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Fostering a Sustainable Future: The Role of Green Extrinsic Motivation and Green Learning & Development in Cultivating Organizational Green Culture

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Abstract: *This study was made to explore the effect of Green Learning & Developing in the transformation of conventional training systems in the Technical Education and Vocational Training (TEVT) sector toward Green TEVT. In this study, a cross-section design was used, and data was collected from TEVT principals and assistant managers who are part of Green TEVT initiative programs launched by the TEVT Sector Support Program (Deutsche et al. (GIZ)). The revealed results indicate a significant positive impact of Green Learning & Development programs in the formulation of Green Intrinsic Motivation through the partial mediating effect of Environmental Knowledge, which has further contributed to the transformation of conventional training behavior of TEVT employees into Pro-Environmental Behavior and has significantly contributed in the formation of Green TEVT. Yet, the diminishing effect of Green Extrinsic Motivation was observed in this study. Therefore, future researchers, by exploring other factors like Leadership Styles, Sector-Specific Studies, and Implementation of Policies and Regulations as hurdles, can make a significant contribution in this context.*

Key Words: Green Learning & Development, Green Intrinsic Motivation, Environmental Knowledge, Pro-Environmental Behavior, Green Extrinsic Motivation, Green Organizational Culture

Introduction

According to the latest report by NASA, the average temperature of the Earth has increased by approximately 1.62°F since the beginning of the 21st century, and this change has been attributed to the surge in human-made emissions released into the atmosphere Bulut and Ecology (2021). The United Nations emphasizes environmental conservation and urges global collaboration to preserve natural resources, which is the primary goal of environmental sustainability, achieved through various legislation by national and international authorities (Khan et al., 2020). Therefore, Organizations are striving to develop an Organizational Green Culture (OGC) that incorporates environmental sustainability through the implementation of green strategies, promoting a sustainable mentality among members through the latest Environmental Knowledge (EK), providing practical guidance for cultural change (Yeşiltaş et al., 2022).

The Technical Educational & Vocational Training (TEVT) sector of Pakistan is striving to build Pro-Environmental Behavior (PEB) through Green Learning & Development (GLD) and EK among TEVT trainers and graduates for the development of long term objectives as to current organizational culture into OGC; for which Punjab Vocational Training Council (PVTC) in collaboration with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) has completed a "Training and Demonstration of Green Energy" programs under which 2700 beneficiaries of 36 selected Vocational Training Institutes (VTIs) of entire 03 regions (South, Center and North) were accommodated (PVTC, 2022) and the same was emphasized by previous researchers the importance of EK in increasing individuals' awareness of environmental issues

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and their ability to address adverse impacts on environment. Kollmuss and Agyeman (2002a) suggested that possessing EK can shape environmental attitudes and lead to PEBs. Ogiemwonyi et al. (2020) found that individuals with EK actively engage in a wide range of PEBs, such as power and water conservation, ecological biodiversity protection, rational automobile use, environmentally-aware consumer behavior, and ecological waste management.

Similarly, Thathong et al. (2014) showed that EK and management techniques in schools can increase students' involvement in PEBs. Abbas and Khan (2022) also found that environmental attitude, knowledge, and lifestyle have significant effects on PEBs as this concept is supported by previous researchers that organizations can leverage their knowledge, capabilities, and short-term profitability goals in pursuit of long-term environmental sustainability objectives (Wirtenberg, 2014) which should be aligned with the Sustainable Development Agenda for 2030 calls for promoting global awareness of sustainable development and healthy living. Adekunle (2021) recommends that governments and organizations take the lead in transitioning towards environmental sustainability, and it can be achieved through PEB and it's a big environmental challenge ascribed to human actions. Therefore, the development of a GOC is instrumental in driving the shift towards environmental sustainability (Bertels et al., 2010).

Significant efforts by environmentalists to safeguard the environment, environmental challenges such as pollution (air, water, natural resources), global warming, and depletion of natural assets have been escalating in recent years (Nilsson, 2019) ; (Yusliza et al., 2020) the Human behavior has been identified as a key factor responsible for environmental pollution and endangering sustainability. (Khan et al., 2020); (Yusliza et al., 2020), therefore, as suggested in the literature (Ryan et al., 2021);(Hughes et al., 2018) that employees in response to their PEB desire Green Extrinsic Motivation (GEM) which refers to engaging in environmentally friendly actions to reduce waste, increase efficiency, and conserve the environment (Ahmed et al., 2021b) supported by Green Self-Determination Theory (GSDT) which represents the role of motivation in promoting environmentally sustainable behavior. GSDT is an extension of the broader Self-Determination Theory (SDT), which proposes that people are naturally motivated to pursue activities that satisfy their basic psychological needs for autonomy, competence, and relatedness. In the context of PEB, GSDT posits that both intrinsic and extrinsic motivation can drive PEB (Gilal et al., 2020).

Among these instrumental drives, the role of GLD, GIM, EK and GEM to maintain and develop a sustainable OGC involves in activities that encourage employees to acquire environmental protection skills and knowledge, which is crucial to develop PEB and for achieving OGC (Silvi and Padilla, 2021). Because GLD can enhance employees' awareness, knowledge, and abilities in environmental activities, as noted in the literature (Farrukh et al., 2022). Yet the factor of GIM as internal drive leads the individuals to engage in environmentally friendly behaviors as argued by (Ahmed et al., 2021b) that GIM arises when individuals perceive their love for the environment and leads them to create products and services that support environmental conservation and preservation by minimizing damage caused by their organization's actions and policies. Green Intrinsic Motivation comes from personal values, beliefs, and satisfaction derived from engaging in green behavior, while GEM comes from external rewards, incentives, or pressures (Saleem et al., 2019). The theory also highlights the importance of supporting autonomous motivation (i.e., motivation that comes from within) over controlled motivation (i.e., motivation that comes from external sources) to promote long-term engagement in PEB (Dahlinger and Wortmann, 2016).

Moreover, this concept of OGC is characterized by interpretation and symbolism that governs the conduct of employees and the procedures of an organization in relation to environmental conservation and preservation(Chen et al., 2011). Despite the growing awareness of the importance of environmental sustainability, in theoretical support of GSDT which explains that motivational factors GIM & GEM, playing a vital role in promoting environmentally sustainable behavior, and provide novel insights and strategies to create certain conditions that support and encourage autonomous motivation for environmental action Ryan et al. (2021) and the relationships between GLD, PEB and OGC (Ryan et al., 2021). Therefore, this research will contribute to literature gap by addressing the practical implications on the role of motivation in promoting environmentally friendly behavior in the TEVT sector of Punjab, Pakistan and provide novel insights into the relationship between GLD, PEB and OGC. And upon analysis of the available literature the hypothesized Conceptual Framework will explain the context and approaching to results which narrate the

policymakers and practitioners in designing and implementing effective strategies to promote environmentally sustainable behavior in the TEVT sector and this will be presented along with a discussion, conclusion, and limitations sections.

The scope of the study discussed in the abstract is focused on exploring the effect of Green Learning & Developing (GL&D) in transforming conventional training systems in the Technical Education and Vocational Training (TEVT) sector towards Green TEVT. The study specifically investigates the impact of GL&D programs on various aspects related to the adoption of pro-environmental behavior and the formation of Green TEVT. To conduct the study, a cross-section design was employed, and data was collected from TEVT principals and assistant managers who participated in Green TEVT initiative programs launched by the TEVT Sector Support Program-GIZ.

The study's contribution lies in the identification and analysis of several key factors. Firstly, it reveals that GL&D programs have a significant positive impact on the formulation of Green Intrinsic Motivation among TEVT employees. This motivation is partially mediated by Environmental Knowledge, indicating that the acquisition of environmental knowledge plays a role in driving intrinsic motivation towards green practices. Furthermore, the study highlights that the transformed training behavior of TEVT employees, influenced by Green Intrinsic Motivation and Environmental Knowledge, leads to the adoption of Pro-Environmental Behavior. This behavioral change is seen as a significant contribution towards the development of Green TEVT. However, the study also observes a diminishing effect of Green Extrinsic Motivation. This suggests that external factors, such as rewards or incentives, may not play a substantial role in motivating TEVT employees towards green practices.

The study concludes by suggesting avenues for future research. It recommends investigating additional factors such as Leadership Styles, conducting sector-specific studies, and examining the implementation of Policies and Regulations as potential hurdles or facilitators in the transformation process towards Green TEVT. Exploring these factors could make a significant contribution to the understanding and advancement of Green TEVT initiatives.

Literature Review & Hypothesis Development

Literature Review

Relationship between GLD & GIM

The study found that GLD practices have a greater impact on employees' commitment compared to employee engagement, which had the least effect, therefore, to promote active learning among employees and meet their individual training needs is crucial (Ahmed et al., 2021a). and in order to enhance pro-sustainability behavior, it is crucial for environmentally conscious organizations to ensure that their employees recognize sustainability as a top priority. Various elements play a role in shaping employees' perceptions regarding their organization's dedication to sustainability (Jerónimo et al., 2020). Therefore, employers must prioritize employee motivation in order to cultivate a positive work environment through Intrinsic motivation which arises when employees are driven to engage in environmentally friendly behavior for their own personal fulfillment (Zaki and Norazman, 2019) and the activities such as providing eco-friendly training, are strongly and positively associated with green intrinsic and extrinsic motivation, as well as proactive environmental management maturity (Ahmed et al., 2021a).

Relationship between GLD and EK

To examine the effects of green HRM practices GLD on employee's PEB, it was argued that EK not only mediated the relationship between GLD & PEB. Green Learning & Development on employees' environmental behavior are partially explained by the level of environmental awareness they possess (Saeed et al., 2019).Yet it was argued by Darvishmotevali and Altinay (2022) that the relationship between green human resource management practices like GT and proactive employee environmental behavior is influenced by the mediating factor of environmental awareness and there is a positive correlation between environmental knowledge management practices and environmental performance, as well as between environmental technology management systems and environmental performance (Bresciani et al., 2023)

and Managers' green behavior is significantly influenced by their level of environmental knowledge and awareness(Safari et al., 2018).

Relationship between GIM and PEB

The literature has established connections between social norms, intrinsic motivation, and external circumstances with PEBs and it was argued by Silvi and Padilla (2021) the significance of intrinsic motivation as a primary factor and demonstrate how varying levels of intrinsic motivation impact the effectiveness of external circumstances, such as green infrastructures (Ojo, 2022). Environmental concern exerted significant influence on green behavior, while GIM demonstrated significant effects on green idea generation behavior as well as on green idea promotion behavior (Kim and Lee, 2022) and the study conducted by Faraz et al. (2021) found evidence supporting the active role of GIM as a mediating mechanism in the development of PEB among employees.

Relationship between PEB & OGC

The connections between OGC and PEB demonstrate noteworthy direct correlations, while it has also been suggested that there is an intermediary relationship present (Hooi et al., 2022). In their study Yeşiltaş et al. (2022) contended that the influence of OGC is not only observed in the substantial enhancement of employees' PEBs but also in the promotion of their EK. Hence, intrinsic motivation not only enhances environmentally-friendly behavior without the need for external rewards but also fosters a cost-effective approach to engaging in pro-environmental actions (Van der Werff et al., 2013, Ojo, 2022, Farrukh et al., 2022)

Relationship between GEM & OGC

Introducing the concept of GEM influenced by (Amabile and Pratt, 2016) and (Deci and Ryan, 2015), which refers to PEBs driven by external rewards. However, these extrinsic rewards can diminish employees' GIM. External factors such as tangible rewards, deadlines, punishments, or negative feedback have been found to decrease motivation and self-determination for creative behavior (Amabile and Pratt, 2016). Extrinsic motivation manifests when employees are driven by external rewards provided by the organization. Employers have a crucial responsibility to offer moral support to their employees, ensuring they are motivated and enthusiastic about their work.(Zaki and Norazman, 2019) and It was argued by (Bolanle et al., 2022) that management incentivize and recognize their efforts through rewards programs. GEM arises when employees pursue tasks in organizational settings with the expectation of monetary and non-monetary benefits, such as the development of an OGC. However, literature suggests that performance contingent rewards can reduce intrinsic interest and motivation for creative activities (Selart et al., 2008). Studies indicate that employees' motivation diminishes when their innovative work is regulated by extrinsic means (Hammond et al., 2011). This aligns with the idea that the more a task is controlled or rewarded, the less intrinsic motivation individuals have to perform it. Byron and Khazanchi (2012) in their meta-analysis revealed that behavior tends to slightly decrease when employees' motivation is controlled by performance contingent rewards.

Hypothesis Development

Direct Hypothesis

H1: There is significant positive impact of Green Learning & Development on Environmental Knowledge.
H2: There is significant positive impact of Environmental Knowledge on Green Intrinsic Motivation.
H3: There is significant positive impact of Green Learning & Development on Green Intrinsic Motivation.
H4: There is significant positive effect of Green Intrinsic Motivation on Pro-Environmental Behavior.
H5: There is significant Positive Effect of Pro-Environmental Behavior on Organizational Green Culture.
H6: There is significant positive effect Green Intrinsic Motivation on Organizational Green Culture.

Mediating Hypothesis

H7: There is significant positive mediating effect of Environmental Knowledge in between relationship of Green Learning & Development and Green Intrinsic Motivation.

H8: There is significant positive mediating effect of Green Intrinsic Motivation in between relationship of Green Learning & Development and Pro-Environmental Behavior.

H9: There is significant positive mediating effect of Green Intrinsic Motivation in between relationship of Green Learning & Development and Organizational Green Culture.

H10: There is significant positive mediating effect of Green Intrinsic Motivation in between relationship of Environmental Knowledge and Pro-Environmental Behavior.

H11: There is significant positive mediating effect of Green Intrinsic Motivation in between relationship of Environmental Knowledge and Organizational Green Culture.

H12: There is significant positive mediating effect of Pro-Environmental Behavior in between relationship of Green Intrinsic Motivation and Organizational Green Culture.

H13: There is significant positive mediating effect of Environmental Knowledge and Green Intrinsic Motivation between relationship of Green Learning & Development and Pro-Environmental Behavior.

H14: There is significant positive mediating effect of Environmental Knowledge and Green Intrinsic Motivation in between relationship of Green Learning & Development and Organizational Green Culture.

H15: There is significant positive mediating effect of Green Intrinsic Motivation and Pro-Environmental Behavior in relationship of Environmental Knowledge and Organizational Green Culture.

H16: There is significant positive mediating effect of Green Intrinsic Motivation and Pro-Environmental Behavior in between relationship of Green Learning & Development and Organizational Green Culture.

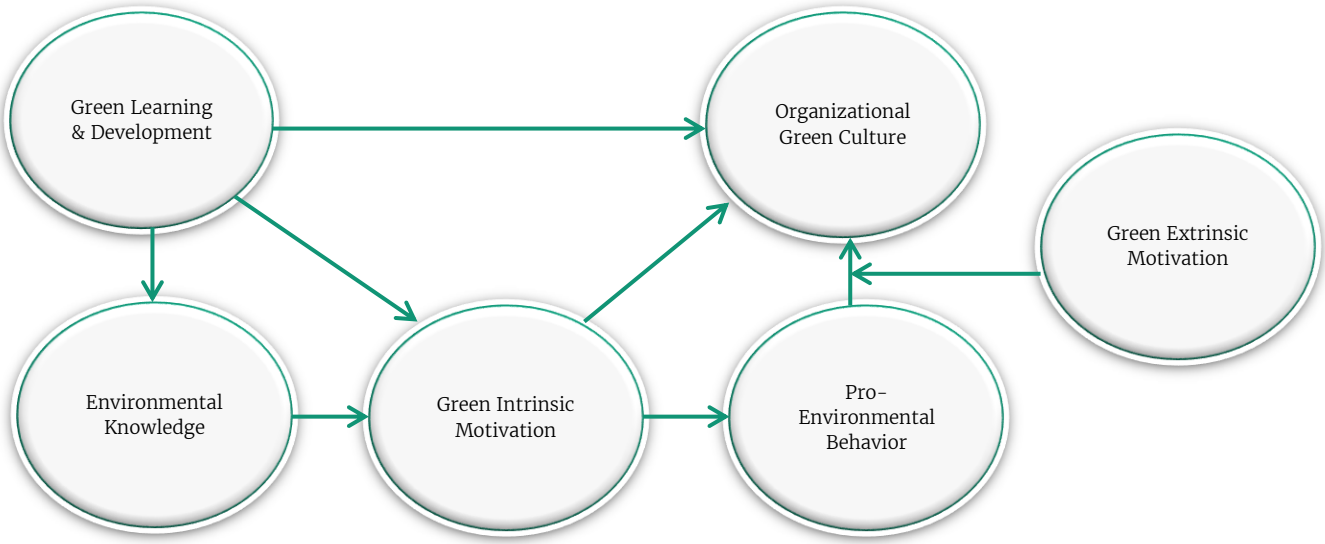
H17: There is significance positive mediating effect of Environmental Knowledge, Green Intrinsic Motivation and Pro-Environmental Environmental in relationship of Green Learning & Development and Organizational Green Culture.

Moderating Hypothesis

H18: Green Extrinsic Motivation negatively moderates the positive effect of Pro-Environmental Behavior on Organizational Green Culture

Figure 1

Conceptual framework



Research Design & Methodology

Research Design & Data Collection

This study employed a cross-sectional survey design and utilized a self-administered questionnaire to collect data from TEVT Trainers. A simple random sampling technique was employed, with TEVT trainers

as the primary unit of analysis. A sample size of 358 TEVT Trainers was determined based on recommendations from (Krejcie and Morgan, 1970) ensuring adequate statistical power for the study. This sample size was considered representative for conducting inferential statistical analysis. Data analysis was conducted using the Structural Equation Modeling (SEM) technique, following the approach of previous researchers such as (Syafril, 2022) and Smart PLS-SEM application, widely utilized in exploring complex relationships in the field of human resource management Sarstedt et al. (2021) was used for the analysis.

Instrument Development

Data for this study was collected using a self-administered questionnaire that included validated scales. These scales were carefully selected to assess the constructs being investigated. We have adapted and modified established and validated 06-items for "GIM" of (Deci and Ryan, 2015, Amabile and Pratt, 2016) within the context of environmental tasks, 09-items for "EK" of (Saeed et al., 2019), 16-items for "PEB" of (Saeed et al., 2019), 07-Items for "OGC" of (Marshall et al., 2015), for 05-items "GEM" of (Deci and Ryan, 2015, Amabile and Pratt, 2016) and 03-items for "GLD" of (Tang et al., 2018).

Data Analysis & Results

Exploratory Factor Analysis

To evaluate the reliability and validity of the questionnaire, a PLS-SEM analysis was conducted on the 46 items. The findings from this analysis were utilized to interpret and enhance the questionnaire. It was determined that 26 out of the 46 questions played a crucial role in improving the accuracy of the indicators in the tested model. While a single-item measure can capture the essence of the constructs being studied, providing an alternative measure (Cheah et al., 2018), it may have limitations in terms of criterion validity (Sarstedt et al., 2021). Therefore, employing a multi-item measure may be more appropriate and advantageous.

Convergent Validity

In the assessment of the reflective measurement model, the first step involved examining the factor loadings. It is desirable for the loadings to be 0.708 or higher, indicating that the construct accounts for more than 50% of the variability in the indicator and ensuring satisfactory item reliability. The obtained results from this analysis, which are presented in Table 1 and Figure 2, demonstrate acceptable validity and reliability of the measures.

Table 1

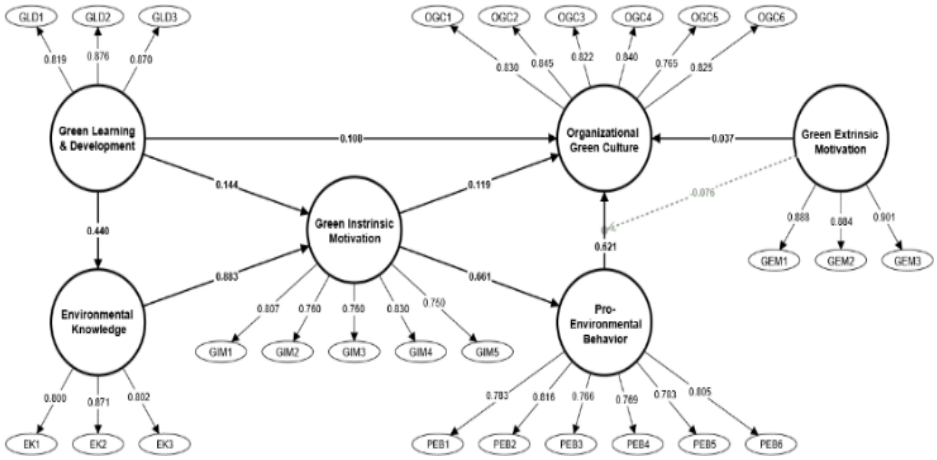
Convergent validity statistics

	Construct Items	Factor Loadings	Alpha	Rho_c	AVE
EK	EK1	0.800	0.765	0.865	0.681
	EK2	0.871			
	EK3	0.802			
GEM	GEM1	0.888	0.871	0.921	0.794
	GEM2	0.884			
	GEM3	0.901			
GIM	GIM1	0.807	0.842	0.887	0.612
	GIM2	0.760			
	GIM3	0.760			
	GIM4	0.830			
	GIM5	0.750			
GLD	GLD1	0.819	0.816	0.891	0.732
	GLD2	0.876			
	GLD3	0.870			
OGC	OGC1	0.830	0.904	0.926	0.675
	OGC2	0.845			
	OGC3	0.822			

	Construct Items	Factor Loadings	Alpha	Rho_c	AVE
	OGC4	0.840			
	OGC5	0.765			
	OGC6	0.825			
	PEB1	0.783			
	PEB2	0.816			
PEB	PEB3	0.766	0.877	0.907	0.620
	PEB4	0.769			
	PEB5	0.783			

Figure 1

Factor loadings, path-coefficients



Discriminant Validity

The evaluation of construct distinctiveness involved the utilization of the Fornell & Larcker Criterion (1981) which compares the AVE against the squared inter-construct correlations. Additionally, the Heterotrait-Monotrait (HTMT) as proposed by Henseler and Fassott (2010) was employed and results are presented in table 2 confirming the establishment of discriminant validity.

Table 2

Discriminant validity (HTMT ratio)

Heterotrait - Monotrait Ratio (HTMT)						
EK	EK	GEM	GIM	GL&D	OGC	PEB
GEM	0.786					
GLM	0.663	0.725				
GL&D	0.551	0.705	0.648			
OGC	0.704	0.605	0.717	0.600		
PEB	0.802	0.591	0.763	0.572	0.682	

Table 3

Discriminant validity (fornell & larcker criterion)

Fomell & Larcker (1981)-Matric						
	EK	GEM	GIM	GL&D	OGC	PEB
EK	0.825					
GEM	0.645	0.891				
GLM	0.947	0.846	0.782			
GL&D	0.440	0.594	0.533	0.855		
OGC	0.587	0.541	0.626	0.518	0.822	
PEB	0.659	0.518	0.661	0.483	0.788	0.787

Confirmatory Factor Analysis

The explanatory power of the model, indicating the proportion of variance explained by the endogenous constructs, is measured by R2 (Shmueli and Koppius, 2011), as emphasized by (Rigdon, 2014) higher R2 values, ranging from 0 to 1, signify greater explanatory power, where values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively. In table number 4, the values demonstrate a moderate and satisfactory level of explanatory power (Raithel et al., 2012).

The Q2 values in the same table display the medium and significant predictive relevance of the proposed model. A relatively good fit with minor discrepancies between the estimated model and observed data is indicated by the SRMR value of 0.065, while the NFI value of 0.913 suggests a moderately good fit.

Table 4

Predictive summary, Q2, F-square and model fitness

Constructs (Endogenous Variables)	R^2 Values		PLS-Predict Q^2 Values	Model Fitness Summary EV	
	R^2	Adj.R^2			
EK	0.193	0.191	0.185	SRMR	0.065
GIM	0.913	0.913	0.277	NFI	0.913
PEB	0.437	0.436	0.212		
OGC	0.655	0.651	0.281		

Results and Analysis

The study employed a SEM analytical technique to test hypotheses and relationships between unobserved constructs. It extracted regression coefficients, assessed their significance, effect sizes, and evaluated the overall fit of the model.

Model I (Direct Effects)

In order to assess the direct effects, bootstrapping tool in smart PLS under sample size of 10000, with parallel processing condition, with confidence interval method "Bias-corrected and accelerated (BSa) bootstrap, at one significance level of 0.05 and with one tailed was applied and the results showed a strong significant relationship between GLD on EK with (Beta=0.440, t=9.077, P<0.000), followed by EK on GIM with (Beta=0.883, t=64.697, P<0.000), GLD on GIM with (Beta=0.144, t=7.250, P<0.000), GIM on PEB with (Beta=0.661, t=18.677, P<0.000), PEB on OGC with (Beta=0.646, t=15.046, P<0.000)and Finally GIM on OGC (Beta=0.116, t=1.682, P<0.002).

These direct relationships among endogenous and exogenous variables showed strong positive relationship with each other and also supported the logical network of associated proposed in conceptual frame work with support of Green Self-Determination Theory, we found how the theory's principles align with the observed relationships in for

H1: which shows strong significant relationship between GLD and EK and it suggests that individuals who undergo learning and development programs focused on environmental issues are more likely to acquire knowledge about the environment.

H2: The positive relationship between EK and GIM implies that individuals with higher environmental knowledge are more likely to be intrinsically motivated to engage in pro-environmental behaviors.

H3: The significant relationship between GLD and GIM indicates that effective learning and development programs focused on environmental sustainability can positively influence individuals' intrinsic motivation to engage in environmentally friendly actions.

H4: The strong positive relationship between GIM and PEB suggests that individuals who are intrinsically motivated by environmental concerns are more likely to engage in behaviors that promote environmental sustainability.

H5: The positive relationship between PEB and OGC indicates that when individuals within an organization engage in PEB, it contributes to the development of a culture that prioritizes environmental sustainability.

H6: The positive relationship between GIM and OGC was observed yet the T statistics are showing a low acceptance value. This indicates that effect of GIM is not a very strong effector over OGC. The Beta values with 0.116, Mean values at bottom level as 0.112 and significance values with .002 indicates the low effect of GIM on OGC and implies that individuals with higher levels of intrinsic motivation towards environmental concerns contribute to the development of a culture in organization but their contribution is at very lower level.

Table 5

PLS-SEM (model I direct effects)

PLS-SEM (Bootstrapping Direct effects)							
	Paths	Beta	Mean	SD	T	P	
Model 1 (Direct Effect)	H1: GLD->EK	0.442	0.442	0.048	9.077	0.000	Accepted
	H2: EK->GIM	0.883	0.883	0.014	64.697	0.000	
	H3: GLD-> GIM	0.144	0.144	0.020	7.250	0.000	
	H4: GIM->PEB	0.662	0.662	0.035	18.677	0.000	
	H5: PEB-> OGC	0.647	0.647	0.043	15.046	0.000	
	H6: GIM-> OGC	0.112	0.112	0.071	1.682	0.002	

Model-II (Indirect Effects -Mediation Analysis)

The classic approach to investigating mediation effects in regression analysis was introduced by (Sobel, 1982), Baron and Kenny (1986). However, alternative methods proposed by researchers such as (Hair et al., 2011, Henseler, 2010, MacKinnon et al., 2004) have emerged. One such alternative method involves using PLS-SEM with independent variables (IVs) and dependent variables (DVs) (Iacobucci et al., 2007).

H7: There is significant positive mediating effect of EK in relationship of GLD and GIM.

Under this study the PLS-SEM (Bootstrapping) analysis was used to assessed the mediation effect of constructs and the results for H7: in table 4 revealed that EK has significant positive partial mediating effect in relationship of GLD and GIM with specific indirect effect (Beta=0.388 , t=9.627, p<0.000, LLCI=0.322, ULCI=0.454), direct effect (Beta=0.144 , t=7.250, p<0.000) and with total effect of (Beta=0.533 , t=11.973, p<0.000) representing that employees who are well aware of environmental issues have keen interest in learning activities toward environmental sustainability and it internally motivates them to continues the efforts and contribution for development of their Pro-Environmental behavior. and the same is supported by previous researcher that employees who exert high level of EK have strong linkage with environmentally-friendly activities(Li et al., 2020).

H8: There is significant positive mediating effect of GIM in relationship of GLD and PEB.

And the results in table 4 revealed a significant and positive partial mediating effect of GIM between GLD and PEB with (Beta=0.096, t=6.487, p=0.000, LLCI, 0.072, ULCI, 0.121) and the same results were supported by research conducted by Zhang et al. (2022) in which they argued that GIM has significant positive mediating role in development of pro-environmental behavior of employees who were involved in green learning and development activities.

H9: There is significant positive mediating effect of GIM in relationship of GLD and OGC.

Hypothesis 9 was assessed and the results in table 4 (Beta=0.017, t=1.554, p=0.006, LLCI, 0.085, ULCI, 0.134), presenting the partial mediating effect of GIM on OGC which are in response of GLD and supported through a study made by Zhao et al. (2023), arguing that there is direct effect of GIM in development of green shared vision representing OGC and employees PEB significantly moderate this relationship.

H10: There is significant positive mediating effect of GIM in relationship of EK and PEB.

And the extracted results (Beta=0.584, t=18.864, p=0.000, LLCI, 0.532, ULCI, 0.634) showing the significant positive mediation effect of GIM in relationship between EK and PEB. These results indicate that employees with GIM support the environmental friendly activities and enhance green activities at workplace because of EK (Bulińska-Stangrecka and Bagieńska, 2021).

H11: There is significant positive mediating effect of GIM in relationship of EK and OGC.

Results of hypothesis 11 (Beta=0.102, T=1.681, P<0.001, LLCI=0.005, ULCI=0.202) indicating significant partial mediating effect of GIM in relationship between EK and OGC. These results were also supported with previous research made by Karatepe et al. (2023) who argued in their research that GIM boost the effect of EK on OGC.

H12: There is significant positive mediating effect of PEB in relationship of GIM and OGC.

Hypothesis 12 was assessed by PLS-SEM bootstrapping method and the revealed results showed specific indirect effect of GIM on OGC though PEB is (Beta=0.428, T=12.635, P<0.000, LLCI=0.374, ULCI=0.486), the Direct Effect (beta=0.116, t=1.682, P<0.005) and the total effect (beta=0.543, t=7.959, p<0.000) showing a significant positive mediating effect of PEB in relationship between GIM and OGC. Research argued in their research that PEB is playing a vital role in development of OGC and vice versa (Zafar et al., 2023).

H13: There is significant positive mediating effect of EK and GIM in between relationship of GLD and PEB.

The results of hypothesis 13 (beta=0.257, t=7.828, p<0.000, LLCI=0.204, ULCI=0.313) showed a bolsters and catalyst effect of EK and GIM in relationship between GLD and PEB, because employees with GIM and EK are well aware about environmentally friendly activities and their commitment level toward achievement of PEB tends to high then others (Wei et al., 2023, Vargas-Hernández and Calderón-Campos, 2022, Pan et al., 2022)

H14: There is significant positive mediating effect of EK and GIM in between relationship of GLD and OGC.

The results of the hypothesis 14 (beta=0.045, t=1.758, p<0.004, LLCI= 0.024, ULCI=0.093) showed a significant positive relationship between GLD and OGC as these results are also supported with previous researchers arguing that employees with EK and GIM, who are educated through GLD programs by their ecofriendly activities significantly contribute in development of OGC (Pan et al., 2022, Vargas-Hernández et al., 2023, Zafar et al., 2023).

H15: There is significant positive mediating effect of GIM and PEB in between relationship of EK and OGC.

H15 assessed and the results revealed after PLS-SEM bootstrapping method (beta=0.378, t=12.367, p<0.000, LLCI=0.329, ULCI=0.430) showed significant positive partial mediating effect of GIM and PEB on OGC through EK and these results are also supported by previous researchers and argued that employees with GIM have PEB which has consistency due the EK and contribute in OGC because the intrinsic motivational effect which was developed and strengthen through EK only on contributed at individual level in the organization in shape of PEB but also at organizational level it plays a significant role in OGC (Agrawal and Puri, 2020, Abbas and Khan, 2022, Abbas and Dogan, 2022).

H16: There is significant positive mediating effect of GIM and PEB in between relationship of GLD and OGC.

And for H16: the extracted results (beta=0.062, t=6.120, p<0.000, LLCI=0.046, ULCI=0.079) showed a positive partial mediation effect of GIM and PEB in relationship of GLD and OGC. TEVT employees who are getting trainings in term of GIM have strong PEB then others and at institutional level they are contributing in reforms to change job task and job methodologies in ecofriendly activities which will ultimately make addition in OGC. The same results extract by researchers that environmentally friendly behavior of employees developed through environmental awareness has direct relationship with organizational green vision and culture (Yang and Gao, 2022, KHASKHELY et al., 2021, Mirahsani et al., 2023)

H17: There is significant positive mediating effect of EK, GIM and PEB in relationship of GLD and OGC.

The results of hypothesis 17 (beta=0.166, t=7.496, p<0.000, LLCI=0.131, ULCI=0.204) indicate significant positive effect of GLD on OGC through mediating role of EK, GIM and PEB. It was argued by previous researchers that employees with knowledge of environmental risk and motivated for wellbeing of workplace have strong PEB and they are consistently contributing in development of OGC (JUHARI and YUSOFF, 2022, Afridi et al., 2023, Durhan et al., 2022) and it was argued by Budzanowska-Drzewiecka and Tutko (2021) in their research that employees who are engage in green behavior activities are intrinsically motivated (Saeed et al., 2019, Farrukh et al., 2022).

Table 6

Model -II (mediation analysis – indirect effects)

Hypothesis Effects	Path	Beta	T	P	LLCI	ULCI
Specific Indirect Effects	H7: -> EK->GIM	0.388	9.627	0.000		
Direct Effect		0.144	7.250	0.000		
Total Effects		0.533	11.973	0.000	0.322	0.454
Specific Indirect effects	H8: GLD->GIM ->PEB	0.096	6.487	0.000		
Direct effect		0.352	9.039	0.000	0.072	0.121
Specific Indirect effects	H9: GLD->GIM ->OGC	0.017	1.554	0.006		
Direct effect		0.290	6.109	0.000	0.085	0.134
Specific Indirect effects	H10: EK->GIM -> PEB	0.584	18.864	0.000		
		0.584	18.864	0.000	0.532	0.634
Specific Indirect effects	H11: EK->GIM -> OGC	0.102	1.681	0.001		
Direct effects		0.480	7.970	0.000	0.005	0.202
Specific Indirect effects	H12: GIM->FEB -> OGC	0.428	12.635	0.000		
Direct effect		0.116	1.682	0.005		
Total effect		0.543	7.959	0.000	0.374	0.486
Specific Indirect effects	H13: GLD->EK -> GIM ->PEB	0.257	7.828	0.000	0.204	0.313
Specific Indirect effects	H14: GLD->EK -> GIM ->OGC	0.045	1.758	0.004	0.024	0.093
Specific Indirect effects	H15: EK->GIM -> PEB ->OGC	0.378	12.367	0.000	0.329	0.430
Specific Indirect effects	H16: GLD->GIM -> PEB ->OGC	0.062	6.120	0.000	0.046	0.079
Specific Indirect effects	H17: GLD->EK -> GIM ->PEB->OGC	0.166	7.496	0.000	0.131	0.204

Model-III (Moderation Analysis)

H18: GEM significantly negatively moderates the positive mediating relationship of PEB and OGC.

The study assessed how GEM moderates the link between PEB and OGC. Without GEM's moderation, the model explained 65.1% of OGC variance. Introducing the interaction term (PEB X GEM) reduced the explained variance to 63.8%, indicating a 1.3% drop. GEM, defined as a tendency to prioritize environmentally friendly actions over rewards, was found to diminish the impact of GIM. Literature supported this, suggesting that employees rewarded for green activities might be less intrinsically motivated (Li et al., 2020, Moser, 2015, Huang et al., 2016). Hypothesis H17, examining the moderation effect (PEB x GEM → OGC), confirmed a significant negative moderation impact of GEM on the relationship between PEB and OGC (β= -0.091, t=3.139, P<0.0014). This supported the hypothesis that GEM negatively moderates the positive link between PEB and OGC.

Table 7

PLS-SEM (model – III moderation analysis)

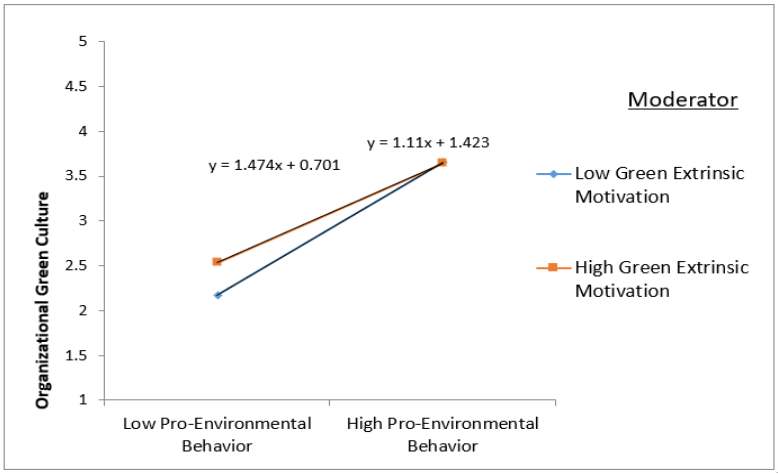
	PLS-SEM (Bootstrapping) Moderation Analysis					
MODEL III (with Moderation effects)	Hypothesis & Path	Beta	SD	T	P	Hypothesis Results
	H17: Moderation effect (PEB x GEM)► OGC	-0.091	0.029	3.139	.0014	Accepted

F-Square: Further F2 test was conduct to check the significance of moderation effect in accordance with guidelines provide by (Cohen, 1992) that an F2 effect size of 0.005, 0.01, and 0.025 corresponds to a small, medium, and large effect size of moderation, respectively. In this case, the F-Square effect size was 0.027, which suggests that there is a large negative moderating effect of (PEB x GEM) in the model. Specifically, it confirms that GEM weakens the relationship between PEB and OGC.

Simple Slope Analysis : Figure 3 includes a slope analysis to enhance the understanding of the moderating effect. The line is observed to be much steeper for low GEM, indicating that the influence of PEB on OGC is much stronger when GEM is low. However, as GEM increases, the line appears to straighten, indicating that an increase in PEB does not lead to a comparable change in OGC. Ultimately, these results suggest that higher levels of GEM diminish the impact of PEB on OGC (Moser, 2015, Huang et al., 2016).

Figure 2

Moderation analysis—simple slope analysis (PEB x GEM) --> OGC



Discussion

This study addresses gaps in understanding the drivers of Pro-Environmental Behavior (PEB) in fostering Organizational Green Culture (OGC) among Technical and Vocational Education and Training (TEVT) employees. It investigates the roles of Green Learning & Development (GLD), Green Intrinsic Motivation (GIM), Environmental Knowledge (EK), and Green Extrinsic Motivation (GEM) in shaping these behaviors.

The study reveals the TEVT sector's challenge in transforming traditional training into Green TEVT, proposing GLD programs to enhance environmental knowledge and intrinsic motivation among employees. These initiatives, aligning HRM practices with environmental goals, foster a sustainable workforce and Green TEVT. Koo et al. (2015) & Yafi et al., (2021) highlights GLD's impact on EK, which positively influences GIM and subsequently drives PEB. Additionally, Afsar et al. (2016) founds that GIM acts as a mediator between GLD and OGC, channeling the effect through individuals' environmental awareness (Steinhorst and Klöckner, 2018, Du et al., 2022). As described by Aboramadan et al. (2022) that GIM partially mediates GLD's impact on PEB (Tan and Zhu, 2022), illustrating how employees' genuine environmental concern motivates them toward eco-friendly activities.

The study underlines GEM's moderating effect on the PEB-OGC relationship (Sharma et al., 2022, Kim and Lee, 2022, Hu et al., 2022). External rewards can diminish internally driven motivation, emphasizing the need to cautiously implement external incentives, ensuring minimal impact on employees intrinsically inclined toward environmentally friendly actions (Mansoor and Paul, 2022).

Lastly, GEM was found to have a moderating effect on the relationship between PEB and OGC. However, these moderating effects were observed to be significant and of substantial magnitude. Interestingly, the negative sign of these relationships aligns with motivation theories Li et al. (2020) and Self-Determination Theories (SDT) (Koo and Chung, 2014), which propose that external influences such as punishment or rewards have the tendency to diminish internally driven interest or enjoyment. Thus, it is crucial to acknowledge that while GIM can enhance PEB among TEVT employees and contribute to the development of OGC in the short term, the presence of external factors such as admiration, bonuses, and rewards can significantly impact human behavior, potentially diminishing the influence of internal self-driven motivation(Ali et al., 2020).

Theoretical Implications

This study makes a significant contribution to the existing literature by introducing a learning mechanism that elucidates how GLD influences PEB, ultimately leading to the development of OGC. We examine the direct and indirect effects of GLD and EK on PEB and OGC, mediated by GIM. Additionally, our findings provide novel insights into the roles of GIM and GEM within the context of OGC. This research enhances our foundational understanding of the subject matter and advances our comprehension of the various motivations at play in a green cultural context.

Firstly, the results support the significant influence of GLD and EK on shaping employees' PEB. Particularly, the inclination to learn about and empathize with environmental issues and their potential solutions fosters the development of PEB, which can be seen as indicators of the formation of OGC (Wang, 2019, Wang et al., 2022). The process of learning and developing green activities within an organization is facilitated by the mediating role of GIM, making it a crucial theoretical contribution of our research. Green Intrinsic Motivation (GIM) exerts a substantial effect and significantly mediates the hypothesized relationships, underscoring its central role in promoting Pro-Environmental Behavior (PEB) and Organizational Green Culture (OGC) (Waterman et al., 2003, Suharyani, 2022)

As expected, Green Extrinsic Motivation (GEM) diminishes the impact of Pro-Environmental Behavior on Organizational Green Culture. These findings also contribute to the theoretical understanding by highlighting that external motivators not only weaken the influence of Pro-Environmental Behavior, which is fostered through Green Learning & Development, Environmental Knowledge, Green Intrinsic Motivation, and Pro-Environmental Behavior of employees, but also reduce the emotional connection to the environment (Hu, 2022).

Practical Implications

Organizations in Punjab like PVTC, TEVTA, NAVTTC, etc., actively promote an eco-conscious culture by enhancing employee knowledge, motivation, and pro-environmental behaviors. PVTC, with TEVT Sector Support Program -GIZ, trains principals and assistant managers for Green TEVT, emphasizing environmental skill development. The study highlights factors influencing Green TEVT implementation and offers practical implications for TEVT organizations to build a sustainable, eco-conscious workforce.

Recommendations: Firstly, TEVT organizations should prioritize fostering Organizational Green Culture (OGC) across departments, recognizing and appreciating green initiatives. Targeted training addressing local environmental challenges in Punjab can raise awareness and responsibility among employees. Secondly, nurturing intrinsic motivation by involving employees in hands-on environmental projects is crucial. Recognizing their contributions fosters OGC more effectively than relying solely on external rewards. Lastly, caution is advised regarding Green Extrinsic Motivation (GEM); while initially appealing, overreliance might hinder OGC's development in TEVT organizations.

Conclusion & Future Research Directions

To create a greener TEVT sector, both employees and management must embrace sustainability. This study emphasizes cognitive aspects like green learning and affective factors such as pro-environmental behavior in shaping Organizational Green Culture. Green intrinsic motivation partly mediates the link between Green Learning & Development and this culture. However, Green Extrinsic Motivation might negatively impact Pro-Environmental Behavior's influence on Organizational Green Culture. Prioritizing Green Learning & Development, environmental knowledge, and intrinsic motivation can promote Pro-Environmental Behavior in TEVT. Careful consideration is crucial regarding Green Extrinsic Motivation, such as green rewards, to avoid negating the efforts of self-motivated employees. Future research could explore sector-specific studies, Leadership Effects, and Policy Implementation as potential hurdles or facilitators to contribute further in this area.

References

Abbas, J., & Dogan, E. (2022). The impacts of organizational green culture and corporate social responsibility on employees' responsible behaviour towards the society. *Environmental Science and Pollution Research*, *29*(40), 60024-60034. https://doi.org/10.1007/s11356-022-20072-w

Abbas, J., & Khan, S. M. (2022). Green knowledge management and organizational green culture: An interaction for organizational green innovation and green performance. *Journal of Knowledge Management*, *27*(7), 1852-1870. https://doi.org/10.1108/jkm-03-2022-0156

Aboramadan, M., Kundi, Y. M., & Becker, A. (2021). Green human resource management in nonprofit organizations: Effects on employee green behavior and the role of perceived green organizational support. *Personnel Review*, *51*(7), 1788-1806. https://doi.org/10.1108/pr-02-2021-0078

Adekunle, I. A. (2021). On the search for environmental sustainability in Africa: The role of governance. *Environmental Science and Pollution Research*, *28*(12), 14607-14620. https://doi.org/10.1007/s11356-020-11432-5

Afridi, F. E., Afridi, S. A., Zahid, R. M., Khan, W., & Anwar, W. (2023). Embracing green banking as a mean of expressing green behavior in a developing economy: Exploring the mediating role of green culture. *Environmental Science and Pollution Research*. https://doi.org/10.1007/s11356-023-25449-z

Afsar, B., Badir, Y., & Kiani, U. S. (2016). Linking spiritual leadership and employee pro-environmental behavior: The influence of workplace spirituality, intrinsic motivation, and environmental passion. *Journal of Environmental Psychology*, *45*, 79-88. https://doi.org/10.1016/j.jenvp.2015.11.011

Ahmed, M., Guo, Q., Qureshi, M. A., Raza, S. A., Khan, K. A., & Salam, J. (2021). Do green HR practices enhance green motivation and proactive environmental management maturity in hotel industry? *International Journal of Hospitality Management*, *94*, 102852. https://doi.org/10.1016/j.ijhm.2020.102852

Ali, F., Ashfaq, M., Begum, S., & Ali, A. (2020). How "Green" thinking and altruism translate into purchasing intentions for electronics products: The intrinsic-extrinsic motivation mechanism. *Sustainable Production and Consumption*, *24*, 281-291. https://doi.org/10.1016/j.spc.2020.07.013

Amabile, T. M., & Pratt, M. G. (2016). The dynamic componential model of creativity and innovation in organizations: Making progress, making meaning. *Research in Organizational Behavior*, *36*, 157-183. https://doi.org/10.1016/j.riob.2016.10.001

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173-1182. https://doi.org/10.1037/0022-3514.51.6.1173

Bresciani, S., Rehman, S. U., Giovando, G., & Alam, G. M. (2023). The role of environmental management accounting and environmental knowledge management practices influence on environmental performance: Mediated-moderated model. *Journal of Knowledge Management*, *27*(4), 896-918. https://doi.org/10.1108/jkm-12-2021-0953

Budzanowska-Drzewiecka, M., & Tutko, M. (2021). The impact of individual motivation on employee voluntary pro-environmental behaviours: The motivation towards the environment of Polish employees. *Management of Environmental Quality: An International Journal*, *32*(5), 929-948. https://doi.org/10.1108/meq-11-2020-0268

Bulińska-Stangrecka, H., & Bagieńska, A. (2021). Culture-based green workplace practices as a means of conserving energy and other natural resources in the manufacturing sector. *Energies*, *14*(19), 6305. https://doi.org/10.3390/en14196305

Bulut, U. (2020). Environmental sustainability in Turkey: An environmental Kuznets curve estimation for ecological footprint. *International Journal of Sustainable Development & World Ecology*, *28*(3), 227-237. https://doi.org/10.1080/13504509.2020.1793425

Byron, K., & Khazanchi, S. (2012). Rewards and creative performance: A meta-analytic test of theoretically derived hypotheses. *Psychological Bulletin*, *138*(4), 809-830. https://doi.org/10.1037/a0027652

Cheah, J., Sarstedt, M., Ringle, C. M., Ramayah, T., & Ting, H. (2018). Convergent validity assessment of formatively measured constructs in PLS-SEM. *International Journal of Contemporary Hospitality Management*, *30*(11), 3192-3210. https://doi.org/10.1108/ijchm-10-2017-0649

Cohen, J. (1992). Statistical power analysis. *Current Directions in Psychological Science*, *1*(3), 98-101. https://doi.org/10.1111/1467-8721.ep10768783

Dahlinger, A., & Wortmann, F. (2016). Fostering Pro-Environmental Behavior with Green Consumer Is: The Effects of Is-Induced Construal and General is Usage Motivations. *Research-In-Progress Papers*. https://aisel.aisnet.org/ecis2016_rip/60

Darvishmotevali, M., & Altinay, L. (2022). Green HRM, environmental awareness and green behaviors: The moderating role of servant leadership. *Tourism Management*, *88*, 104401. https://doi.org/10.1016/j.tourman.2021.104401

Deci, E. (2017). Intrinsic motivation and self-determination☆. *Reference Module in Neuroscience and Biobehavioral Psychology*. https://doi.org/10.1016/b978-0-12-809324-5.05613-3

Du, M., Chai, S., Wei, W., Wang, S., & Li, Z. (2022). Will environmental information disclosure affect bank credit decisions and corporate debt financing costs? Evidence from China's heavily polluting industries. *Environmental Science and Pollution Research*, *29*(31), 47661-47672. https://doi.org/10.1007/s11356-022-19229-4

Durhan, T. A., Akgül, B. M., & Karaküçük, S. (2022). Testing the green culture scale on Turkish population: The green culture scale. *Journal of Human Sciences*, *19*(4), 569-581. https://doi.org/10.14687/jhs.v19i4.6286

Faraz, N. A., Ahmed, F., Ying, M., & Mehmood, S. A. (2021). The interplay of green servant leadership, self-efficacy, and intrinsic motivation in predicting employees' pro-environmental behavior. *Corporate*

Social Responsibility and Environmental Management, *28*(4), 1171-1184. https://doi.org/10.1002/csr.2115

Farrukh, M., Ansari, N., Raza, A., Wu, Y., & Wang, H. (2022). Fostering employee's pro-environmental behavior through green transformational leadership, green human resource management and environmental knowledge. *Technological Forecasting and Social Change*, *179*, 121643. https://doi.org/10.1016/j.techfore.2022.121643

Gilal, F. G., Chandani, K., Gilal, R. G., Gilal, N. G., Gilal, W. G., & Channa, N. A. (2019). Towards a new model for green consumer behaviour: A self-determination theory perspective. *Sustainable Development*, *28*(4), 711-722. https://doi.org/10.1002/sd.2021

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139-152. https://doi.org/10.2753/mtp1069-6679190202

Hammond, M. M., Neff, N. L., Farr, J. L., Schwall, A. R., & Zhao, X. (2011). Predictors of individual-level innovation at work: A meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts*, *5*(1), 90-105. https://doi.org/10.1037/a0018556

Henseler, J. (2009). undefined. *Computational Statistics*, *25*(1), 107-120. https://doi.org/10.1007/s00180-009-0164-x

Henseler, J., & Fassott, G. (2009). Testing moderating effects in PLS path models: An illustration of available procedures. *Handbook of Partial Least Squares*, 713-735. https://doi.org/10.1007/978-3-540-32827-8_31

Hooi, L. W., Liu, M., & Lin, J. J. (2021). Green human resource management and green organizational citizenship behavior: Do green culture and green values matter? *International Journal of Manpower*, *43*(3), 763-785. https://doi.org/10.1108/ijm-05-2020-0247

Hu, X., Khan, S. M., Huang, S., Abbas, J., Matei, M. C., & Badulescu, D. (2022). Employees' green enterprise motivation and green creative process engagement and their impact on green creative performance. *International Journal of Environmental Research and Public Health*, *19*(10), 5983. https://doi.org/10.3390/ijerph19105983

Hu, X., Khan, S. M., Huang, S., Abbas, J., Matei, M. C., & Badulescu, D. (2022). Employees' green enterprise motivation and green creative process engagement and their impact on green creative performance. *International Journal of Environmental Research and Public Health*, *19*(10), 5983. https://doi.org/10.3390/ijerph19105983

Huang, Y., Yang, M., & Wong, Y. (2016). The effect of internal factors and family influence on firms' adoption of green product innovation. *Management Research Review*, *39*(10), 1167-1198. https://doi.org/10.1108/mrr-02-2015-0031

Hughes, D. J., Lee, A., Tian, A. W., Newman, A., & Legood, A. (2018). Leadership, creativity, and innovation: A critical review and practical recommendations. *The Leadership Quarterly*, *29*(5), 549-569. https://doi.org/10.1016/j.leaqua.2018.03.001

Iacobucci, D., Saldanha, N., & Deng, X. (2007). A meditation on mediation: Evidence that structural equations models perform better than regressions. *Journal of Consumer Psychology*, *17*(2), 139-153. https://doi.org/10.1016/s1057-7408(07)70020-7

Jerónimo, H. M., Henriques, P. L., Lacerda, T. C., Da Silva, F. P., & Vieira, P. R. (2020). Going green and sustainable: The influence of green HR practices on the organizational rationale for sustainability. *Journal of Business Research*, *112*, 413-421. https://doi.org/10.1016/j.jbusres.2019.11.036

JUHARI, N. F., & MOHD YUSOFF, Y. (2022). Employee ecological behavior as mediator in the effect of green culture on employees' green satisfaction. *Universiti Malaysia Terengganu Journal of Undergraduate Research*, *4*(3), 13-26. https://doi.org/10.46754/umtjur.v4i3.340

Karatepe, O. M., Dahleez, K., Jaffal, T., & Aboramadan, M. (2023). Test of a sequential mediation model of green management innovation. *The Service Industries Journal*, *43*(5-6), 312-335. https://doi.org/10.1080/02642069.2022.2164274

Khan, M. S., Saengon, P., Alganad, A. M., Chongcharoen, D., & Farrukh, M. (2020). Consumer green behaviour: An approach towards environmental sustainability. *Sustainable Development*, *28*(5), 1168-1180. https://doi.org/10.1002/sd.2066

Khaskhely, m. K., khan, n. R., & qazi, S. W. (2021). Contribution of employee green values in improving corporate sustainable environmental performance via organizational green culture and employee green behaviors-a conceptual nexus.

Kim, M., & Lee, S. (2022). Drivers and interrelationships of three types of pro-environmental behaviors in the workplace. *International Journal of Contemporary Hospitality Management*, *34*(5), 1854-1881. https://doi.org/10.1108/ijchm-09-2021-1094

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239-260. https://doi.org/10.1080/13504620220145401

Koo, C., & Chung, N. (2014). Examining the eco-technological knowledge of smart green IT adoption behavior: A self-determination perspective. *Technological Forecasting and Social Change*, *88*, 140-155. https://doi.org/10.1016/j.techfore.2014.06.025

Koo, C., Chung, N., & Nam, K. (2015). Assessing the impact of intrinsic and extrinsic motivators on smart green IT device use: Reference group perspectives. *International Journal of Information Management*, *35*(1), 64-79. https://doi.org/10.1016/j.ijinfomgt.2014.10.001

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, *30*(3), 607-610. https://doi.org/10.1177/001316447003000308

Li, W., Bhutto, T. A., Xuhui, W., Maitlo, Q., Zafar, A. U., & Ahmed Bhutto, N. (2020). Unlocking employees' green creativity: The effects of green transformational leadership, green intrinsic, and extrinsic motivation. *Journal of Cleaner Production*, *255*, 120229. https://doi.org/10.1016/j.jclepro.2020.120229

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and Resampling methods. *Multivariate Behavioral Research*, *39*(1), 99-128. https://doi.org/10.1207/s15327906mbr3901_4

Mansoor, M., & Paul, J. (2022). Impact of energy efficiency-based ICT adoptions on prosumers and consumers. *Journal of Cleaner Production*, *331*, 130008. https://doi.org/10.1016/j.jclepro.2021.130008

Marshall, D., McCarthy, L., McGrath, P., & Claudy, M. (2015). Going above and beyond: How sustainability culture and entrepreneurial orientation drive social sustainability supply chain practice adoption. *Supply Chain Management: An International Journal*, *20*(4), 434-454. https://doi.org/10.1108/scm-08-2014-0267

Moser, A. K. (2015). Thinking green, buying green? Drivers of pro-environmental purchasing behavior. *Journal of Consumer Marketing*, *32*(3), 167-175. https://doi.org/10.1108/jcm-10-2014-1179

Nilsson, J. H. (2019). Urban bicycle tourism: Path dependencies and innovation in greater Copenhagen. *Journal of Sustainable Tourism*, *27*(11), 1648-1662. https://doi.org/10.1080/09669582.2019.1650749

Ojo, A. O. (2021). Motivational factors of pro-environmental behaviors among information technology professionals. *Review of Managerial Science*, *16*(6), 1853-1876. https://doi.org/10.1007/s11846-021-00497-2

Pan, C., Abbas, J., Álvarez-Otero, S., Khan, H., & Cai, C. (2022). Interplay between corporate social responsibility and organizational green culture and their role in employees' responsible behavior towards the environment and society. *Journal of Cleaner Production*, *366*, 132878. https://doi.org/10.1016/j.jclepro.2022.132878

Pvtc. 2022. Projects brief as on december 2022 [online]. Pakistan: Punjab vocational training council. [accessed 31-dec-2022 2022].

Raithel, S., Sarstedt, M., Scharf, S., & Schwaiger, M. (2011). On the value relevance of customer satisfaction. Multiple drivers and multiple markets. *Journal of the Academy of Marketing Science*, *40*(4), 509-525. https://doi.org/10.1007/s11747-011-0247-4

Rigdon, E. E. (2014). Rethinking partial least squares path modeling: Breaking chains and forging ahead. *Long Range Planning*, *47*(3), 161-167. https://doi.org/10.1016/j.lrp.2014.02.003

Ryan, R. M., Donald, J. N., & Bradshaw, E. L. (2021). Mindfulness and motivation: A process view using self-determination theory. *Current Directions in Psychological Science*, *30*(4), 300-306. https://doi.org/10.1177/09637214211009511

Safari, A., Salehzadeh, R., Panahi, R., & Abolghasemian, S. (2018). Multiple pathways linking environmental knowledge and awareness to employees' green behavior. *Corporate Governance: The International Journal of Business in Society*, *18*(1), 81-103. https://doi.org/10.1108/cg-08-2016-0168

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2021). Partial least squares structural equation modeling. *Handbook of Market Research*, 1-47. https://doi.org/10.1007/978-3-319-05542-8_15-2

Selart, M., Nordström, T., Kuvaas, B., & Takemura, K. (2008). Effects of reward on self-regulation, intrinsic motivation and creativity. *Scandinavian Journal of Educational Research*, *52*(5), 439-458. https://doi.org/10.1080/00313830802346314

Shmueli, & Koppius. (2011). Predictive analytics in information systems research. *MIS Quarterly*, *35*(3), 553-572. https://doi.org/10.2307/23042796

Silvi, M., & Padilla, E. (2021). Pro-environmental behavior: Social norms, intrinsic motivation and external conditions. *Environmental Policy and Governance*, *31*(6), 619-632. https://doi.org/10.1002/eet.1960

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, *13*, 290. https://doi.org/10.2307/270723

Suharyani, y. D., nurhayati, m 2022. Green knowledge management to improve green competence with green motivation as intervening variable. *Jurnal ekonomi*, *12*, 717–724.

Syafril, e. S. 2022. Hr development, work engagement and organizational commitment to analyst and assistant performance sales of pt. Bank negara indonesia (persero). Enrichment: journal of management, 12, 3299-3306.

Tan, Y., & Zhu, Z. (2022). The effect of ESG rating events on corporate green innovation in China: The mediating role of financial constraints and managers' environmental awareness. *Technology in Society*, *68*, 101906. https://doi.org/10.1016/j.techsoc.2022.101906

Tang, G., Chen, Y., Jiang, Y., Paillé, P., & Jia, J. (2017). Green human resource management practices: Scale development and validity. *Asia Pacific Journal of Human Resources*, *56*(1), 31-55. https://doi.org/10.1111/1744-7941.12147

Thathong, K., & Leopenwong, S. (2014). The development of environmental education activities for forest resources conservation for the youth. *Procedia - Social and Behavioral Sciences*, *116*, 2266-2269. https://doi.org/10.1016/j.sbspro.2014.01.557

Van der Werff, E., Steg, L., & Keizer, K. (2013). It is a moral issue: The relationship between environmental self-identity, obligation-based intrinsic motivation and pro-environmental behaviour. *Global Environmental Change*, *23*(5), 1258-1265. https://doi.org/10.1016/j.gloenvcha.2013.07.018

Vargas-Hernández, J. G., Maillard, C. A., & Vargas-González, O. C. (2022). Green organizational culture, green innovation, and green performance for achieving environmental sustainability. *Handbook of Research on Promoting an Inclusive Organizational Culture for Entrepreneurial Sustainability*, 313-333. https://doi.org/10.4018/978-1-6684-5216-5.ch017

Wang, C. (2019). How organizational green culture influences green performance and competitive advantage. *Journal of Manufacturing Technology Management*, *30*(4), 666-683. https://doi.org/10.1108/jmtm-09-2018-0314

Wang, S., Abbas, J., Sial, M. S., Álvarez-Otero, S., & Cioca, L. (2022). Achieving green innovation and sustainable development goals through green knowledge management: Moderating role of organizational green culture. *Journal of Innovation & Knowledge*, *7*(4), 100272. https://doi.org/10.1016/j.jik.2022.100272

Waterman, A. S., Schwartz, S. J., Goldbacher, E., Green, H., Miller, C., & Philip, S. (2003). Predicting the subjective experience of intrinsic motivation: The roles of self-determination, the balance of challenges and skills, and self-realization values. *Personality and Social Psychology Bulletin*, *29*(11), 1447-1458. https://doi.org/10.1177/0146167203256907

Wei, F., Abbas, J., Alarifi, G., Zhang, Z., Adam, N. A., & Queiroz, M. J. (2023). Role of green intellectual capital and top management commitment in organizational environmental performance and reputation: Moderating role of pro-environmental behavior. *Journal of Cleaner Production*, *405*, 136847. https://doi.org/10.1016/j.jclepro.2023.136847

Wirtenberg, j. 2014. Building a culture for sustainability: people, planet, and profits in a new green economy, abc-clio.

Yafi, E., Tehseen, S., & Haider, S. A. (2021). Impact of green training on environmental performance through mediating role of competencies and motivation. *Sustainability*, *13*(10), 5624. https://doi.org/10.3390/su13105624

Yang, F., & Gao, L. (2021). Corporate environmental responsibility and employees' pro-environmental behaviors at work: Insights from organizational identification and workplace spirituality perspective. *Journal of Environmental Planning and Management*, *66*(2), 400-423. https://doi.org/10.1080/09640568.2021.1989673

Yeşiltaş, M., Gürlek, M., & Kenar, G. (2022). Organizational green culture and green employee behavior: Differences between green and non-green hotels. *Journal of Cleaner Production*, *343*, 131051. https://doi.org/10.1016/j.jclepro.2022.131051

Yusliza, M. Y., Amirudin, A., Rahadi, R. A., Nik Sarah Athirah, N. A., Ramayah, T., Muhammad, Z., Dal Mas, F., Massaro, M., Saputra, J., & Mokhlis, S. (2020). An investigation of pro-environmental behaviour and sustainable development in Malaysia. *Sustainability*, *12*(17), 7083. https://doi.org/10.3390/su12177083

Zafar, H., Ho, J. A., Cheah, J., & Mohamed, R. (2022). Promoting <scp>pro-environmental</scp> behavior through organizational identity and green organizational climate. *Asia Pacific Journal of Human Resources*, *61*(2), 483-506. https://doi.org/10.1111/1744-7941.12347

Zaki, N. A., & Norazman, I. (2019). The relationship between employee motivation towards green HRM mediates by green employee empowerment: A systematic review and conceptual analysis. *Journal of Research in Psychology*, *1*(2), 6-9. https://doi.org/10.31580/jrp.v1i2.946

Zhang, H., Omhand, K., Li, H., Ahmad, A., Samad, S., Gavrilut, D., & Badulescu, D. (2022). Corporate social responsibility and energy-related pro-environmental behaviour of employees in hospitality industry. *International Journal of Environmental Research and Public Health*, *19*(23), 16141. https://doi.org/10.3390/ijerph192316141

Zhao, M., Yao, L., Ma, R., Sarmad, M., Orangzab, -., Ayub, A., & Jun, Z. (2023). How green mindfulness and green shared vision interact to influence green creative behavior. *Psychology Research and Behavior Management*, *16*, 1707-1723. https://doi.org/10.2147/prbm.s405399

Appendix

Scale items

Environmental knowledge

1. I am familiar with the issue of environmental pollution caused by chemicals.
2. I possess a strong understanding of various environmental concerns.
3. I can personally observe the degradation of the environment.
4. I have knowledge on effective strategies to safeguard the environment against pollution.
5. I am well-informed about the concept of climate change.
6. I am knowledgeable about clean energy and methods to encourage its adoption.
7. I possess an understanding of the risks associated with landfill waste.
8. I am conscious of the consequences of unsustainable consumption.
9. I am knowledgeable about land degradation and methods to prevent it.

Pro-Environmental Behavior

1. I actively contribute suggestions and innovative ideas regarding environmentally friendly practices to environmental committees, aiming to enhance my organization's environmental performance.
2. I actively participate in environmentally friendly programs within my workplace.
3. I willingly share my knowledge about environmental matters with my colleagues.
4. I propose new practices that have the potential to improve my organization's environmental performance.
5. I critically question practices at work that may harm the environment.
6. Before taking actions that could impact the environment, I carefully consider their potential consequences.
7. I willingly engage in environmental tasks at work, even if they are not obligatory.
8. I consciously avoid wasting resources such as electricity or water in the workplace.
9. I opt to use stairs instead of elevators at work to conserve energy.
10. I ensure to turn off lights when leaving my office at work.
11. Whenever possible, I print documents double-sided.
12. I actively participate in recycling initiatives at work, including paper, cans, batteries, and oil.
13. I consistently perform my assigned duties in environmentally friendly ways.
14. I fulfill my job responsibilities specified in my job description with an environmental-friendly approach.
15. I carry out tasks expected of me at work while incorporating environmentally friendly practices.
16. Compared to my colleagues, I strive to minimize waste and actively participate in recycling efforts in the workplace.

Organizational Green Culture

1. At your organization, you disseminated information to all employees to ensure their understanding of the importance of Organizational Green Culture.
2. You made efforts to promote Organizational Green Culture as a primary objective across all departments.
3. Your organization had a well-defined policy statement emphasizing the integration of Organizational Green Culture into all operational areas.
4. Organizational Green Culture was given high priority in your organization's activities.
5. Organizational Green Culture was a core corporate value in your organization.
6. Your organization recognized its responsibility to uphold Organizational Green Culture.
7. Your organization worked diligently to cultivate an image of Organizational Green Culture (adapted from Lumpkin and Dess, 2001).

Green Intrinsic Motivation

1. The individual takes pleasure in generating new green ideas.
2. The individual finds enjoyment In problem-solving environmental tasks at work.
3. The individual embraces the challenge of tackling completely new environmental tasks.
4. The individual derives satisfaction from enhancing existing green ideas In their job role.
5. The individual experiences excitement when They come up with new green ideas.
6. The individual feels a strong desire to actively contribute to the development of green ideas.

Green Extrinsic Motivation

1. I am highly motivated by the recognition I can receive from my organization for my environmental tasks.
2. I frequently contemplate the rewards, salary, or promotion associated with my environmental tasks.
3. It is important to me that other acknowledge and recognize my true abilities In performing environmental tasks.
4. I have a need to receive tangible rewards or compensation for my environmental tasks.
5. I am concerned about how other will react to my environmental Ideas.

Green Learning & Motivation

1. Our organization develops training programs in environmental management to enhance employees' awareness, skills, and expertise in environmental matters.
2. We have integrated training initiatives that aim to emotionally engage employees in environmental management.
3. Our organization practices green knowledge management by liking environmental education and knowledge to behaviors, enabling the development of preventive solutions.