Impact of Green Transformational Leadership on Employee Green Behavior : A PLS-SEM Approach

Pallavi Deshpande [1]
Anugaminipriya Srivastava [2]
Medha Kulkarni [3]
Reena (Mahapatra) Lenka [4]

Abstract

Purpose : The purpose of this paper was to understand the impact of green transformational leadership (GTL) on employee green behavior (EGB) in the information technology (IT) sector.

Methodology : For this research, the data were collected from IT employees of Pune, Maharashtra. The association between the latent variables, along with various characteristics, was observed. One hundred thirty employees from IT organizations were assessed through the survey method, and analysis was done using SPSS and the PLS-SEM approach.

Findings : The empirical study showed a positive relationship between GTL and EGB. The results of the study also showcased that a green organizational identity (GOI) strongly mediated the relationship between GTL and EGB, and green training (GT) as a moderator strengthened the relationship.

Practical Implications : Pro-environmental initiatives and policies cultivated an atmosphere of unity and collaboration in the workplace toward the environment.

Originality/Value : This study added value to GTL. The findings would be helpful for policymakers.

Keywords : green transformational leadership (GTL), green organizational identity (GOI), green training (GT), employee green behavior (EGB), information technology (IT)

JEL Classification Codes : C83, D23, F64, O15

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[1] *Assistant Professor,* Symbiosis International Deemed University, Pune, Near Lupin Research Park, Lavale, Tal, Mulshi, Pune - 412 115, Maharashtra. (Email : phdgrad.pallavi.deshpande@siu.edu.in ; Pallavi4deshpande@gmail.com) ORCID iD : https://orcid.org/000-0002-7726-3939

[2] *Associate Professor,* Symbiosis Institute of Business Management, Pune, Symbiosis International Deemed University, Near Lupin Research Park, Lavale, Tal, Mulshi, Pune - 412 115, Maharashtra.
(Email : anugaminipriyasrivastava@sibmpune.edu.in) ; ORCID iD : https://orcid.org/0000-0003-0617-2711

[3] *Assistant Professor,* Deogiri Institute of Engineering and Management Studies, Railway Station Road, Aurangabad - 431 001, Maharashtra. (Email : medhakulkarni3108@gmail.com)
ORCID iD : https://orcid.org/0000-0003-4893-5705

[4] *Assistant Professor,* Symbiosis Institute of Management Studies, Symbiosis International Deemed University, Pune - 412 115, Maharashtra. (Email : prof.reenalenka@gmail.com) ; ORCID iD : https://orcid.org/0000-0001-5917-7650

The contribution of the information technology (IT) sector toward the development of India on a global level is countable. Information technology is a huge industry and needs tremendous energy resources, so it needs to practice and create environment-friendly, sustainable computing resources. The IT industry also helps to raise the gross domestic product (GDP). It has become one of the growth catalysts in the Indian economy (Mehta, 2010). In an effort to reduce the negative environmental effects of its operations, the IT sector is making significant efforts and actions (Chakraborty & Biswas, 2020). The system that results from the integration of all living and nonliving elements and is deteriorating as a result of human activity is the environmental ecosystem. Major and intensive industrial operations have increased environmental depletion. This research is indeed in demand and needed as the industry has shifted to a sustainable approach. Considering the digital era, the biodegradability of unused and outdated products and maximizing energy efficiency are also a big concern nowadays (Mukherjee & Chandra, 2018). The IT industry is developing strategies for channeling E-waste in an environment-friendly manner and also making efforts for green innovation. It is keen on implementing the three "R"s (reduce, reuse, and recycle) in an organization. The IT sector has identified that leadership plays a vital role in taking such initiatives toward the environment for sustainability (Tang et al., 2012).

It is observed that organizations want to take firm steps to accomplish environmental goals, but direction and resource commitment are needed to develop eco-friendly behavior. To explore this research gap, we conducted a study to find out the role of green transformational leadership (GTL) in motivating an organization to implement sustainable practices that enhance the ecological system. The developed countries have recognized the environmental issues (Gallagher, 2012); but developing countries like India also need to focus on it. Environmental preservation and protection measures must be implemented in order to address this problem (Gabela-Flores & Diedrich, 2021). For the preservation of the ecosystem and environmental safety, which are essential for sustainable development, leaders' guidance and execution of the appropriate corrective steps are much appreciated (Robertson & Barling, 2017). Such leaders are called transformational leaders (TLs) who can transform the behavior and attitude of the teams and other employees of the organization. GTL ensures sustainable performance, the key to the long-term progression of the organization with its go-green approach and pro-environmental implementation of actions (Affolderbach & Schulz, 2017).

In the last decade, many IT organizations have introduced or changed processes, products, and policies to minimize pollution, optimize the use of resources, address environmental problems, and improve community and stakeholder relations. It is one of the sectors acknowledged as a key leading sector for the development of sustainable societies. A deep study revealed sustainable development can be obtained through green leadership, which can play a crucial role in sustainability and development. Thus, this study attempts to determine the body of knowledge in the following ways: First, it is established that there is a considerable link between GTL and employee green behavior (EGB), and second, it has been explained how green organizational identity (GOI) functions as a mediator between EGB and GTL. Third, a better knowledge of EGB is provided by the role of green training (GT) as a moderator. We also examined the impact of GOI and GT on green behavior among IT industry employees.

Thus, with this objective in mind, the following are the three research questions (RQs):

⤷ **RQ1 :** What is the influence of GTL on the green behavior of employees?

⤷ **RQ2 :** What interactions exist between GTL and green employee behavior through the GOI?

⤷ **RQ3 :** Does GT encourage green behavior among the employees? How does GT improve the connection between GOI and EGB?

The leader-member exchange (LMX) hypothesis developed by Sparrowe and Liden (1997) and the transformational leadership theory developed by Chen et al. (2014) have been examined to support the

relationship between leaders and their subordinates. Green leadership nurtures employees' sense of pride in an environment (Mittal & Dhar, 2016). Green leadership inculcates an organization's environmental tradition and culture among the employees. According to the "theory of sustainability" described by Garske and Ekardt (2021), sustainability is a long-lasting economic and social impact that is applicable in a global context. Sustainability is made up of three important pillars – Economy, society, and environment (Wang et al., 2020).To accomplish these three pillars, green leadership plays a crucial role. Sustainability relies upon the internal system, customs, environmental ethics, and foundation of the organization, which reflects the organizational green culture (Chen & Chang, 2013).

Literature Review and Research Hypotheses

Green Transformational Leadership (GTL)

Today's "green economy" initiative, which involves a number of stakeholders, including government agencies, organizations, and environmental pressure groups, is standardizing the GTL concept. GTL motivates an organization to implement sustainable practices that enhance the ecological system and asks to work in such a manner where protecting the environmental system is mandatory (Dragomir, 2020). In the opinion of Jiang et al. (2020), green leadership is the optimism that fosters growth and green innovation, a long-term progressive vision, sustainable organizational practices for a healthy environment, and social responsibility toward stakeholders and society. According to Mittal and Dhar (2016), green transformational leadership is characterized by a few upbeat behaviors and approaches that produce long-term advantages for all parties involved—including the environment, the company, the next generation, and society at large—and eventually guarantee the sustainability of the enterprise. According to Ahmed et al. (2020), green transformational leadership as managerial or leader's behavior intends to promote green creativity, actions, and innovations to create an advantage over competitors for the organization. Focus on the environment and the organization can cultivate a green organizational culture and competitive advantage for the organization (Subramaniam, 2012). According to Chen et al. (2012), green leadership creates a long-term green vision while making decisions for staff members and inspires them in line with it. Robertson and Barling (2017) asserted that GTL can establish an environment-friendly organizational culture, offer a distinct environmental vision, and motivate and accomplish environmental objectives by taking into account the members' optimism about the environment.

Green Organizational Identity (GOI)

According to Chakraborty and Biswas (2020), GTL encourages the development of GOI, which helps to create a green competitive advantage. GOI serves as an incentive for taking environmentally friendly actions that affect people's attitudes toward the environment (Mittal & Dhar, 2016). Individuals or groups construct it through symbols, language, and pride (Zhu et al., 2021). Developing GOI among employees is a continuous process and needs to be dynamic according to contextual requirements, policy, and code of conduct to make organizations better (Al-Zawahreh et al., 2018).

Employee Green Behavior (EGB)

EGB is the term used to describe the behaviors employees adopt to support environmental sustainability and lessen their ecological impact at work. It entails making decisions and acting in ways that promote a more sustainable and healthy environment (Zhang et al., 2022). Businesses must utilize policies, incentives, education

and training sessions, team objectives, and actions to promote and support employees' eco-friendly behavior in order to create a sustainable culture (Iqbal, 2020). EGB will occur when staff members suggest ways to consume less energy and resources or encourage colleagues to do duties in an eco-friendly manner (Kardoyo et al., 2020). In addition, EGB refers to a distinct social behavior that is flexible and promotes social well-being for value creation (Shah, 2010). However, the term "EGB" in this study refers to a single person who decides to participate in voluntary environmental action within the company; the organization and management observe this activity but do not formally recognize or reward it (Luu, 2019).

Green Training (GT)

GT can be defined as an educational activity designed to increase awareness and understanding of the environment and cultivate an organization's social responsibility for the environment (Dragomir, 2020). GT is called one of the most crucial instruments for fostering green service innovation and accelerating the shift to a more sustainable society (Teixeira et al., 2016). GT develops proficiency for different business functions. Patra et al. (2019) considered GT as one of the initiatives taken by the leaders for green service innovation and developing awareness regarding it. Management should organize GT for employees to improve the organization's sustainability. The goal of GT is to enhance the environmental knowledge, skills, and attitudes associated with it, as well as to improve employees' skills, knowledge, and attitudes toward a healthy environment (Zoogah, 2011). GT trains the employees to value the environment and nurture the attitude about its huge significance in our lives. It also trains them in working methods that could conserve energy, promote economical use of resources, reduce waste, diffuse environmental awareness within the organization, and provide an opportunity to engage employees in environmental problem-solving activities. Employees' understanding of the significance and worth of environmental management is raised by proactive efforts such as GT (Sibian & Ispas, 2021). It helps them to practice different methods of conservation, including waste management, embrace methods for cost reduction, and promote the economical use of resources within an organization. Furthermore, it sharpens the skills of employees to deal with different environmental issues.

Figure 1. *Conceptual Research Model*
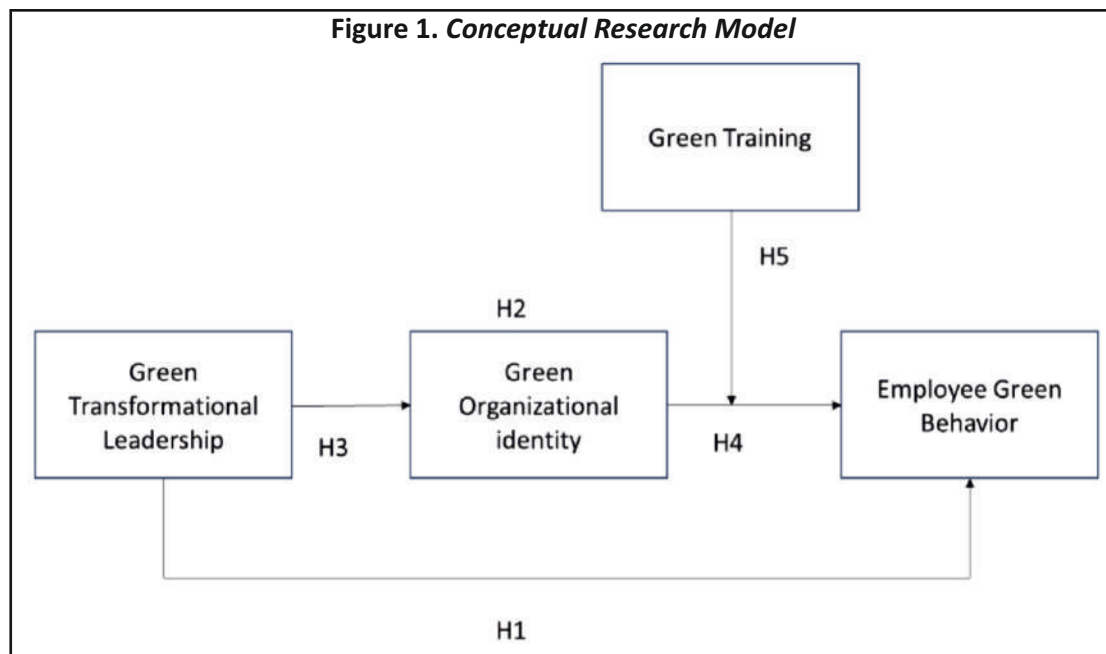
Based on the above discussion, the conceptual model is depicted in Figure 1, and the hypotheses are given in the ensuing paragraphs.

↳ **H1 :** GTL significantly influences EGB.

Leadership traits have a significant impact on an organization's performance. GTL is a key factor in improving environmental performance. Such leadership is essential for achieving organizational goals related to a healthy ecosystem, according to numerous research studies (Mittal & Dhar, 2016). Personal attention, intellectual stimulation, charisma, and inspirational motivation are the four traits of TLs. According to Mekpor and Dartey-Baah (2020), a TL's charismatic personality facilitates the production of ideas among his/her followers, earning their respect and, eventually, their trust. The dynamism that TLs inculcate allows them to inspire a sense of shared accountability in their followers (Mekpor & Dartey-Baah, 2020). Individualized attention assists the TLs in inspiring a sense of community among their followers, which fosters the growth of concern for one another (Behuria, 2021). Furthermore, a TL can use inspirational motivation to help followers see the way that the organization's goal can be transformed into reality in addition to helping the leaders themselves. Last but not least, the TLs can inspire their followers' cognitive talents through their capacity for intellectual stimulation, which helps them become more creative (see Figure 1).

↳ **H2 :** GOI mediates the relationship between GTL and EGB.

According to Mittal and Dhar (2016), organizational identity constitutes three characteristics of an organization namely "distinctive, central, and enduring." Further, it is formed out of three primary components: "ideational, definitional, and phenomenological." Employee behavior can be inspired by organizational identity; further, it provides a frame of reference that helps employees understand strategic issues. Therefore, organizational identity shapes its workforce (Chen, 2011). This concept of GOI is provided by Chen (2011), who said that it functions as a symbolic structure about environmental management and protection that members wholeheartedly construct to provide meaning to their behaviors. The goal of organizational experts to investigate the connection between leadership and employee behavior has frequently been highlighted. Wang et al. (2020) noted that TLs are crucial in determining staff creativity.

Furthermore, GTL was discovered to have a favorable impact on EGB (Chen & Chang, 2013). Furthermore, previous studies have demonstrated that environmental leaders establish GOI and influence subordinates to acknowledge, accept, and think positively about the organization (Chen, 2011) (refer to Figure 1). Hence, it is hypothesized that :

↳ **H3 :** GTL is positively related to GOI.

Various researchers have highlighted that GTL functions in fostering the development of green innovation in both the manufacturing and service sectors (Mittal & Dhar, 2016). In addition, recent research has shown that environmental leadership and green competitive advantage can be achieved through the use of a GOI (Chen, 2011). Based on this, it is assumed that when a company embraces GTL, its GOI increases, which in turn stimulates innovative green practices. Therefore, we suggest that there is a direct relationship between GTL and GOI, which leads to EGB (see Figure 1). Hence, it is hypothesized that :

↳ **H4 :** GOI is positively related to EGB.

Recent studies have proved that if employees of an organization are highly motivated by the organizational goals and objectives, they tend to follow them (Soewarno et al., 2019). Further, according to Srivastava and

Mahendar (2018), employees carry the same identity along with them, which significantly shows the influence of the organization on them, which ultimately becomes their identity, assuming that an organization is eager to continue its green activities. Under such circumstances, it strengthens employee identity, which in turn causes employee behavior to reflect environmentally friendly behaviors and initiatives (see Figure 1). Hence, it is hypothesized that :

$\hookleftarrow$ **H5 :** GT moderates the relationship between GOI and EGB.

GT enhances the actions related to environment-related attitudes, skills, and knowledge. Such training can develop attitudes, create awareness, and build knowledge and skills of employees in conducting pro-environmental activities in the organization (Srivastava & Shree, 2019). Additionally, it makes individuals responsible toward the environment to be sensitive enough toward it, which can help them to carry out prevention processes. It is also stated by Deshpande and Srivastava (2023) that training in work organizations is an element of applied psychological research that is positively conducted for making a clear contribution to the environment by employees and, hence, leads to the enhancement of human well-being and performance in the organization. When employees carry the organizational identity and feel pride in organizational policies toward the environment and are concerned about it, they try to follow it further. If employees get motivation from GT, their behavior toward enhancing the environment increases. Hence, the moderating variable GT enhances the performance of the employees and helps the organization to meet the environmental goals (see Figure 1).

Research Methodology

Research Approach

This is an empirical research. A positivist (deductive) and logical method is the foundation of the study. In addition, this study employed a survey method, which is commonly used in management research and business studies. It took the survey over two months (April – May 2023) to gather a sizable amount of information. Because the survey method may collect data from a range of sources, it has become more and more common.

Target Population and Sampling

People employed in Pune, Maharashtra, in the IT sector (IT services) make up the target population. To assess the study, a sample size of 130 respondents was taken into consideration. The G-Power 3.1 version, which yielded the traditional effect size numbers, was used to calculate the sample size. Furthermore, this research has been carried out in small and medium-sized IT companies (employee strength is approx. 150–200) where the organizations were on the edge of strategizing about the protection and conservation of the environment and taking small initiatives. At the same time, multinational companies (MNCs) are marching on green HRM practices. We circulated questionnaires to 230 employees and opted to use a convenience-based sampling technique to obtain the data.

Furthermore, the data collection process focused on employees who had worked for roughly a year in order to ensure that they may have spent enough time in the organization to become familiar with the corporate green culture and leadership, among other things. The respondents were from mid-scale IT companies, working at various designations. The demographic factors in the study were respondents' experience, gender, age, and position in the organization.

Table 1 provides a comprehensive information on the demographics of the respondents.

Table 1. *Demographic Characteristics of the Respondents (n = 130)*

Particulars	Description	Values	Percentage
Gender	Female	48	36%
	Male	82	64%
Age (years)	20 – 30	65	61%
	31 – 40	31	21%
	41 – 50	26	18%
	50+	8	6%
Years of Experience	Less than 5	19	10%
	5 – 10	51	48%
	11 – 15	28	20%
	16 – 20	20	15%
	20+	12	8%
Position	Jr./Sr. Software engineer	52	45%
	Jr./Sr. Associate	32	24%
	Manager/Team Lead	24	14%
	Sr. Manager/Sr. Team lead	20	14%
	Directors/Vice-President	2	3%

Data Collection Method

This research followed an empirical data collection approach. A structured questionnaire was used to measure the latent variables on a web-based platform such as Google Forms since the sample consists of information technology employees. Permission was taken by contacting these companies' human resources (HR) departments personally. To achieve authentic responses, the questionnaire was included with a cover letter. Only 169 responses out of 230 were received in three weeks. After removing invalid and missing data, 130 insightful responses were taken into consideration for the study. At last, the analysis was conducted using partial least square (PLS-SEM) software.

Measurement of Variables

Green Transformational Leadership

For this study, GTL was evaluated on a six-item scale developed by Chen and Chang (2013). The respondents were asked to rate on a 5-point Likert scale via an online survey. The Cronbach's reliability value of this scale was 0.746. The figure of 0.746 shows that the data is reliable and internally consistent. The sample item question is: "The leader gets the organization members to work together for the same environmental goals."

Employee Green Behavior

EGB was evaluated on a 10-item scale developed by Prasad and Mangipudi (2022). The respondents were asked to rate on a 5-point Likert scale via an online survey. A sample item for the same is: "I help to design policy intervention to facilitate pro-environmental behavior in the organization." The Cronbach's reliability value of this scale was 0.944.

Green Organizational Identity

GOI was evaluated on a six-item scale developed by Chen and Chang (2013). The respondents were asked to rate on a 5-point Likert scale via the online survey. A sample item is: "The company employees are proud of the company's history, environmental management, and protection." The Cronbach's reliability value of this scale was 0.984.

Green Training

Tang et al. (2017) designed a four-item measure to evaluate GT. An online survey was used to collect ratings from the respondents on a 5-point Likert scale. An example of the same would be: "We create environmental management training programs to raise staff members' environmental awareness, competence, and skills." This scale had a Cronbach's reliability of 0.788.

Analysis and Results

Partial least squares structural equation modeling (PLS-SEM) and SmartPLS 4 techniques were used to analyze the data collected for this study. This technique was used due to its ability to provide reliable results; PLS-SEM is largely employed in management to generate the results. A nonparametric approach is used to capture the explained variance within latent dimensions, which cannot be observed directly. Covariance-based SEM (COV-SEM) requires more residual distribution information, measurement scales, and sample sizes than Smart PLS-SEM. Consequently, complex research models that integrate relevant theories and empirical data can be analyzed using them effectively. We have adhered to Leguina's (2015) recommendation by following a two-step procedure. First, the discriminant and convergent validity of the outer model were tested. Second, the hypotheses were evaluated using the inner model. Next, the outer model's discriminant and convergent validity were examined. After that, the inner model was used to assess the hypotheses.

Outer Model Measurement

In research, outer model measurement refers to assessing the fit between observed data and the proposed measurement model. The objective of this method is to examine the relationships between observed variables and latent constructs. This measurement determines an instrument's validity and reliability, so it plays a crucial role in the study. In research, outer model measurement refers to assessing the fit between observed data and the proposed measurement model. The purpose of this method is to examine the relationships between observed variables and latent constructs. This measurement determines an instrument's validity and reliability, so it plays a crucial role in the study. Three key aspects were evaluated in outer model measurements: indicator reliability, discriminant validity, and convergent validity. Indicator reliability assesses the consistency and stability of the indicators. As far as convergence validity is concerned, it examines whether indicators measure the same construct; whereas, discriminant validity examines how distinctively different constructs are measured (Hair et al., 2019). The internal consistency reliability was tested with Cronbach's alpha values, which range from 0.788 to 0.984 for all the variables (refer to Table 2). Internal reliability was also satisfactory since the composite reliability (CR) values range from 0.863 to 0.987, which indicates greater internal consistency as it ranges between 0 and 1 and has higher values (Cheung et al., 2023). This indicates that all latent variables may be utilized to predict structural functions on the inner model, and there is no measurement error on the outer model.

A sufficient degree of reliability was indicated by the standard factor loadings, which for every item varied from 0.744 to 0.980 and more than 0.7. Adequacy of convergent validity was assured with average variance

Table 2. *Outer Validity Measurement and Multicollinearity Detection*

Variables	Outer Loadings	Alpha	C.R.	AVE	VIF
EGB10	0.857	0.944	0.953	0.692	3.161
EGB2	0.814				2.78
EGB3	0.743				2.518
EGB4	0.773				3.035
EGB5	0.841				3.244
EGB6	0.842				2.038
EGB7	0.865				2.415
EGB8	0.868				2.42
EGB9	0.874				3.133
GOI1	0.972	0.984	0.987	0.927	1.083
GOI2	0.959				2.003
GOI3	0.97				3.421
GOI4	0.941				2.636
GOI5	0.954				3.181
GOI6	0.98				3.071
GT1	0.835	0.788	0.863	0.612	1.961
GT2	0.744				1.573
GT3	0.751				1.711
GT4	0.794				1.693
GTL2	0.889	0.946	0.955	0.782	1.281
GTL3	0.812				3.05
GTL4	0.872				2.86
GTL5	0.804				2.386
GTL6	0.957				3.14
GTL1	0.958				2.898

extracted values. All the values are higher than 0.5, which is an acceptable level (Hair et al., 2016). Only EGB1, having an AVE value less than the prescribed limit, was eliminated from the structural model. In addition, every predictor variable is assessed for multicollinearity in regression analysis with the variance inflation factor (VIF) measure. According to Hair et al. (2019), VIF levels ought to ideally be less than 3. Between 3 and 5, there could be colinearity problems; with VIF values more than 5, there will be serious collinearity problems. Every value is less than 3.3 for the current investigation.

Three standards were proposed by Leguina (2015) to determine whether discriminant validity is sufficient. It comprises the heterotrait-monotrait method ratio (HTMT), cross-loadings of the variables, and the Fornell–Larcker criteria method (see Table 4). Table 3 indicates the cross-loadings/factor loadings for the unobserved latent variable (values in bold), which is higher than other cross-loadings. Higher values are indicative of the discriminant validity of the factors. As per the Fornell–Larcker criterion method, AVE values should be greater than the inter-variable correlation coefficient to support the higher discriminant validity of the scale (refer to Table 4). Finally, we have considered HTMT levels that are less than 0.90. Considering the above criteria of Leguina for scale reliability, discriminant, and convergent validity, outer model measurement was approved. Therefore, we moved forward with hypothesis testing and structural model assessment.

Table 3. *Cross Loadings/Outer Loadings*

Indicators	EGB	GOI	GT	GTL
EGB10	**0.857**	0.42	0.7	0.598
EGB2	**0.814**	0.312	0.531	0.283
EGB3	**0.743**	0.559	0.541	0.317
EGB4	**0.773**	0.247	0.501	0.351
EGB5	**0.841**	0.47	0.687	0.497
EGB6	**0.842**	0.411	0.511	0.468
EGB7	**0.865**	0.348	0.66	0.59
EGB8	**0.868**	0.664	0.67	0.544
EGB9	**0.874**	0.32	0.727	0.532
GOI1	0.475	**0.972**	0.461	0.343
GOI2	0.487	**0.959**	0.468	0.383
GOI3	0.522	**0.97**	0.47	0.403
GOI4	0.469	**0.941**	0.422	0.353
GOI5	0.453	**0.954**	0.42	0.327
GOI6	0.532	**0.98**	0.477	0.401
GT1	0.649	0.46	**0.835**	0.476
GT2	0.534	0.284	**0.744**	0.478
GT3	0.533	0.403	**0.751**	0.482
GT4	0.618	0.322	**0.794**	0.552
GTL2	0.485	0.13	0.512	**0.889**
GTL3	0.395	0.117	0.535	**0.812**
GTL4	0.414	0.308	0.482	**0.872**
GTL5	0.286	0.076	0.386	**0.804**
GTL6	0.652	0.552	0.707	**0.957**
GTL1	0.602	0.496	0.615	**0.958**

Table 4. *Fornell–Larcker Criterion (Discriminant Validity)*

	EGB	GOI	GT	GTL
EGB	**0.832**			
GOI	0.51	**0.963**		
GT	0.749	0.472	**0.782**	
GTL	0.572	0.384	0.635	**0.884**

Table 5. *HTMT Matrix*

	EGB	GOI	GT	GTL
EGB				
GOI	0.518			
GT	0.853	0.532		
GTL	0.55	0.325	0.707	

Table 6. *Model Fit Hypotheses*

Endogenous Latent Factors	(R^2)	(Q^2)	RMSE	MAE
EGB	0.605	0.32	0.782	0.611
GOI	0.448	0.29	0.761	0.598

Table 7. *Hypotheses Testing*

Hypotheses		*t*-value	*p*-value	Result
H1	*GTL –> EGB*	2.329	0.02	Accepted
H2	*GTL –> GOI –> EGB*	5.365	0	Accepted
H3	*GTL –> GOI*	8.481	0	Accepted
H4	*GOI –> EGB*	1.898	0.058	Accepted

Structural (Inner) Model Measurement

A structural equation analysis was conducted to examine the hypotheses. It was primarily intended to determine whether the model was able to explain and predict changes in the endogenous variables caused by the exogenous variable. To indicate a satisfactory model fit, Chin (1998) recommended an R^2 value of at least 0.10. R^2 values of 0.605 and 0.448 are found for "Employee Green Behavior" and "Green Organizational Identity," respectively (Table 7). Clearly, the study's model effectively represents the gathered data, as the R^2 values exceed the recommended threshold. Furthermore, the Stone–Geisser Q^2 calculation yielded values of 0.32 and 0.29 (for EGB and GOI), both of which are higher than zero (Table 6). As a result, the structural model shows satisfactory predictive power.

An inner model assessment uses model fit indices to evaluate the adequacy of SEMs. This study examines EGB and organizational green identity as endogenous latent factors. Root mean square error (RMSE) and mean absolute error (MAE) are two common indices for evaluating the fit of latent factors. In statistics, RMSE is defined as the difference between observed and predicted values. A model's ability to predict observed values is measured by this variable. Lower RMSE values indicate a good fit between the model's predicted and observed values (Kline, 2016). The RMSE values of 0.782 and 0.761 show that the model's predictions for EGB and GOI have relatively minor errors when compared to the observed values.

Similar to RMSE, a lower MAE value indicates a better fit between the model's predictions and the observed values. The MAE values of 0.611 and 0.598 suggest that the average absolute difference between the predicted values and the observed values for EGB and GOI is relatively small. Based on the specific context and the variables being measured, RMSE and MAE can be accepted in different ranges. It is, however, generally desirable for both indices to have lower values. Data variability and the model's accuracy suggest that the model's predictions are reasonably accurate.

Discussion

Based on the established research model, Table 7 provides the results of hypotheses testing for different relationships. At a given significance level, the hypotheses are either accepted based on the *t*-values and *p*-values. The direct and mediating relationships were bootstrapped in SmartPLS 4 to calculate path coefficients and *t*-values. From an original dataset, repeated sampling with replacement was done. The resampling method known as "bootstrapping" is used to calculate a statistic's sampling distribution. In SmartPLS 4, the path coefficients of the structural model are computed by bootstrapping. Multiple bootstrap samples are generated from the original data,

the model is run on each one, and the results are combined to obtain resilient parameters and significance estimations (see Figure 2).

According to H1, GTL is positively related to EGB. As the *t*-value is 2.329 and the *p*-value is less than the conventional significance level of 0.05, it is reasonable to conclude that GTL positively impacts EGB. In H2, we examine the mediation role of GOI between GTL and EGB. In this case, the *p*-value is 0, which indicates that it is less than any conventional significance level (e.g., 0.05). Therefore, GOI mediates the relationship between GTL and EGB, as there is strong evidence for this hypothesis (refer to Figure 2). As described in H3, GTL positively contributes to GOI. The *t*-value is 8.481, and the *p*-value is 0. Using conventional significance levels, the *p*-value is less than 0.01. This indicates a strong correlation between GTL and GOI. H4 indicates the positive correlation between GOI and EGB. The hypothesis that GOI influences EGB is weakly supported because the *p*-value (0.058) is more than the traditional significance level of 0.05 but less than 0.1 (10% significance level). Consequently, the hypothesis is upheld at a 10% significance level.

The purpose of H5 is to determine the moderation effect of GT on the relationship between GOI and EGB. Hence, the *p*-value (0.02), which is less than the conventional significance level of 0.05, does support the hypothesis. Therefore, the hypothesis can be supported by significant evidence. To ascertain whether GOI mediates between GTL and EGB, mediation analysis is performed. Through the use of GOI as a mediating variable, GTL indirectly influences EGB.

GOI is demonstrated to mediate the relationship between GTL and EGB, according to the results of the study. In support of this, hypotheses H2, H3, and H4 have been accepted. Additionally, GTL and EGB (H1) have a direct relationship. Based on these hypotheses, GOI partially mediates GTL – EGB relationships. In addition, support for direct relationships can be measured by GOI, which is a complementary mediation between GTL and EGB. Furthermore, the proposed study investigates GT as a moderator of the relationship between GOI and EGB. The moderation study shows that GT does have a substantial moderating influence on GOI and EGB based on the data that were supplied (see Figure 2).

Figure 2. *Results of PLS-SEM Analysis*
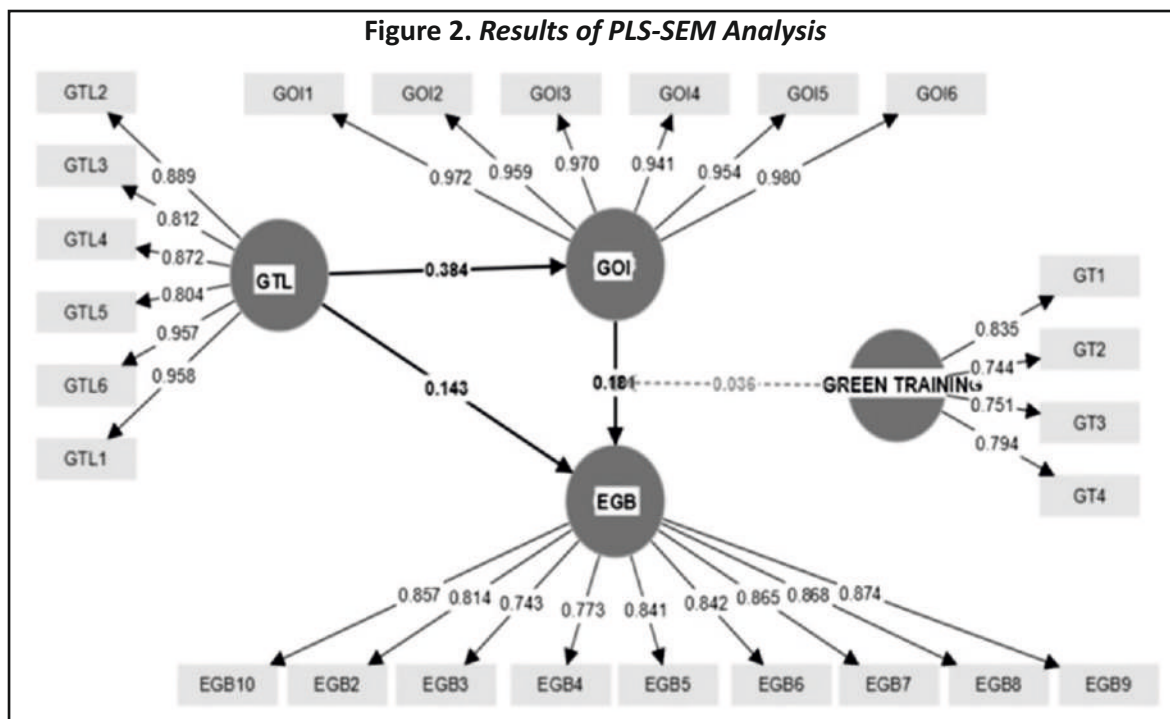
This study shows that GTL positively and significantly affects EGB with a *p*-value of 0.02. Significant change can be seen in employee behavior when leaders are committed to the environment; hence, they are called TLs. This way, they set an example for their team, staff, and followers. High environmental behavior standards set by GTL inspire and guide their team and subordinates to prioritize environmentally friendly behavior. This yields GOI automatically. In a similar vein, GOI has a significant impact on EGB, as evidenced by a *p*-value of 0.058 (see Figure 2), concluding the study's findings about the relationship between GTL and GOI.

The findings of the study add to the body of knowledge in four ways. First, it describes that GTL plays a crucial role in developing EGB by developing GOI among them. Leaders or higher management talk about its implementation and motivate employees to follow it. When leaders follow the organizational green ethics, then followers also develop such a kind of attitude and hence improvise their behavior towards the environment. The contemporary study shows that green leadership has a considerable impact on employees following and taking green initiatives. Secondly, by looking at the findings, we have observed that the research is the first to look at the relationship between GTL and EGB. Then, the crucial role of GOI being a mediator has been analyzed, which shows a significant relationship between them. Thirdly, the findings and evidence also prove that GT plays the role of a catalyst in developing green behavior. Suppose an organization organizes such training programs for employees; in that case, employees will get motivated and also support the organization as they start developing a GOI due to transformative green leaders.

Theoretical Contribution

Studies have shown that GTL plays a vital role in inspiring employees to improve their behavior towards the environment. GT, as a moderator, plays the role of catalyst in it. Employees who are motivated and also motivate colleagues to take the initiative to protect the environment and follow the organizational green policy have highly developed GOI (Chang & Chen, 2013). Leaders become the role model for their followers as they lend a helping hand for any eco-friendly actions. When leaders tend to follow the organizational environmental principles, they carry the organizational identity, which plays a mediating factor for EGB (Zhu et al., 2021). TLs always emphasize the importance of resources and energy conservation. They won't compromise organizational environmental principles to achieve organizational success. TLs also give resource commitment to employees, which can be seen through employees' behavior. GT is a facilitation to develop eco-friendly mutual harmony among employees who, without any hesitation, can indulge as well as promote sustainability through the process of green innovation (Dragomir, 2020). Redekop et al. (2018) supported this study by saying GTL excels in developing environment resilience and performance to ensure sustainable environmental performance for a longer time.

Practical/ Managerial Implications

If we keep the holistic approach towards green TL, green design in the IT industry can be implemented by taking vital initiatives for environmental protection. This study will provide useful insights to the higher authorities, policymakers, and managers on the change possible through their green actions and decisions, like desktop power management, audio-video conferencing, and automated power systems. Eco-friendly desktops can be manufactured called "Greenware," which will help to reduce e-waste. These "green" PCs will strictly adhere to the restriction of hazardous substances (RoHS). The more they implement the green aspect, the more they will get the response from the employees of the origination toward sustainability. One of the main objectives of sustainable development is environmental sustainability, which is something that green leadership approaches undoubtedly attempt to assist firms in achieving. It will also help IT organizations to reduce the cost along with reducing carbon footprint. Energy saving and green procurement are possible with GTL (Parng et al., 2021).

Conclusion

This study focuses on the impact of GTL on the eco-friendly behavior of the employees. Hence, the interaction between human beings and the environment can be improved for sustainability. After 1970, the discussion of environmental ethics began (Chen, 2011; Wurzel et al., 2019). Various factors are impacting the environment. Still, when an organization tries to follow environmental ethical norms through green leadership, transformation in employee behavior can be seen with the help of timely GT and development programs. Such workshops and training develop the environmental value system in an organization. Multinational IT companies are adhering to environmental laws by having green innovation, green design, and green commitment. They have launched "green desktops" for the employees to work. IT companies are strictly in charge of handling the following: paperwork, excessive use of technology, energy consumption, and disposal of hazardous materials and hardware parts. Thus, the IT sector is considering the strong need for green leadership in managing resources, enhancing the health of the environment, and hence sustainability. Due to leaders' strong dedication to environmental conservation and the resulting changes in staff behavior, GTL has attracted a lot of attention. In the Indian setting, laws and regulations are complied with by IT companies in order for them to become environmentally sustainable, making environmental preservation and conservation feasible.

Limitations of the Study and Scope for Future Research

This study could focus only on the mid-size IT companies from Maharashtra. It is possible to conduct the same study in other Indian states with a bigger sample size. Future research can concentrate on using a variety of long-term surveys. Cross-sectional studies can also provide an alternative perspective on how GTL affects EGB. Numerous industries and fields, including manufacturing, healthcare, the automotive industry, and construction, are suitable for this study.

Authors' Contribution

Dr. Anugaminipriya Srivastava developed the concept, while Pallavi Deshpande created the qualitative and quantitative designs for the empirical investigation. High-profile research papers were extracted by Pallavi Deshpande, who then used keywords to filter them and create concepts that were pertinent to the study's design. Dr. Anugaminipriya Srivastava designed the questionnaire in English. Since it was distributed to IT specialists, we did not convert it into any other language. The work was assisted by Dr. Medha Kulkarni, who also confirmed the analytical techniques. Pallavi Deshpande and Dr. Reena Lenka wrote the literature. Using SPSS and PLS-SEM, Dr. Medha Kulkarni and Pallavi Deshpande performed the numerical computations.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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Appendix

Construct	Indicator
Green Transformational Leadership *(GTL)*	
GTL1	The organization's leader uses environmental plans to motivate the members.
GTL2	The group follows the leader's well-defined environmental goals.
GTL3	The leader gets the organization members to work together for the same environmental goals.
GTL4	The leader encourages the organization members to achieve environmental goals.
GTL5	The leader acts while considering the environmental beliefs of the organization members.
GTL6	The leader stimulates the organization members to think about green ideas.
Green Organizational Identity *(GOI)*	
GOI1	Employees are quite proud of the company's legacy, management, and environmental protection.
GOI2	Employees have a sense of pride in the company's environmental goals and missions.
GOI3	Employees feel that the company has carved out a significant position with respect to environmental management and protection.
GOI4	Employees feel that the company has formulated well-defined environmental goals and missions.
GOI5	Employees are knowledgeable about the company's environmental tradition and culture.
GOI6	Workers recognize the company's strong emphasis on environmental protection and management.
Green Training *(GT)*	
GT1	We develop environmental management training programs to improve employees' environmental knowledge, proficiency, and competency.
GT2	Employees can learn more about the value of environmental conservation through GT initiatives.
GT3	Our integrated training program results in emotional engagement from employees in environmental management.
GT4	Green knowledge management allows us to create preventive solutions by connecting environmental education and knowledge to behavior.
Employee Green Behavior *(EGB)*	
EGB1	I help to design policy interventions to facilitate pro-environmental behavior in the organization.
EGB2	I suggest my colleagues engage in environmentally responsible behaviors.
EGB3	I help my co-workers to be eco-friendly.
EGB4	I make sure the taps are correctly closed when not in use.
EGB5	When not in use, I switch the computer monitors off or put them in hibernation.
EGB6	I try to repurpose the products instead of discarding them.
EGB7	I dispose of biodegradable and nonbiodegradable wastes separately.
EGB8	I am not bothered when others waste the resources in my office.
EGB9	I believe that it is always better to preserve nature rather than ruin and fix it.
EGB10	The depletion of natural resources for future generations worries me.

About the Authors

Prof. Pallavi Deshpande is working as an Assistant Professor at Garware College of Commerce, Pune. She has worked as an HR manager in the field of corporate social responsibility and sustainability. Her research interests include green leadership, green organizational identity, emotional intelligence, and sustainable organizational performance.

Prof. Dr. Anugaminipriya Srivastava is working as an Associate Professor at the Symbiosis Institute of Business Management Pune, Symbiosis International (Deemed University). She has completed her Ph.D. thesis in the area of HRM from the Department of Management Studies, IIT Roorkee.

Dr. Medha Kulkarni is working as an Assistant Professor at the Deogiri Institute of Engineering and Management Studies, Chhatrapati Sambhajinagar. She has pursued a Ph.D. in the field of marketing management. Her research interests include behavioral finance, marketing of financial products, and advertising of mutual funds.

Dr. Reena (Mahapatra) Lenka has 20 years of experience, which is a unique blend of academic & industry domains. She has published three books related to HR analytics, corporate law, and consumer behavior. She has 16 published patents (national) and one international (South African) granted patent.