

Article

Impact of Green Transformational Leadership on Employees' Environmental Performance in the Hotel Industry Context: Does Green Work Engagement Matter?

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Abstract: This study primarily aimed to investigate the impact of green transformational leadership on employees' environmental performance and green work engagement in the hotel business. In addition to this, it sought to empirically examine the potential mediating effect of green work engagement in the association amid green transformational leadership and employees' environmental performance in three- and four-star hotels in Egypt. For this purpose, a questionnaire was designed and sent to the chosen workforce to ascertain their thoughts on the study's components (GTL, green work engagement, and hotel employees' environmental performance) using their connections with HR managers and hotel staff at popular Egyptian tourist sites. The questionnaire was organized to take account of four main aspects: (1) the demographic attributes of the investigated participants, (2) green transformational leadership matters, (3) green work engagement, and (4) employees' environmental performance matters. Structural equation modeling (SEM) was employed with a bootstrapping technique to examine the study's hypotheses. The findings of the study revealed that green transformational leadership has a significant positive effect on green work engagement and environmental performance among hotel employees. Furthermore, the link between green transformational leadership and the hotel employees' environmental performance was found to be significantly positively and partially affected by green work engagement.

Keywords: green hotels; transformational leadership; environmental performance; work engagement; eco-friendly hotels



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1. Introduction

Environmental issues are currently receiving a great deal of attention at the international level [1,2]. Many industrialized countries are interested in activating environmental policies, such as modifying energy-intensive manufacturing processes that cause severe pollution [3,4]. Many researchers have dedicated their efforts to developing technologies aimed at preserving the environment, such as recycling waste and water and using energy from natural sources that are not harmful to the environment [5,6], developing renewable energy, environmental modernization, diminishing carbon releases, and augmenting environmental efficacy/performance. In addition to these efforts, the administration concerned with implementing environmental policies, including green transformational leadership [7,8], is being developed, consequently increasing the productivity of the environmental factors overall.

Though scarce, the previous literature customarily probed the effects of GTL on green products. Even a few scientific studies have investigated the unsustainable results related

to GTL [9]. Management has focused on exploring unique leadership skills and talents that may encourage sustainable business operations based on the findings of the analysis of non-green results and considering the organizational advantages of profit intensification [10]. The goal of this research is to evaluate how GTL influences the productivity of workers. Henceforth, this study outlines an innovative research framework wherein green transformational leadership augments job efficacy [11]. The literature review revealed that no such research has been conducted in the past to probe the effects of GTL on non-green outcomes such as job efficacy [10].

According to most of the literature, significant GTL exists in the work environment and has an impact on green outcomes. Exploring non-green outcomes is very important, as it highlights the significance of the green outcomes. GTL has contributed to exploring novel leadership skills and capabilities that can foster maintainable corporate practices, endeavoring to enhance organizational interests to simultaneously maximize profits [12]. To narrow these gaps, this study aims to investigate how GTL affects the productivity of employees in the workplace. This research suggests a framework by which GTL will lead to enhanced functional outcomes [11].

For the last few decades, ecological repercussions have been more important to intellectuals, organizations, and officials [13,14]. Environmental endeavors, legislation, and the insistence of organizations have recently increased the awareness of the importance of sustainability and its means, as well as improving experience in handling environmental issues. Green procedures have been incorporated into numerous organizational facets [12]. This investigation takes account of GTL [15] and its ecological outcome on enterprises.

Recent research studies (e.g., [16,17]) have established a significant association between GTL, the environmental performance of enterprises, and green work engagement. However, studies regarding the association of the factors mentioned above in Egyptian hotels are still limited or are not available to researchers. This research intends to bridge the knowledge gap regarding the worth of GTL in supporting the environmental performance of an employee as well as green work engagement. This research examines the direct and indirect effects related to GTL on the environmental performance of employees in the Egyptian hotel industry. It also examines how green engagement on the part of hotel workers influences the relationship between GTL and the environmental performance of employees of Egyptian hotels. To evaluate the relationship between GTL and ecological performance through green engagement, this research advocates a valuable theoretical framework, providing researchers and specialists in the hotel industry in Egypt (especially those working in Egypt) with several valuable suggestions for enhancing the environmental effectiveness of GTL and the green involvement of employees. Accordingly, considering the above arguments, we created three research inquiries, described below:

RQ1: What influence does a GTL have on the employees' environmental performance?

RQ2: How does green engagement impact the employees' environmental performance?

RQ3: How does green engagement intermediate the relationship between GTL and the employees' environmental performance?

As green transformational leadership is a very important element in the organizational context of institutions and is concerned with activating modern strategies that are concerned with increasing productivity and developing performance in addition to paying attention to environmental issues, some studies therefore recommend additional research on mediating factors between green transformational leadership and green job engagement, including hotel performance [18].

To realize the objectives of this study, this paper is divided into eight parts: Part Two contains the theoretical outline for the study, outlining the research structures and revising the associations amid the research variables. Part Three includes information on collecting and analyzing the data. Part Four elucidates the results of the study. Part Five discusses the obtained results. The theoretical and practical implications are presented in Part Six. Finally, the limitations, further research directions, and conclusion of the study are presented in Parts Seven and Eight, respectively.

2. Review of the Literature

2.1. Green Transformational Leadership (GTL)

Environmental problems have forced organizations to take responsibility for addressing environmental concerns, as the organizations have come under pressure from various stakeholders, i.e., governments, consumers, communities, and competitors. This has resulted in a need to produce environmentally proactive leaders. In this way, GTL helps facilities to run more smoothly and efficiently. In fact, GTL inspires people to work toward a shared vision for the future of the environment. [19].

The concept of transformational leadership refers to the attainment of something of significance. The moral elevation reflects that experts inspire one another, augmenting the enthusiasm and morals to an advanced level; this means that a transformational leader inspires their staff to realize organizational objectives by enhancing staff awareness and influencing the team to look beyond egocentricity. Transformational leadership philosophy also centers on fostering admirers as upcoming experts. While researching affiliated groups, Sun et al. [20] utilized the GTL principles. In a GTL model, managers inspire and motivate their teams to realize a shared vision. They inspire the team and educate the younger members by modeling moral principles such as equity and fairness [21].

The importance of GTL increases with both group and personal productivity [22]. Many productive sectors consider the green environment and environmentally friendly, green products. The strategic steps to achieve this consist of a series of managerial actions and decisions to create a superior business product. Transformational leadership is imperative in using resources to develop strategic steps to generate a better competitive advantage. The company's performance is supported by the fact that leading with green management positively affects the performance of the company [21,23].

Green transformational leadership reflects the conduct of leaders who endeavor to produce a clear vision for inspiring their protégés. GTL also improves the skills of followers to augment pro-environmental activities in the enterprise [24,25]. Environmentally explicit transformation leaders demonstrate their pledge toward environment safeguarding, consequently and knowledgeably inspiring their juniors to obtain training towards promoting green behavior [20,22].

Transformational leadership is the behavior of charismatic, exciting, uplifting, and knowledgeable leaders who focus on adapting to the climate and initiate changes according to the natural transformations of events. The GTL is the preeminent type of initiative because it is more devoted, consistent, and loyal, and it categorically impacts job fulfillment. Green transformational leadership motivates individuals to cooperate and think about new items to achieve goals [20,23].

Transformational leadership has become an essential administrative topic in recent years. Studies have confirmed its impact on the behavior of employees within organizations in which transformational leadership is concerned with achieving the organization's long-term goals and helps subordinates comprehend functional values from the perspective of green, environmental trends [26].

Green transformational leadership has many advantages that contribute to the development of work and the development of environmental awareness among workers, including motivating employees to overcome hindrances by giving due consideration to concepts that are valuable for the organizational setting, developing the organization through the application of environmental sustainability standards, and solving environmental issues in a fitting manner [19,23,26]. Such a leader displays pro-environmental conduct in organizations and is perceived as a role model for their juniors. A green transformational leader can elevate the concerns of the juniors regarding environmental matters by having better relationships with them and relaying their green values to the employees [21,24].

Given the efficiency of the green environment, GTL enables the labor force to be prolific. It encourages employees to adhere to workers' environmental activities to produce environmentally friendly products using rarer resources, ultimately reducing contamination [21,23,27]. These green traits are also associated with green transformational leadership,

which maintains leaders' upright reputation and inspires the workforce, offering it a precise course of action to follow. Leaders' behaviors, ideas, and visions are considered great influences if they are linked to environmental actions. Therefore, green transformational leadership is seen as a headship style that inspires, heartens, and transforms the behaviors of followers to realize green objectives and goals, in addition to promoting sustainability within an organization [26,28].

2.2. Green Work Engagement (GWE)

Work engagement can replicate the perceptive commitment of staff, and the passionate and interactive drivers that advance the totaled facets of a person to perform diverse tasks [29,30]. Active engagement in one's work is a positive and fulfilling mental state marked by enthusiasm, strength, and understanding. Enthusiasm is described as a pronounced *pneuma* while working in an enterprise or workstation. It is also the dynamism brought to the job by the workers, as well as the willpower displayed by the workers to overcome hindrances at work. Alternatively, dedication means expanding the difficult feelings a worker may encounter at work. Dedication is supplemented by workplace emotions of solidarity, fervor, and pride [31]. Employees' emotional, cognitive, and physical engagement with their work does not indicate engagement. Thus, green staff engagement can be described as "the vigor a worker applies to his green work-associated tasks" [30,32].

Employee engagement has many positive organizational benefits, including a decrease in turnover rate, a decrease in the rate of absenteeism, an increase in the retention rate, an increase in employee loyalty and satisfaction at work, and an improvement in quality, productivity, profitability, and customer satisfaction [31,33].

Green work engagement is imperative to the environmental sustainability of organizations. This involvement comes from implementing a green training system and rewards, which results in workers pledging to achieve green accomplishments [33]. Green HRM procedures inspire green workers' commitment by having sustainability objectives in addition to corporate social responsibility inside organizations [34].

2.3. Employees' Environmental Performance (HEP)

Discussing work performance, Zablah et al. [35] explained the degree to which a worker makes their contribution toward organizational efficacy in line with the beliefs linked to their role in the workplace. Katz and Kahn [36] referred to job performance as task performance and contextual performance. The performance of tasks can be interpreted as the efficacy of the actions contributing to the functioning of the enterprise. In contrast, circumstantial actions also contribute to organizational efficacy by shaping cultural and social situations that act as catalysts for task processes and activities [37,38]. Taking relational performance onboard, a conceptual context is an essential component of overall work performance [36].

Considering the inclination to concentrate on sustainability in managing organizations, this research aims to focus on the environmental efficacy of the personnel. Employees' sustainable performance communicates the degree to which the employees contribute to the sustainable development of their venture [35]. The mission of the supportable development of an organization is broken up into sustainable task performance and relational sustainable development. The term "sustainable task performance" refers to the extent to which workers achieve their potential for sustainable development by completing their assigned tasks [34]. The degree to which employees contribute to the long-term viability of their businesses by boosting organizational values is an indication of what is known as relational sustained development [35,39].

Several studies have investigated the correlation between transformative leadership and employee performance [40–42]. Most authors have researched the benefits and efficacy that hotels attain by introducing environmentally sustainable businesses. They have publicized that hotels attain better benefits and efficacy at all levels [43], encompassing better fiscal efficacy, a decrease in costs, greater efficacy of cost control, and the minimization

of resource usage [44] by introducing environmentally sustainable business practices. Various authors have added enhanced competitiveness, corporate reputation, effective promotion, growing brand value, and superior trust from tourists to the list of benefits gained by the hotels [45,46], aiding in better promotion and greater capacity utilization [46].

2.4. The Association between Green Transformational Leadership and Hotel Employees' Environmental Performance

GTL is perceived as a strategic green performance element for evolving organizations [45]. Some environmental scientists perceive leadership as a transformational behavior [11,47]. According to Robertson and Barling [13], specialized transformational leadership focuses on inspiring followers to engage in preventative environmental actions. GTL was characterized by Hong et al. [3] as the conduct of leaders which enthruses staff to attain environmental goals and exceed predicted ecological functioning. This research article dealt with a behavioral perspective, and the authors defined environmental leaders as those who motivate supporters to engage in environmentally conscious behaviors to improve the company's overall environmental performance. The authors of this research article also defined environmental leaders as those who stimulate supporters to observe green activities to attain green performance for the company.

Transformational leadership that is tailored to the circumstance of an organization is essential for ensuring the productivity of employees and the viability of businesses [48]. Green transformative leadership is essential for increasing the green effectiveness of an organization [46]. According to Wang et al. [47], GTL is linked favorably to the accuracy of employees' intuition tenets and significantly affects the staff's environmentally friendly actions. Further, Widisatria and Nawangsari [26] concluded that GTL has positive effects on environmental efficacy. GTL is positively connected to the suitability of the cognizable tenets of staff and greatly affects the behavior and performance of environmentally friendly employees. Therefore, companies and institutions require green transformational leadership to create a maintainable efficacy of employees in the working environment [48–50]. Employees who are intellectually enthused and motivated by transformational leaders are more likely to be involved in green behavior at their place of work [49]. In addition to the previous findings, numerous studies have shown that transformative leadership positively affects employees' performance in the workplace [39,47,51]. This type of leadership is suitable for organizing the work environment. Project executives are recommended to make use of transformational leadership as an expedient to enhance the performance of employees [52].

Although numerous studies have examined the nexus between transformational leadership and employee performance in different contexts, the relationship between these constructs in the green hospitality industry context, particularly in developing countries such as Egypt, is still limited and requires more empirical investigations to determine to what extent GTL directly affects the environmental performance of hotel employees. Based on the findings of the previous studies, it may be assumed that the higher the perceived green transformational leadership, the better the employees' environmental performance. As a result, we suggest that:

H1: *Green transformational leadership has a significant, positive impact on employees' environmental performance in hotels.*

2.5. Association between GTL and Green Work Engagement

Overall, work engagement has been a noteworthy facilitator in many research studies [6,53–56]. An employee's level of enthusiasm for their work is often believed to be a key motivator in determining their productivity [53]. Numerous scholars have examined the nexus between transformational leadership and work engagement. In the context of Indonesian heavy equipment companies, an empirical study carried out by Gustiah and Nurhayati [54] on a sample of 110 employees concluded that GTL has a significant positive effect on GWE. An empirical investigation was conducted to examine the effect

of transformational leadership on work engagement among 530 full-time employees in Australia, revealing that the employees' work engagement was significantly influenced by transformational leadership [55]. The findings of the study indicated that employees with transforming managers were more engaged, energetic, and committed to their work. Further, the findings of the study carried out by Huang et al. [56] showed that a change in the green engagement of top management teams was significantly positively affected by the green transformational leadership of CEOs.

Similar to the relationship between GTL and the environmental performance of employees, limited empirical investigations are concerned with examining the relationship between GTL and work engagement in the hotel industry context, specifically in developing countries. As a result, building on the conclusions of the previous studies in non-hospitality industry settings, we attempt to investigate the effect of GTL on work engagement in the hotel industry context and to determine to what extent employee engagement in Egyptian hotels may be affected by the green transformational leadership adopted. In this context, we postulate that green transformative leaders who inspire and motivate their followers to achieve the hotels' environmental goals may significantly contribute to supporting and increasing the work engagement of the employees. Hence, this study tests the following hypothesis:

H2. *Green transformational leadership has a significant, positive impact on green work engagement in hotels.*

2.6. Association between Green Work Engagement and Employees' Environmental Performance

The relationship between green work engagement and employees' environmental performance is a positive one. Studies have found that employees who are more engaged in green work activities tend to have higher levels of environmental performance (i.e., [31,56–60]). For instance, Kahn [57] advocated that green work engagement may stimulate individuals to devote their energy to carrying out roles that realize a higher level of involvement. Furthermore, the results of Gustiah and Nurhayati's [54] empirical investigation demonstrated that GWE had a significant, positive effect on green employee performance ($B = 0.582, p < 0.001$). Specifically, they suggested that when GWE increases, green employee performance significantly improves. In addition, in the context of the Indonesian textile sector, Wiradirja et al. [60] found that green employee involvement was positively associated with the employees' environmental performance, and that this relationship was mediated by organizational citizenship behavior. More specifically, they revealed that employees who were involved in green work activities and were aware of the green vision of the firm were more likely to behave proactively to save the environment, which, in turn, improved the employees' environmental performance. Visamitanan and Assarut (61) indicated that environmental performance positively and directly influences green intake as the procedure is linked to work settings that support the welfare of staff while they work; this is very similar to the corporate fringe benefits provided to employees.

From the previous findings, the substantial role of green work engagement in boosting employees' environmental performance directly and indirectly should be noted. Despite the effective role of work engagement, there is still an urgent need, especially in the green hotel sector, to identify the impact of GWE on the environmental performance of hotel employees. In light of the aforementioned results, we hypothesize that:

H3. *Green work engagement has a significant, positive effect on employees' environmental performance in hotels.*

2.7. The Mediating Role of Green Work Engagement in the Relationship between GTL and Environmental Performance

Several research studies have probed the impact of GTL on employees' environmental performance [59]. Consistent with Mittal and Dhar [25], GTL stimulates staff to accomplish the environmental objectives of an organization by offering them a vibrant aspiration, passion, inspiration, and vision, in addition to supporting requirements to realize envi-

ronmental efficacy. Consequently, GTL is perceived to be the forecaster of environmental efficacy. The authors of [61] presented that GTL directly and positively influenced environmental job engagement. For this reason, these standpoints inspire us to recommend a direct and positive association between GTL and environmental efficacy. These outcomes validate the fundamental role of leadership in cultivating the green behavior of staff, as GTL instigates the staff's involvement in the sustainable, environmental objectives of their organization, delivering their supporters a clear passion, aspiration, and vision in addition to backing requirements to accomplish environmental efficacy [62,63].

In the context of the mediating role of work engagement in the relationship between GTL and the environmental performance of employees, only one recent study in the textile sector context [54] has examined this role, to the best of the authors' knowledge. This study revealed that GWE significantly partially mediated the relationship between GTL and the environmental performance of the employees. Considering the previous findings, which confirmed the significant positive effect of GTL on GWE, and the substantial effect of GWE on employees' environmental performance, we suggest that GWE may act as a mediator in the relationship between GTL and employees' environmental performance. In other words, it is believed that GTL can lead to higher levels of GWE, which can lead to higher levels of environmental performance in employees. Hence, we assume that:

H4: *Green work engagement has a significant mediating effect on the relationship between green transformational leadership and the environmental performance of employees in the hotel industry context.*

Based on the existing literature review, which concerns the relationship between green transformational leadership, work engagement, and employees' environmental performance, we attempt to not only shed light on the direct impact of GTL on employees' environmental performance in the hotel industry context, but also to study the indirect effects of GTL through the mediating role of work engagement. Further studies are needed to better understand the mechanisms underlying this relationship in the hotel industry context. One mechanisms expected to affect this relationship is green work engagement. Figure 1 presents the theoretical framework of this study.

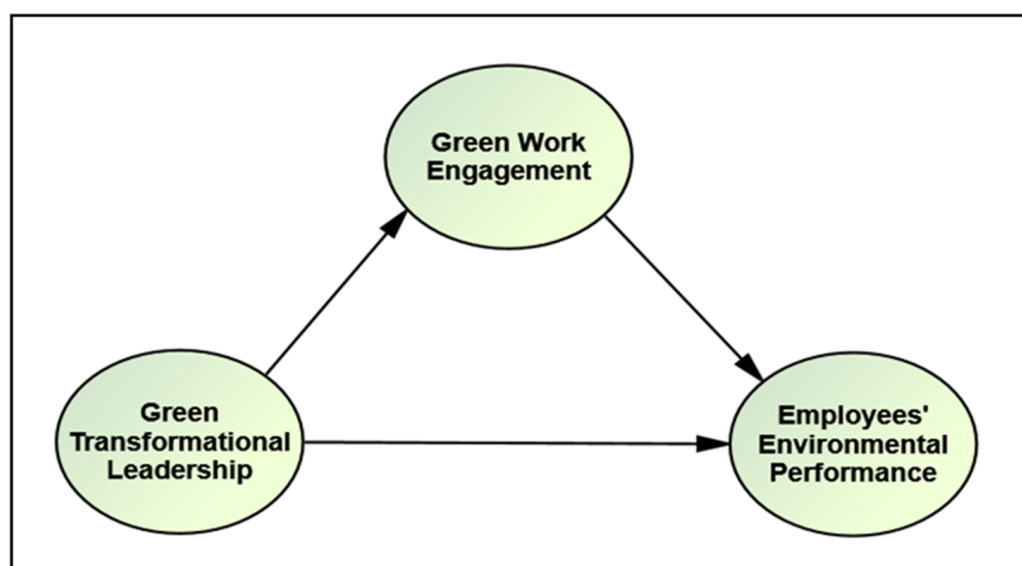


Figure 1. The research conceptual model.

3. Materials and Methods

3.1. Measures and Instrument Development

To carry out this research, data were collected through a questionnaire that participants primarily completed themselves. After reviewing the existing literature, we identified

reliable scales that have been used repeatedly. Using these scales, we created a standard questionnaire with four parts. The first half of the questionnaire dealt with the participants' basic demographic information, such as their age, educational background, sex, and marital status. The participants' views on GTL were considered in the second phase. On a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), participants were asked to rate their agreement or disagreement with statements on green transformational leadership. This measure was adapted and used by Zhang et al. [4]. The leader of the green innovation project inspires the project members with the environmental plans, encourages the project members to attain the environmental objectives, and stimulates the project members to conceive green ideas. These are only three of the ten components that make up the scale. The green transformational leadership scale has a Cronbach's alpha of 0.923, indicating high levels of dependability within itself. Sections 3 and 4 reveal environmental results and views on green work involvement.

The scale for measuring employees' environmental performance was based on Kim et al. [5] and Paillé and Meija-Morelos [64]. The seven-item measure was based on a five-point Likert scale, in which 1 indicates never and 5 indicates always. Items that have "I reduce wastes at the workplace", "I conserve water usage at the workplace", and "I do my best for enhancing the environmental reputation of our hotel" are relevant examples. The scale indicated an excellent internal consistency with high numerical figures ($\alpha = 0.924$).

An updated six-item scale based on the work of Aboramadan [6] was used to evaluate green work engagement at the job. This included (1) activities relating to the environment that gives us joy, (2) accomplishments in the field of environmental protection that we are particularly pleased with, and (3) complete immersion in this job. A five-point Likert scale was used to measure the level of participation, with 1 representing strongly disagree and 5 representing strongly agree. The average score reflected how committed someone was to their job. Therefore, a higher average score indicated more dedication.

After the contents of the survey were prepared in the English language, the contents were converted into the Arabic language to obtain information from the native speakers. The same survey was then converted again, from Arabic to English, so that the meaning of any word was not changed at any cost. Moreover, five hospitality academics assessed the contents and questionnaire and offered comments to authenticate the questionnaire's validity, ensuring that the research instrument quantitatively quantified the constructs designed for measuring the study's variables. Further, a pilot study was conducted on 25 hotel employees (who were not included in the primary sample of the study) to test the feasibility of the questionnaire by determining whether it was appropriate and coherent and whether the questions were easily understood, well-defined, and presented consistently. After receiving feedback from the test subjects, a few modifications were made to the wording of the questionnaire. Some statements were also reordered and rearranged. The Cronbach's alpha for the turnover intent scale was 0.934, indicating a very high level of internal consistency.

3.2. Sampling and Data Collecting

The primary purpose of this research study is to analyze the relationship between GTL and the environmental performance of employees in a selection of three- and four-star hotels in Egypt. This study also investigates the potential mediating function of GWE in this relationship. To achieve this aim, a questionnaire was designed and sent to the chosen workforce to gauge their perceptions of the study's components (GTL, green work engagement, and environmental performance). Using their connections to HR managers and hotel staff in popular Egyptian tourist sites, the study's researchers recruited participants. A non-probability sampling technique (convenience sampling) was used, in which participants were selected conveniently because they provided the most straightforward access to the desired data.

An appropriate sample size was determined using the guidelines provided by Hair et al. [65]. They submitted recommendations to determine the optimal sample size

by counting the number of variables being tested. A ratio of 1:10 (variable to sample) is minimally sufficient. Due to the high number of variables (33 in total), a minimum of 330 participants was required for this research. Our research has a sufficient sample size of 347 people. More than three-quarters of the examined individuals (78%) were men ($N = 271$) and 22% were females ($N = 126$), based on the valid replies collected from the studied participants (347). Regarding age, the largest group (55.6%, $N = 193$) consisted of those between the ages of 30 and 45, representing 44% ($N = 153$) of the total sample. The participants' marital status was reported as 64.3% ($N = 223$).

It was emphasized to the participants that their participation in the research was entirely optional. They were asked to sign a consent form before participating in the research. The participants were asked to complete the questionnaire independently, as CMVs are possible. The participants were assured that their information would be kept private and would be used exclusively for the study, which helped lower the risk of CMV. Since there was no "wrong" or "right" answer, participants were asked to be completely candid. Moreover, CMV was discovered using a standard and straightforward statistical method (Harman's single-factor test). The data were gathered from August 2022 to October 2022, a period of almost two months.

3.3. Data Analysis

SPSS, version 22, and Amos, version 24, were used to analyze the data. Descriptive statistics such as percentage, standard deviation, mean, and frequency were utilized to represent respondents' demographics as well as to verify the study's research components. Harman's single-factor test revealed the presence of Common Method Variance (CMV). Confirmatory Factor Analysis (CFA) and Cronbach's alpha were used to verify the validity and reliability of the measuring instruments. Convergent validity was confirmed by computing the average variance extracted (AVE) and the composite reliability (CR). Fornell–Larcker criteria for discriminant validity and the heterotrait–monotrait ratio (HTMT) were investigated. After generating several hypotheses about the study's variables, we used structural equation modeling (SEM) with the help of the bootstrapping strategy to determine their direction and interrelationships.

4. Results

4.1. Descriptive Statistics

The standard deviation and mean values for all research study variables are displayed in Table 1. GTL participants exhibited agreement on most of the examined issues, with a mean score of 4.02. Green work engagement and the hotel employees' environmental performance were also positively correlated. In both cases, the average mean was found to be 4.37, while in the other case it was 4.23.

4.2. Measurement Model

As previously mentioned, a self-administered questionnaire was used to collect the information. Consequently, Harman's single-factor test [66] identified a common variance/bias (CMV) method. It was shown that a single factor accounted for just 41.01% (less than 50%) of the variation, indicating that the CMV is not indicative of a problem. A maximum probability CFA was used to determine the stability and accuracy of the study's constructs. Table 1 shows that all values of the latent variable CR and Cronbach's alpha are above the cutoff value of 0.80 [66], indicating adequate internal consistency.

The construct validity was also researched using convergent and discriminant validities [67]. An average variance extracted (AVE) of over 0.50 and a factor loading of at least 0.50 are necessary for convergent validity [68]. All the study objects had factor loadings that were more than 0, and the AVEs of each construct were above 0, with ranges from 0.727 to 0.918, indicating that convergent validity was obtained. According to the Fornell–Larcker criteria, the square root of the AVE of each construct must be more significant than its correlation with another construct for it to have discriminant validity. The information

in Table 2 serves as an example of how the correlations between the constructs are less significant than the AVE's square root of all the constructs.

Table 1. Reliability and confirmatory factor analysis properties.

Items	Std. Loading (CFA) ¹	M (S.D.)	Cronbach's Alpha	CR ²	AVE ³
Green Transformational Leadership (GTL)					
GTL1: The leader of the green innovation project inspires the project members with the environmental plans.	0.817	4.47 (0.838)	0.923	0.953	0.915
GTL2: The leader of the green innovation project provides a clear environmental vision for the project members to follow.	0.775				
GTL3: The leader of the green innovation project gets the project members to work together for the same environmental goals.	0.839				
GTL4: The leader of the green innovation project encourages the project members to achieve environmental goals.	0.802				
GTL5: The leader of the green innovation project acts by considering the environmental beliefs of project members.	0.869				
GTL6: The leader of the green innovation project stimulates the project members to think about green ideas.	0.822				
Green Work Engagement (GWE)					
GWE1: My environmental-related tasks inspire me.	0.727	4.21 (0.620)	0.924	0.911	0.905
GWE2: I am proud of the environmental work that I do.	0.783				
GWE3: I am deeply involved in my environmental work.	0.927				
GWE4: I am enthusiastic about my environmental tasks at my job.	0.918				
GWE5: I feel happy when I am working intensely on environmental tasks.	0.905				
GWE6: With environmental tasks at my job, I feel bursting with energy.	0.769				
Hotel Employees' Environmental Performance (HEP)					
HEP1: I reduce waste at the workplace	0.752	4.23 (0.840)	0.934	0.909	0.892
HEP2: I conserve water usage at the workplace	0.751				
HEP3: I conserve energy usage at the workplace	0.823				
HEP4: I reduce purchases of non-renewable materials, chemicals, and components	0.710				
HEP5: I adhere to environmental regulations	0.875				
HEP6: I do my best to mitigate and prevent environmental crises	0.843				
HEP7: I do my best for enhancing the environmental reputation of our hotel.	0.826				

Standard Loading, (CFA) ¹ = standardized factor loading; CR ² = composite reliability; AVE ³ = average variance extracted std. loading; composite reliability model fits the data: $\chi^2/df = 4.296$; $p < 0.001$; comparative fit index (CFI) = 0.907; normed fit index (NFI) = 0.911; incremental fit index (IFI) = 0.923; the Tucker–Lewis coefficient (TLI) = 0.921; root mean square residual (RMR) = 0.052; root mean square error of approximation (RMSEA) = 0.072.

Table 2. Constructs' correlation and discriminant validity based on Fornell–Larcker criterion.

Construct	1	2	3
1—Green transformational leadership	0.820		
2—Green work engagement	0.671 ***	0.883	
3—Hotel employees' environmental performance	0.692 ***	0.711 ***	0.797

*** $p < 0.001$, The bold diagonal values represent the square root of AVE.

Additionally, in line with Henseler et al. [69], the heterotrait–monotrait correlation ratio (HTMT) was used to assess the discriminant validity of the model. According to the authors, discriminant validity is impaired when the HTMT value is more than 0.85. Following the findings in Table 3, all HTMT values were below 0.85, demonstrating the presence of discriminant validity across all pairs of latent components.

Table 3. Discriminant validity via HTMT.

Construct	1	2	3
1—Green transformational leadership			
2—Green work engagement	0.639		
3—Hotel employees’ environmental performance	0.655	0.676	

Note: HTMT should be less than 0.85 as per Henseler et al. [68].

The statistics in Table 1 about the fit of the study’s model show that it was satisfactory: $\chi^2/\text{df} = 4.296$, $p < 0.001$, comparative fit index (CFI) = 0.907, normed fit index (NFI) = 0.911, incremental fit index (IFI) = 0.923, the Tucker–Lewis coefficient (TLI) = 0.921, root mean square residual (RMR) = 0.052, and root mean square error of approximation (RMSEA) = 0.072.

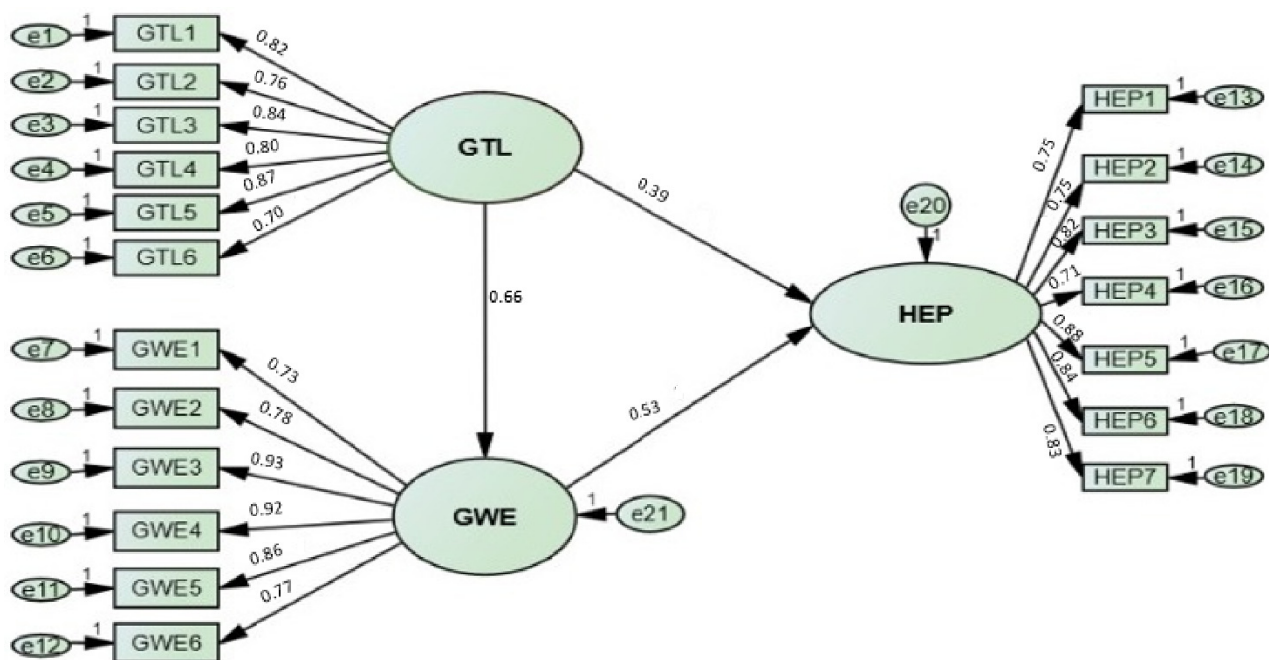
4.3. Structural Equation Modeling (SEM)

The purpose of using SEM was to trace the flow of the research and identify its causal relationships. Table 4 demonstrates that the study model fits the data well, as indicated by Hair et al. [65]. Values including CFI = 0.907, NFI = 0.911, IFI = 0.923, TLI = 0.921, RMR = 0.052, RMSEA = 0.072, and $\chi^2/\text{df} = 4.296$, $p < 0.001$ were the goodness-of-fit indices. The direct impact of GTL on green work engagement and hotel environmental performance is detailed in Table 4, and its indirect impact on the hotel employees’ environmental performance is clarified in Figure 2. The results from this study provide support for H1, suggesting GTL has a significant positive impact on employees’ environmental performance in hotels ($\beta = 0.389$, $t\text{-value} = 8.260$, $p < 0.001$). To the same extent, GTL has a substantial effect on green work engagement ($\beta = 0.663$, $t\text{-value} = 14.012$, $p < 0.001$). As a result, we accept H₂. Additionally, the third hypothesis, which postulates that hotel employees’ environmental performance is influenced by the perceived GWE ($\beta = 0.534$, $t\text{-value} = 11.335$, $p < 0.001$), is supported. The potential role of green work engagement in the relationship between the HEP and GTL was investigated. A bootstrapping method was used to verify this indirect relationship. Table 4 shows that there was a positive and statistically significant indirect effect of GTL on the HEP via the WGE ($\beta = 0.355$, $t\text{-value} = 7.538$, $p < 0.001$). As a result, we accept H4. A path analysis was performed utilizing partial and full mediation proposals from Kelloway [70] and Zhao et al. [71] to examine the arbitrating influence of WGE in the relationship between GTL and HEP. This demonstrated that complete mediation can be established only when the indirect effects are substantial while direct effects are not; partial mediation can be proved only when both channels are substantial. Results from the SEM indicate that the WGE acts as a partial mediator of the connection between GTL and the HEP.

Table 4. Structural parameter estimates.

Hypothesized Path				Standardized Path Coefficients	t-Value	Results	
Direct Path							
H ₁ : GTL	→	HEP		0.389	8.260 ***	Accepted	
H ₂ : GTL	→	GWE		0.663	14.012 ***	Accepted	
H ₃ : GWE	→	HEP		0.534	11.335 ***	Accepted	
Indirect path							
H ₄ : GTL	→	GWE	→	HEP	0.355	7.538 ***	Accepted

Note: Model fit; $\chi^2/df = 4.296$ $p < 0.001$; CFI = 0.907; NFI = 0.911; IFI = 0.923; TLI = 0.921; RMR = 0.052; RMSEA = 0.072. *** $p < 0.001$.

**Figure 2.** The structural model.

5. Discussion

The main aim of this study is to empirically examine the impact of GTL on employees' environmental performance in a sample of three- and four-star hotels in Egypt, in addition to investigating the potential mediating effect of green work engagement on this relationship. Based on the results of the hypotheses that were tested in this study, the following significant conclusions can be drawn. First, the findings of the SEM showed that GTL had a significant, positive impact on employees' environmental performance in the investigated hotels. These findings support the previous works, which examined the association between the two concepts (i.e., [20,63,72]). For instance, Sun et al. [20] found that GTL had a favorable and significant impact on environmental performance in SMEs such as hotels in Lahore, Karachi, and Rawalpindi. This conclusion also corroborates the findings of an empirical investigation by Sobaih et al. [63], who revealed that GTL had a direct, beneficial impact on environmental performance in the Saudi Arabian food-processing sector. Additionally, these findings are in agreement with Sobaih et al. [72], who researched the hotel industry of KSA, confirming that there is a direct relationship and positive effect among green transformational leadership, green innovation, green human resource management practices, and environmental performance; this finding bolsters the study outcomes adopted by Rehman and Yaqub [73] on the hospitality industry of Pakistan.

According to the findings of this study, it can be concluded that GTL plays a significant role in enhancing and improving the environmental performance of hotel employees. This type of leadership is positively correlated with the appropriateness of employees' cognitive values and significantly impacts the behavior and performance of environmentally friendly employees. Employees who are intellectually inspired and motivated by transformational leaders who are interested in the environment are more likely to show care for the environment and participate in green initiatives in the workplace. In other words, leaders who adopt the GTL strategy could effectively lead and inspire their followers to comprehend the organization's long-term environmental objectives by furnishing them with the necessary vision, ambition, inspiration, and enthusiasm, leading to an improvement in their environmental performance. Based on the previous research, it can be emphasized that the higher the perceived GTL, the greater the environmental performance among hotel employees.

Second, in the context of the GTL–GWE relationship, this study's findings revealed that GTL significantly contributes to promoting employees' environmental performance in the hotel sector context. These findings are in line with earlier studies (i.e., [54–56,74]), indicating that GTL has a significant positive impact on employees' environmental performance in various contexts. For example, in four- and five-star hotels in Turkey, Cop et al. [74] illustrated that GWE was significantly affected by GTL. They justified their conclusions in the case of green transformative leaders creating an environment in which employees can learn and grow, providing them with a sense of ownership and involvement in the organization and the environment. The findings of this study confirmed the substantial role of GTL in promoting GWE, indicating that leaders with transformational characteristics contribute to making their followers completely committed to their jobs, capable of reaching challenging work goals, deeply involved in environmental work, more enthusiastic and energetic with environmental tasks at their jobs, and helping employees feel happy when they are working intensely on environmental tasks. As a result, it could be recommended that adopting transformational behavior by hotel managers substantially contributes to better work engagement among their subordinates.

Third, this study demonstrated that GWE has a significant positive impact on hotel employees' environmental performance, implying that the environmental performance of hotel employees increases once they have been engaged in environmental activities. These findings align with the existing literature, which ultimately suggested that GWE is significantly associated with an increase in employees' environmental performance (i.e., [54,57,60,61,75]). Gui, et al. [75] demonstrated that environmental performance depends on ensuring that workers have the required green attitudes and habits, ultimately leading to adequate performance criteria. Darban et al. [76] referred to the beneficial impact between work engagement and green recovery performance in the hotel business. Along with the findings of the earlier studies, this study suggests that organizations that promote green employee engagement initiatives, such as green teams, sustainability, sustainable development initiatives, and green rewards systems, have higher levels of employee environmental performance.

Last, in the context of the mediating effect of GWE on the green transformational leadership and employees' environmental performance relationship, this study indicated that GWE has a significant, partial effect on the relationship between the two constructs, confirming that GWE increases with the employing GTL behaviors, which consequently contributes to improving the environmental performance among hotel employees. These findings support the conclusions by Gustiah and Nurhayati [54]. In other words, it can be established that employees will be highly engaged in green activities and initiatives at their workplace when they perceive a higher level of GTL from their leaders, leading to a higher level of environmental performance than employees who do not perceive a higher level of GTL from their leaders. This finding demonstrates the significant role of GWE, not only as a key predictor of employees' environmental performance but also as a substantial intervening variable in the link between green transformational leadership and employees' environmental performance.

6. Theoretical and Practical Implications

6.1. Theoretical Implications

Several theoretical implications can be drawn from this study. First, the findings of the study contribute significantly to the literature on GTL, GWE, and HEP in the hotel sector context by providing a comprehensive understanding of the impact of GTL on GWE and employees' environmental performance. The study emphasized the significant direct impact of GTL on employees' environmental performance. Second, the findings of the study demonstrated the significant role of GTL in promoting GWE among hotel employees. Third, the study revealed the significant role of GWE in enhancing environmental performance among hotel employees. The study has found that employees who are more engaged in green work activities, such as recycling, energy conservation, and other environmental initiatives, tend to have higher levels of environmental performance. This is likely because green work engagement increases employees' knowledge and understanding of environmental issues, which in turn leads to more effective environmental practices. Additionally, green work engagement can increase employees' motivation to take part in environmental initiatives, which can further improve their environmental performance. Fourth, the study's findings confirmed the significant mediating role of GWE in the relationship between GTL and employees' environmental performance. To the best of the authors' knowledge, it is the first empirical investigation that examined the intervening role of GWE in this relationship, particularly in the hospitality industry context in a developing country (such as Egypt). As a fifth contribution, a new theoretical framework including GTL, GWE, and HEP has been developed and validated in the hotel industry setting. Considering the significance of the findings, future research in other hospitality industry settings can use this framework as a guide to examine these relationships. Sixth, these findings can be a valuable base to help hospitality scholars better understand the mechanisms affecting employees' environmental performance in the hotel sector context.

6.2. Practical Implications

There are further practical implications for hotel managers, particularly in Egyptian destinations, that should be considered. The findings of the study confirmed the significant direct and indirect effects (via GWE) of GTL on employees' environmental performance. In addition, it indicated the significant, partial mediating effect of GWE on the TLS-HEP relationship. Furthermore, the study assured that GWE significantly contributes to enhancing employees' environmental performance. As a result, hotel management should foster a culture of green values and initiatives in the workplace to cultivate green engagement and create an environment for sustainable development. Hotel management should develop and maintain meaningful policies and initiatives that make it easier for employees to become engaged in green activities, such as setting specific environmental goals and offering financial incentives. Additionally, leaders should encourage environmental practices among hotel employees by focusing on commitment and behavioral changes. They should also provide rewards and recognition for the employees who excel in their environmental practices. For example, an employer could offer a "Green Star" award to an employee for a particularly successful green initiative. In addition to providing incentives and support, leaders should create an inspiring and motivating environment for employees so that they feel that their efforts are having a positive impact. Further, they should involve employees in project and environment planning initiatives to foster a sense of ownership and engagement. Furthermore, providing educational opportunities and training can improve employees' understanding of the contributions they can make to an environmentally friendly workplace. An effective way to do this is to open a discussion of practices and policies that can help reduce the organization's environmental footprint and solicit ideas from employees. By engaging staff in this way, the hotel can improve its sustainability performance without investing extra resources in research and development.

7. Limitations and Further Research

Several restrictions have been found in the present investigation: the participants in this research were Egyptians working at three- and four-star hotels. Therefore, the generalization of these findings would be difficult. However, these results should hold for this particular hotel sector segment. Future studies might examine how workers in different varieties of hotels, as well as other hospitality sectors, feel about GTL, GWE, and HEP (e.g., luxury hotels, resorts, restaurants, etc.). Second, the research only considered one aspect, green work engagement, as a mediator between GTL and HEP. In the future, researchers may investigate other mechanisms that may affect this relationship (i.e., green commitment and green trust). Thirdly, a self-administered questionnaire was used to collect the data so that individuals could respond honestly based on their own experiences. In future studies, potentially improved insight might result from combining quantitative and qualitative approaches. Fourth, in this study, we did not examine the demographic characteristics of the respondents (i.e., age, educational level, and work experience) as moderators of this relationship. Future research may explore these features for their potential moderating effects.

8. Conclusions

This study began by examining how GTL affects the green work engagement of employees and the employees' environmental performance in a direct way. This research confirms the significant impact of GTL on employees' green work engagement and environmental performance. Similarly, we confirmed the indirect influence of GTL on employees' environmental performance via green work engagement. While green work engagement had a perfect mediation effect, the findings showed that it only partially attenuated the correlation between GTL and the employees' environmental performance. This research found a clear correlation between GTL and both environmental performance and employee participation in green initiatives. These results verify the crucial function of leadership in energizing employees to take an active part in creating a green workplace. Green transformative leaders encourage their employees to contribute to the company's sustainable environmental goals by providing them with a clear passion, vision, and desire, and by embracing standards to achieve environmental performance. In addition, the positive correlation between green work engagement and environmental performance provides more evidence that such efforts successfully improve environmental performance in the hotel industry context.

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