with their low-carbon behaviour. (2) employees' low-carbon behaviour positively influences corporate environmental performance, and (3) employees' moral reflectiveness strengthens and moderates the interplay between green self-efficacy and low-carbon behaviour.

6.2. Theoretical implications

The study's outcome provides an enormous theoretical contribution to existing literary work on employees' low-carbon behaviour

and corporate environmental performance, especially in the hotel industry. The study offers four theoretical insights, which are discussed below. First, the present study incorporates the staff's environmental perspectives (through green self-efficacy, employee environmental awareness, and perceived corporate environmental responsibility) in a theoretical model to better explain the strategies by which the hotel industry can enhance employees' commitment and involvement in the attainment of firms' environmental goals. It has been established by extant research that employees of firms are vital in the successful implementation of ecological plans of enterprises [88,89]. Hence, this study adds to the theoretical understanding that can help future research and practices of the hotel industry's corporate environmental performance.

Second, this research proved that employees' low carbon behaviour is a crucial predictor of hotel industry corporate environmental performance. Thus, the study contributes to the literature that has focused chiefly on the collaboration of the interplay between low-carbon behaviour and corporate environmental performance. Third, by theorizing the moderation influence of employees' moral reflectiveness on the interaction between green self-efficacy and low-carbon behaviour, the research highlights the multi-dimensional nature of employees' moral reflectiveness in enhancing GSE and LCB. Thus, this indicates the essence of focusing on individual moral reflectiveness in promoting ecological and low-carbon behaviour among employees. Therefore, the study findings suggest that moral reflectiveness can help employees engage in low-carbon behaviour and achieve higher corporate environmental performance.

Fourth, the findings present a shift in hospitality management research from employees' perceptions of corporate environmental performance. The theoretical significance of this research is that the study pays greater attention to the perceptions and ideas of employees. In addition, the research focused on enterprises whose actions and activities cause ecological challenges, such as the hospitality and tourism industries. This research does not evaluate environmental performance and employee behaviour in general but instead evaluates the low carbon behaviour in detail by considering employee green self-efficacy and environmental knowledge.

Lastly, the current study extends the theoretical research of SIT [13] to evaluate how green self-efficacy, employee environmental awareness, and perceived corporate environmental responsibility influence employees' low-carbon behaviour. This study is a pioneer in applying SIT to assess the predictors of staff behavioural concepts in the hotel industry in South Africa. In addition, the study re-inforces SIT flexibility in providing a contextual understanding of employees' behaviour in various scenarios, as indicated in previous research on low-carbon behaviour [4,21,28].

6.3. Managerial implication

Based on the present study's findings, the following policy directions are recommended for hotel managers and stakeholders. First, the study outcome showed a positive association between green self-efficacy -and low carbon behaviour; hence, we suggest that the hotel industry incorporate green self-efficacy into companies' procedures through conditioned and encouraging reinforcement. Also, the hotel industries can provide their staff with various skill sets (phycological and emotional state, verbal interaction, social modelling and mastery of experience) to enhance their self-efficacy. Thus, these skill sets can be realized through mental and physical support from mentors, co-workers, the human resource department, and hotel industry managers. This support will go a long way to improve the confidence level of employees to engage in low-carbon behaviour. In addition, to enhance employees' green self-efficacy, the study proposes that managers in the hotel industry award staff that participates in a "green lifestyle" at the workplace. Thus, such initiatives can help the firm improve staff confidence, inspire employees to act environmentally friendly and, most importantly, help firms achieve higher corporate environmental performance.

Second, this study reported that employee environmental awareness positively affects employees' low-carbon behaviour. As a result of these findings, this study proposes that hotel managers organize employee awareness training periodically to help them understand how their decisions and duties affect the overall firm's environmental goals. In addition, employee environmental awareness should be embedded into all all-human resource practices, such as selection, training, rewarding schemes, and performance management practices. Through the recruitment and training modules, the hotel industry can convey an essential message to the recruiters about the significance of ecological Sustainability, which can help increase their engagement in low-carbon behaviour at the workplace. Moreover, this study recommends that hotel managers enact policies and standards to incentivize employees' green initiative efforts. Thus, a reward scheme should be implemented to appraise employees who devise innovative ideas to help promote corporate environmental performance.

Third, as revealed by the findings of this research, if the hotel industries want to improve the low carbon behaviour of employees, they need to increase their activities of PCER. Hence, we suggest that it is essential for hotel management to communicate and outline the PCER initiatives and environmental strategies to their employees. This communication can be conducted using media such as official reports, social media, and training programs. Moreover, the hotel industry should consider employees' concerns and senti-ments regarding any CER activities they want to embark on.

The study's empirical analysis also highlighted that employees' moral reflectiveness could stimulate the association between green self-efficacy and low-carbon behaviour. This study recommends that individual moral orientation be strengthened through the stip-ulation and conformity to ethical standards in an organization. The research findings suggest that promoting moral reflectiveness enhances employees' GSE, eventually translating into higher LCB actions. This essential information is helpful for decision-makers and managers to outline strategies and programs that focus on enhancing individual morals about ecological preservation. Fifth, this research provides essential analysis and data to inform managers, practitioners and stakeholders about the need to promote low-carbon behaviour, employees' green self-efficacy and perceived corporate social responsibility among the staff of an organization. Thus, this research has confirmed that these variables are integrated into the higher environmental performance of firms.

6.4. Limitations and future research directions

First, this research survey was conducted from a single source; hence, the outcome cannot be generalized. Therefore, future analysis will be conducted by gathering data from the hotel industries in diverse jurisdictions to replicate the work of this research. Second, this study only collected data from employees in the hotel industry. Hence, future analysis can gather data from other sectors, such as event enterprises, restaurants, airports, and the educational industry. Thirdly, because inferential statistics like PLS-SEM are designed to assess the net effects and linearity, they restrict the ability to quantify asymmetrical conclusions. Therefore, future studies will employ advanced approaches to investigate the connection and interaction between these variables. Lastly, the components of behavioural concepts analyzed in this research are limited. Future studies can evaluate more comprehensively how factors such as green HR management, employee commitment, and green innovation practices can be tested in the theoretical framework of Ability, motivation, and Opportunity (AMO) and Social Cognitive theory.

Ethics approval

Not applicable.

Consent to participate

Not applicable.

Consent to publish

All authors reviewed and approved the manuscript for publication.

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Data availability

Data will be made available on request.

CRediT authorship contribution statement

Agyemang Kwasi Sampene: Writing – original draft, Software, Methodology. **Cai Li:** Project administration, Formal analysis, Conceptualization. **Fredrick Oteng Agyeman:** Writing – review & editing, Software, Conceptualization. **Robert Brenya:** Methodology, Investigation, Formal analysis.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e28075.

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