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Abstract

Purpose: This study observes the influence of environmental management accounting (EMA) and environmental knowledge management (KM) practices on environmental performance with mediating role of top management support. Moreover, green work climate perception (GWCP) is used as a moderator between top management support and environmental performance.

Design/Methodology/Approach: Partial Least Square Structural Equation Modeling (PLS-SEM) is used to test research hypotheses. Data was collected to distribute questionnaires in light of the purposive sampling technique; a total of 329 questionnaires were used for final analysis. This study is correlational and cross-sectional. Multiple regression analysis ~~is~~was used to see the influence of EMA, environmental KM practices, top management support, and GWCP on environmental performance.

Findings: The results reveal that EMA, environmental KM practices, and top management support are positively related to environmental performance. Moreover, top management support significantly mediates between EMA, environmental KM practices, and environmental performance. GWCP is positively associated with environmental performance. Finally, GWCP significantly strengthens the positive relationship between top management support and environmental performance.

Practical Implications: This study highlighted a significant issue ~~that~~of how top management uses EMA, environmental KM practices, top management support, and GWCP in examining environmental performance. Moreover, this study covers the gap and supports top management to concentrate on exogenous variables to examine environmental performance.

Originality/value: This study adds value to literature to focus on factors that influence environmental performance. This initial research observes the influence of EMA and environmental KM practices on environmental performance with top management support as a mediator in light of the KBV. Besides, GWCP is used as a moderator between top management support and environmental performance. Finally, our research can provide benefits to researchers, students, and managers.

Keywords: Environmental management accounting, environmental knowledge management practices, top management support, green work climate perception, environmental performance.

1. Introduction

Knowledge has importance in academicians' and practitioners' eyes. It is considered an important intangible resource for an organization's success (Ferraris et al., 2019a). Intangible assets are positively related to an organization's success (Sukumar et al., 2020). Literature postulated that knowledge is considered an important strategic asset for an organization's survival and continual existence (Barão et al., 2017). Nowadays, rapid changes occur in technology, and difficult for organizations to recognize and predict them (Singh et al., 2017). Moreover, knowledge management (KM) is deemed an important asset for organizations to continue in unstable environments (Rehman et al., 2021c). KM assists in creating fresh ideas and exploiting the firm's internal and external knowledge (Dezi et al., 2019). KM is a fundamental key driver to generating value and keeping organizations growing in the real world (Ferraris et al., 2019b). Environmental KM can effectively answer environmental issues (Huang & Shih, 2009). KM practices such as knowledge acquisition, knowledge sharing, and knowledge application are important to enhance corporate sustainable development (Abbas & Sağsan, 2019). Our research utilized environmental KM practices to determine EP. Environmental KM practices are measured through knowledge absorption, knowledge receptivity, and knowledge sharing.

Organizations focus on environmental sustainability because of public awareness, as they like environmentally friendly products (Rehman et al., 2021a). Several manufacturing organizations have inefficiencies in making products and services (Huseno, 2018), and usually, there is much wastage. The literature statesd that industrial waste begins from water, material, energy, and other materials usage, and due to this, organizations face loss (Sari et al., 2020).,- Tthus, organizations search for efficient systems and strategies that increase the firm's performance. EMA is considered a significant area of discussion because it assists management in recognizing and exploiting the needed information for environmental performance (Tashakor et al., 2019). The EMA is deemed an essential part of modern business as it allows the business to identify, evaluate, and assemble different kinds of information. Few of the researchers supported that intangible resources such as environmental management accounting (EMA) (Sari et al., 2020) and knowledge management (Ferraris et al., 2019b; Oliva et al., 2019) is crucial for firms success. Hence, this study attempts to see the influence of EMA and environmental KM practices on environmental performance.

Researchers observe the direct impact of EMA (Sari et al., 2020) and KM practices on a firm's performance (Santoro et al., 2019). Researchers ignore the mediating influence of top management support between EMA, environmental KM practices, and environmental performance. Hence, this study sees the mediating effect of top management support between EMA, environmental KM practices, and environmental performance. The knowledge-based view (KBV) postulated that knowledge-based resources (i.e., intangibles) are valuable for an organization's success or failure (Ooi, 2014). This study used several intangible resources such as EMA, environmental KM practices, top management support, and GWCP to determine environmental performance. EMA is positively related to environmental performance (Solovida & Latan, 2017). Moreover, environmental KM can effectively answer environmental issues (Huang & Shih, 2009). Environment-friendly firms are dependent on management commitment/support that enhances the firm's performance (Spencer et al., 2013). Organizational resources such as top management commitment are necessary for attaining world-class environmental performance (Latan et al., 2018). Finally, green work climate perception (GWCP) is used as a moderator between top management support and environmental performance.

Researchers paid less attention to determining environmental performance directly through GWCP (Rubel et al., 2021). Psychological green climate the individual's pro-environmental behavior impacts environmental performance (Dumont et al., 2017).

This study adds value to EMA, environmental KM practices, top management support, GWCP, and environmental performance literature. This study initially integrated EMA, environmental KM practices, top management support, GWCP, and environmental performance that prior had researchers overlooked (Rehman et al., 2021c; Sari et al., 2020; Wang et al., 2019). This research also examines the mediating role of top management support between EMA, environmental KM practices, and environmental performance. Finally, GWCP is used as a moderating variable between top management support and environmental performance. This study contributes by incorporating EMA, environmental KM practices, top management support, and GWCP to examine environmental performance using KBV. Moreover, the manufacturing industry of Pakistan can concentrate on EMA, environmental KM practices (i.e., absorption, receptivity, and sharing), top management support, and GWCP in its decision-making to enhance environmental performance. The fFollowing are the research objectives.

- To examine the association between EMA, environmental KM practices, top management support, and environmental performance.
- To examine whether top management support mediates between EMA, environmental KM practices, and environmental performance.
- To examine whether GWCP significantly moderates top management support and environmental performance.

Data was collected from the textile, chemicals, and automobile industries of Pakistan by using the purposive sampling technique. A total of 329 questionnaires were used for the final analysis. This study has several contributions and implications. For instance, the researchers paid less focus to ~~determine~~determining environmental performance through environmental KM practices, EMA, GWCP, and top management support using a knowledge-based view (Rehman et al., 2021c; Sari et al., 2020). Moreover, textiles, chemicals, and the automobile industry of Pakistan can concentrate on environmental KM practices, EMA, GWCP, and top management support in its decision-making to enhance environmental performance. R~~As r~~esearchers have confirmed that if management focuses on environmental issues, it can enhance environmental performance (Kraus et al., 2020; Rehman et al., 2021a).

This article is structured as follows. In Section 1, we present an introduction; Section 2 is about the literature review and hypotheses development; in Section 3, we present methodology: Section 4 is about regression model test; and Section 5 covers discussion, implications, conclusion, limitations, and future research.

2. Literature Review and Hypotheses Development

2.1 Knowledge-Based View (KBV)

This study draws on a research framework in light of KBV to investigate the relationship between EMA, environmental KM practices, top management support, GWCP, and environmental performance. The KBV of organizations develops and extends resource-based view theory with the emphasis on how organizations generate, acquire, protect, use, and transfer knowledge (Grant, 1996). From the KBV perspective, knowledge is deemed a significant organizational strategic resource (Kengatharan, 2019). The firm's ~~aimsto~~aims to make and apply the knowledge (Nonaka, 1994). K~~The k~~nowledge resources are difficult to copy and specifically

significant to ensure sustainable competitive advantage (Wiklund & Shepherd, 2003). The researchers supported this argument that knowledge resources are intangible and dynamic, difficult to imitate, and assist in attaining sustainable competitive advantage (Curado & Bontis, 2006). This study used several intangible resources such as EMA, environmental KM practices, top management support, and GWCP to determine environmental performance. Knowledge is considered an intangible resource and valuable for a firm's failure or success (Ooi, 2014). EMA is an intangible asset, leading to environmental performance (Latan et al., 2018). Top management support is the most important intangible resource ~~of~~for organizations in environmental practices (Ilyas et al., 2020). GWCP is an environmental resource that can ~~give~~ benefit organizations in solving environmental issues. Organizations cannot ignore environmental factors as they influence environmental performance (Kraus et al., 2020; Rehman et al., 2021a; Rehman et al., 2020). This study contributes to KBV by adding EMA, environmental KM practices, top management support, and GWCP to determine environmental performance.

2.2. Environmental Management Accounting

From a management accounting perspective, EMA is a combination of both cost and financial accounting and decreases environmental influence and risks, and minimizes cost regarding environmental protection that top management uses in decision-making to enhance performance. EMA is valuable ~~to monitor~~for monitoring ~~-~~ environmental costs and recording ~~-~~environmental performance (Burritt & Saka, 2006). Besides, EMA is considered an approach to revealing information that facilitates organizations to reach improved financial and environmental performance (Zhou et al., 2017). EMA can assist organizations ~~to~~in meeting environmental responsibility and direct recognition of the economic benefits of enhanced economic and environmental performance (Ferreira et al., 2010). Environmental accounting is rapidly gaining momentum in the search for sustainable companies (Christ & Burritt, 2015). EMA is deemed a valuable area of discussion because it supports management in recognizing and exploiting the required information for environmental performance. EMA is deemed the firm's internal management tool to deal with the firm's environmental burden and conventional practices (Qian et al., 2018). EMA is deemed a solution ~~for~~to financial and physical environment issues. Literature has confirmed that physical and financial information is valuable for efficient decision-making that improves environmental performance (Latan et al., 2018).

EMA implementation can reduce costs and energy, enhance production efficiency, and minimize waste (Schaltegger, 2018). The EMA implementation is quite low at the organizational level, and several organizations only integrate ~~the~~ minimal EMA into some projects (Doorasamy, 2015). EMA stresses the significance of environmental costs and supplies information on the material flows that assist ~~to~~in enhancing~~e~~ environmental and economic performance (Albelda, 2011). EMA significantly leads to better environmental performance (Asiaei et al., 2021; Erauskin-Tolosa et al., 2020). The researchers confirmed that EMA has a positive contribution to environmental performance disclosure (Nkundabanyanga et al., 2021). Moreover, researchers have identified that EMA significantly enhances environmental performance (Solovida & Latan, 2017). The KBV is used to observe the relationship between EMA and environmental performance. The f~~F~~ollowing is the proposed hypothesis:

H_1: EMA is positively related to environmental performance.

2.3. Environmental Knowledge Management Practices

In organizations, knowledge is considered a significant resource and increases the value of their assets (Rezaei et al., 2020). Moreover, researchers have stated that knowledge is a vital factor in the success of business creation (Jafari-Sadeghi et al., 2019). The practitioners and the academicians paid much focus to knowledge (Giampaoli et al., 2017). Few of the researchers stated that knowledge is useful in the success of organizations (Ferraris et al., 2019a; Rehman et al., 2021c; Rezaei et al., 2020). Knowledge management (KM) geots higher concentration from practitioners and researchers in all kinds of organizations because of organizational survival and prosperity (Migdadi, 2020). KM is a useful resource for the survival of firms in a complex environment (Abbas & Sağsan, 2019). Moreover, KM is a fundamental element in that value and keeps firms growing in the real world (Ferraris et al., 2019b). KM assists management in the creation of new ideas and exploitation of the organization's external and internal knowledge (Dezi et al., 2019). KM has been deemed a process through which firms make sure that their workers have the correct information in the correct format at the exact time (Ooi, 2014). Effective KM enables firms to collect, share, and utilize knowledge scientifically between parties and internal departments (Mahdiraji et al., 2021). The argument supported by Mokhtarzadeh et al. (2021) is that inter-organizational relationships are rapidly growing in organizations. Rapid changes occur in technology and are difficult for organizations to recognize and predict them (Singh et al., 2017). From a sustainability perspective, KM is mainly responsible to createfor creating and usinge knowledge resources sustainably by taking into account economic, social, and environmental performance (Lim et al., 2017).

This study used environmental KM practices that have dimensions such as absorption, sharing, and receptivity. Environmental KM refers to a system to connects data, analysis, and people that presents an opportunity to formalize industrial ecology in a business setting (Wernick, 2003). Moreover, environmental knowledge is a type of knowledge that consists of the concepts of ecological/environmental protection, natural environment, and ecosystems (Fryxell & Lo, 2003). Knowledge receptivity reflects the ease with which management works over a generation of new ideas internally (Wang et al., 2008). Knowledge absorption means the firm's capability to assimilate and apply knowledge for a competitive advantage (Torugsa & O'Donohue, 2016). KM and sharing can lead to competitive advantage if effectively implemented (Remondino & Bresciani, 2011). Besides, knowledge sharing refers to the activities involved in making knowledge accessible to others in an organization (Caimo & Lomi, 2015). Environmental KM can effectively answer environmental issues (Huang & Shih, 2009). KM practices such as knowledge acquisition, knowledge sharing, and knowledge application are important to enhance corporate sustainable development (Abbas & Sağsan, 2019). In contrast, KM has an insignificant relationship with a firm's performance (Wahda, 2017). Therefore, this association is not clear. Therefore, our research tries to observe the influence of environmental KM practices on EP. Nowadays, firms are expected to focus on their business environment (Kraus et al., 2020). Thus, this study concentrates on environmental KM practices to measure environmental performance. The fFollowing is the proposed hypothesis:

H_2: Environmental KM practices are positively related to environmental performance.

2.4. Top Management Support (TMS)

Top management support is a significant for firm's behaviors and practices (Lin, 2010). The literature statesd that top management support is deemed a significant internal force to conduct a particular behavior (Blass et al., 2014). Moreover, researchers have found that top management support is an intangible asset that can enhance an organization's success (Perez et al., 2007). Top

management committed to the environment will adopt an accounting system that offers information like material flow cost accounting (Christ & Burritt, 2015). The literature reveals that top management motivation enhances environmental sustainability when they know that it can increase environmental performance (Latan et al., 2018). Moreover, researchers reveal that environmental committees within firms reflects upon top management support for the environmental issues that lead to superior environmental performance (Dixon-Fowler et al., 2017). PThe prior researchers recognized that top management commitment and support play a valuable role to solvein solving environmental issues (Ilyas et al., 2020; Spencer et al., 2013). Top management support allows companies in instigatingto initiate and implementing green practices and environmental issues (Sarkis et al., 2010). The fFollowing is the proposed hypothesis:

H_3: Top management support is positively related to environmental performance.

2.5 Mediating role of Top Management Support

EMA aid in measuring, controlling, and disclosing the environmental performance of firms (Naranjo Tuesta et al., 2021). EMA can assist organizations to meetin meeting their environmental responsibility and direct recognize the economic benefits of improved environmental and economic performance (Ferreira et al., 2010). Moreover, EMA is imperative to monitor environmental costs and record environmental performance (Burritt & Saka, 2006). Environmentally friendly practices have a significant influence on environmental performance (Henri & Journeault, 2010). In contrast, researchers have found that EMA does not influence organizational performance (De Sales, 2019). The relationship is not clear. Our research used top management support as a mediator between EMA and environmental performance. As it plays a vital role in studies regarding firm behavior like EMA implementation (Phan et al., 2017) and modern accounting system adoption (Tung et al., 2014).

Recently, researchers have stated that knowledge is considered a significant and useful resource for the success of organizations (Rehman et al., 2021c). KM is a fundamental element to makecreating value and keeping firms growing in the real world (Ferraris et al., 2019b). Environmental KM can effectively respond the environmental issues (Huang & Shih, 2009). Moreover, researchers have confirmed that KM practices like application, sharing, and acquisition are vital to increasing organizational sustainable development (Abbas & Sağsan, 2019). In contrast, KM has an insignificant relationship with a firm's performance (Wahda, 2017). The relationship is not clear. Our study used top management support as a mediator between environmental KM practices and environmental performance. As top management commitment and support play a valuable role to solvinge environmental issues (Ilyas et al., 2020; Spencer et al., 2013). Proposed hypotheses:

H_4: Top management support significantly mediates between EMA and environmental performance.

H_5: Top management support significantly mediates between environmental KM practices and environmental performance.

2.6 Green Work Climate Perception (GWCP)

The firm's green initiatives create a GWCP that encourages worker's green behavior. Workers view that their co-workers are involved in environment-friendly activities; they also motivate and engage in sustainable workplace activities (Norton et al., 2015). Psychological green climate the individual's pro-environmental behavior impacts environmental performance (Dumont et al.,

2017). The KBV gives importance to intangible knowledge resources and these days customers divert their attention to environmentally friendly products. Hence, organizations cannot ignore the environment as it plays a crucial role in examining environmental performance (Kraus et al., 2020; Rehman et al., 2021a; Rehman et al., 2020). The GWCP can shape ~~the~~ workers views of firms behavioral norms related to environmental sustainability (Norton et al., 2014). GWCP can moderate between top management support and environmental performance. Figure 1 portrays the research model. Proposed hypotheses:

H_6: GWCP is positively related to EP.

H_7: GWCP significantly moderates top management support and environmental performance.

Insert Figure 1 Here

3. Methodology

3.1 Questionnaire Development

This article includes five constructs: EMA, KM practices, top management support, GWCP, and environmental performance. The variables items were adapted from prior studies. EMA six items from Wang et al. (2019). Top management support four items from Wang et al. (2019). Environmental KM practices ~~are~~were measured through knowledge absorption, three items, knowledge receptivity, five items, and knowledge sharing four items ~~from~~ Wang et al. (2008). Originally, the author worked on KM practices (Wang et al., 2008), and this study modified items environmentally. GWCP was measured through four items from Norton et al. (2014). Environmental performance was measured through five items from Laosirihongthong et al. (2013), one item was deleted because of factor loading below 0.50. ~~The~~ Pprior studies regarding the manufacturing sector measured their environmental performance using the same scale (Kraus et al., 2020; Rehman et al., 2021a). This study is cross-sectional and quantitative, and questionnaires are used to collect data. A total of 329 questionnaires were used for the final analysis and three software ~~are~~were used for analysis such as SPSS 25.0, SmartPLS 3.3.3, and WarpPLS 7.0.

3.2 Population and Sampling

The data was collected from textiles, chemicals, and the automobile industry that are situated in Pakistan. The population includes Lahore, Rawalpindi, and Faisalabad Chamber of Commerce & Industry organizations. The reason to choose the Chamber of Commerce & Industry is that in Punjab, Province of Pakistan, these Chambers have the majority of the organizations (Portal, 2022). The purposive sampling technique is used to collect data. The purposive sampling technique is suitable for researchers to access a particular subset of organizations or people (Sekaran & Bougie, 2016). Only those organizations selected that work over EMA and GWCP. To see the purpose of this study, middle and top-level managers were selected for data collection because they have full information regarding EMA, environmental KM practices, top management support, GWCP, and environmental performance.

~~Three~~There are various ranges regarding sample size (Comrey & Lee, 1992). For instance, a sample size below 50 is considered weaker, 51 to 100 is considered weak, 101 to 200 is deemed adequate, between 201 to 300 is good, a sample size of 500 is very good, and 1000 is considered excellent. A total of 1000 questionnaires were distributed, and only one questionnaire was for each organization. Several respondents ~~do~~did not respond because of less time. Out of 1000 questionnaires, 335 were returned, and only 329 questionnaires were finally used for

analysis. Table 1 reveals about study population. A total of 2049 organizations (textile, automobile, and chemicals) are in Lahore, Faisalabad, and the Rawalpindi Chamber of Commerce. This study collected data from the textile, chemicals, and automobile industries because the majority of the organizations in Lahore, Faisalabad, and Rawalpindi Chamber of Commerce are from textile, automobile, and chemicals. Table 2 shows the demographic profile of respondents. This study used SPSS 25.0 to compute percentages of demographic variables.

Insert Table 1 Here

Table 2 reveals most of the respondents were male, which equals 308 or 93.62%, and females were 21 or 6.38%. Hierarchically, junior managers were 94 or 28.6%, and senior managers were 235 or 71.4%. A total of 3 Chambers of Commerce & Industry (i.e., Lahore, Faisalabad, and Rawalpindi) are part of the population. Most of the organizations were from Lahore 185 or 56.23%~~,~~ Faisalabad 103 or 31.31%~~,~~ and Rawalpindi includes 41 or 12.46%. The majority of the organizations in the sample were textile 193 or 58.7%. Moreover, chemicals organizations were 95 or 28.9%, and automobiles 41 or 12.4%. From an education perspective, the majority of respondents have master's degrees, 197 or 59.9%. While respondents had~~ve~~ a bachelor's degree of 91 or 27.7%, M.Phil/MS 29 or 8.8%, the remaining was in other categories. From the firm's strength perspective, the majority of the organizations have employees between 351 to 700 and equal to 147 or 44.7%. Besides, organizations with employees less than 100 were 61 or 18.5%, employees 101 to 350 were 73 or 44.7%, and organizations with more than 700 were 48 or 14.6%. Various researchers used the five-Likert scale to measure constructs (Akram et al., 2022; Alnaimi et al.; Bhatti et al., 2020; Elrehail et al., 2021; Rehman et al., 2019c; Rehman et al., 2021b,f; Sun et al., 2022). This research also used a five-point Likert scale to measure constructs.

Insert Table 2 Here

3.3 Common Method Bias (CMB)

This study collected data from managers about exogenous and endogenous variables simultaneously over time through structured questionnaires. Therefore, there is a possibility that CMB issues occur and disturbed empirical data used in research (Rehman et al., 2021c; Rehman et al., 2021d; Rehman et al., 2021e; Rehman et al., 2021a). The CMB issue normally occurs in behavioral research. The literature statesd that the CMB recognizes a rigorous issue in ~~the~~ self-survey reports (Podsakoff & Organ, 1986). The researchers can reduce the impact of CMB by following procedural and statistical techniques. Procedurally, researchers assure respondents that their information will not leak without their consent and that their data is in safe hands. Moreover, researchers provoked the respondents to think that simple language was~~is~~ used in the questionnaire (Podsakoff et al., 2012).

Statistically, this study followed two methods for CMB. First, Herman's single factor followed, which explains 46.746% of the total variance below 50%, as shown in Table 3. Herman's single factor is computed through SPSS 25.0 as it cannot be computed through SmartPLS. Second, for CMB, there is a need to compute the full collinearity of variables. The literature statesd that if the value of full collinearity is less than 3.3, it identifies no CMB issues (Kock, 2015). Table 4 shows that there is no issue of full collinearity.

Insert Table 3 Here

3.4 Model Estimation

Our research used PLS-SEM analysis to measure the research framework. Several reasons are available to use PLS-SEM instead of CB-SEM. For instance, PLS-SEM is superior to regression in executing the estimations for assessing mediation (Preacher & Hayes, 2004). The researchers stated that PLS-SEM computes measurement errors and corrects for the mediation effect (Chin, 1998). Moreover, the PLS-SEM technique is more suitable for handling simple and complex frameworks (Rehman et al., 2021e). The PLS model outcome is deemed more suitable than the ordinary least square model in a situation where the sample size is smaller and some multicollinearity issues (Rehman et al., 2021c). Hence, our research used PLS-SEM because the sample size is not big. Five reflective variables were used to develop a research model, where ~~only~~ environmental KM practices have three dimensions. PLS-SEM includes measurement and structural models.

Table 4 highlights that the least factor loading is 0.564, and the upper factor loading is 0.921, more than 0.50 (Hair et al., 2014). Literature confirmed that internal consistency reliability could be measured through Cronbach's alpha and composite reliability (CR) (Chin, 2010). CR is more appropriate than Cronbach's alpha (Hair et al., 2014). Table 4 highlight~~sed~~ that Cronbach's alpha and CR of every latent variable (LV's) at first-order are higher than 0.70 and reveal no internal consistency problem. Convergent validity refers to observing construct items measure similar constructs (Rehman et al., 2019a). The average variance extracted (AVE) is used to measure convergent validity, and the AVE of all LVs should be at least 0.50 (Hair et al., 2014). Moreover, researchers must remove all the items with loading less than 0.50 to get better outcomes for~~of~~ CR and AVE (Bhatti & Rehman, 2020). Table 4 shows that there is no issue of convergent validity. WarpPLS 7.0 was used to compute full-collinearity. SmartPLS ~~has a limitation to~~cannot ~~-~~calculate full-collinearity and thus, we used WarpPLS to compute this (Rehman et al., 2021b, c). Table 4 shows there is no issue regarding full-collinearity. Figure 2 portrays the measurement model ~~at~~ in first-order.

Insert Table 4 Here
Insert Figure 2 Here

Discriminant validity means how every variable is different from other variables in terms of statistics (Rehman et al., 2019b). Formerly traditional metrics used to determine discriminant validity that were proposed by Fornell and Larcker (1981). After 36 years, Henseler et al. (2015) proposed a new way to measure discriminant validity called heterotrait-monotrait (HTMT). HTMT is deemed appropriate when factor loadings have smaller differences. HTMT is 0.85 for all LVs conceptually different and 0.90 for LVs conceptually similar. Table 5 shows that the discriminant validity criterion meets.

Insert Table 5 Here

Environmental KM practices are measured in the second-order, having dimensions such as knowledge absorption, knowledge receptivity, and knowledge sharing. A two-stage approach is used for environmental KM practices in WarpPLS. Second-order variable environmental KM practices and four first-order variables: EMA, top management support, GWCP, and environmental performance. The nature of the research framework is reflective-reflective. There is no issue with AVE, CR, and full-collinearity as mentioned above in the criterion. Moreover,

the discriminant validity criterion also fulfills the second-order. Table 7 shows that the HTMT of all LVs is below 0.85. Figure 3 portrays the measurement model ~~at~~in ~~the~~ second-order.

Insert Tables 6 and 7 Here
Insert Figure 3 Here

4. Regression Model Test

Our research has a total of seven hypotheses: four direct, two mediating, and one moderating. SmartPLS 3.3.3 was used for analysis and bootstrapping runs with the 5,000 subsamples. Figure 4 depicts the structural model. EMA is positively related to environmental performance (β=0.267, p=0.000, and t=4.580) and supported H_1. The outcomes are consistent with Nkundabanyanga et al. (2021) that EMA enhance environmental performance. Environmental KM practices are positively related to environmental performance (β=0.167, p=0.016, and t=2.497) and supported H_2. The findings are consistent with Abbas and Sağsan (2019) that KM practices significantly increase environmental performance. Top management support is significantly related to environmental performance (β=0.315, p=0.000, and t=5.153) and supported H_3. The outcomes are consistent with Perez et al. (2007) that top management support significantly increase environmental performance. Top management support significantly mediates the relationship between EMA (β=0.053, p=0.013, and t=2.564), environmental KM practices (β=0.207, p=0.000 and t=5.148), and environmental performance. Hence, H_4 and H_5 were accepted. GWCP is positively related to environmental performance (β=0.144, p=0.003, and t=3.103) and supported H_6. The results are consistent with Norton et al. (2014) that GWCP significantly improves environmental sustainability. Finally, GWCP significantly moderated top management support and environmental performance (β=0.090, p=0.019, and t=2.424) and supported H_7. Figure 5 portrays this association.

Insert Table 8 Here
Insert Figure 4 Here

F-square (f^2) demonstrates whether an exogenous variable impacts an endogenous variable (Rehman et al., 2020). The f^2 has several categories such as small (f^2=0.02), medium (f^2=0.15), and higher effect (f^2=0.35) recommended by Cohen (1988). Table 8 reveals that EMA, environmental KM practices, and GWCP have smaller effects on environmental performance. For the predictive power of the research model, R^2 and Q^2 were computed. The R^2 using SmartPLS and literature stated that the R^2 must be at least 10% (Falk & Miller, 1992). The R^2 was computed to examine the explanatory power of the research model (Khan et al., 2019). The predictive power of the research framework was observed through Q^2. Our research indicates that Q^2 ~~of~~ environmental performance is 0.320 and top management support is 0.269, greater than zero.

Insert Figure 5 Here

5. Discussion

This research intends to contribute to KBV theory by investigating the relationship between EMA, environmental KM practices, and environmental performance with the mediating role of top management support. Moreover, GWCP is used as a moderator between top management

support and environmental performance. This study builds a research framework and recommends efficiently utilizing EMA, environmental KM practices, top management support, and GWCP to enhance environmental performance.

EMA is positively related to environmental performance and supported H_1. The outcomes are similar to Nkundabanyanga et al. (2021) that EMA significantly increases the environmental performance of large and medium manufacturing firms in Uganda. In this study, EMA is a tool in managerial accounting to solve environmental issues. Our research recommends that organizations should consider EMA to enhance environmental performance. For example, top management should record all physical inputs and outputs like water, material, energy, and emissions, and wastes. Top management should recognize product improvement analysis, product inventory analysis, and product environmental impacts analysis. Moreover, an accounting system can recognize, estimate, and classify environmental-related costs and liabilities. Environmental KM practices are positively related to environmental performance and supported H_2. The outcomes are alikesimilar to Abbas and Sağsan (2019), who reveals that KM practices are positively related to environmental performance. Moreover, researchers have stated that environmental KM can efficiently solve environmental issues (Huang & Shih, 2009). Hence, if managers want to improve environmental performance, then environmental KM practices must be part of decision-making.

Top management support is positively related to environmental performance and supported H_3. Perez et al. (2007) found that top management support for environmental issues can enhance environmental performance. Literature has confirmed that top management support plays a valuable role to answerin answering environmental issues (Ilyas et al., 2020; Spencer et al., 2013). If the management focuses on environmental issues, then the environmental performance of organizations can be increased (Kraus et al., 2020; Rehman et al., 2021a). Top management support significantly mediates between EMA, environmental KM practices, and environmental performance, hence, supporting H_4 and H_5. Environment-friendly firms are dependent on top management support that attain competitive advantage (Spencer et al., 2013). Prior researchers overlooked to see the mediating influence of top management support between EMA, environmental KM practices, and environmental performance. Our study results align with KBV that knowledge-based resources such as EMA, environmental KM practices, top management support, and GWCP, lead to sustainable performance (Grant, 1996). GWCP is positively related to environmental performance and supported H_6. GWCP can shape the workers views of a firms behavioral norms related to environmental sustainability (Norton et al., 2014). The researchers paid less focus on GWCP to measure environmental performance (Rubel et al., 2021). Psychological green climate the individual's pro-environmental behavior impacts environmental performance (Dumont et al., 2017). Finally, GWCP significantly moderated top management support and environmental performance and supported H_7.

5.1 Theoretical Implications

The literature has rarely discussed the impact of EMA, environmental KM practices, top management support, and GWCP on environmental performance. Our study extends (Sari et al., 2020), revealing that EMA practices, directly and indirectly, affect product innovation on environmental performance in large Indonesian manufacturing companies. Thus, our research incorporates EMA, environmental KM practices, top management support, and GWCP to predict environmental performance using KBV. EMA and environmental KM practices have a significant influence on environmental performance in light of top management support.

Moreover, the results elucidate that GWCP assists textile, automobile, and chemical organizations to understand the full potential of top management support and lead to environmental performance. The prior researcher determineds corporate environmental performance through top management commitment (Latan et al., 2018); our research findings demonstrate that the relationship between top management support and environmental performance is contingent on GWCP. The manufacturing industry will not get maximum advantage from top management support until management focuses more on GWCP.

The researchers used the natural resource-based view (RBV) theory to test EMA and environmental performance (Latan et al., 2018; Solovida & Latan, 2017). Moreover, resource orchestration theory is used to determine environmental performance through EMA (Asiaei et al., 2021). Prior researchers paid less attention to seeing the relationship between EMA and environmental performance by using the KBV lens and see this relationship using contingency theory (Nkundabanyanga et al., 2021). Hence, this study fills this gap. Prior researchers used KM practices to measure competitive advantage (Rehman et al., 2021c). KM practices such as knowledge acquisition, knowledge sharing, and knowledge application are important to enhance environmental sustainability (Abbas & Sağsan, 2019) but less attention has been paid to see the influence of environmental KM practices on the environment using KBV. Thus, this study attempts to fill this gap by testing the relationship between environmental KM practices and environmental performance through KBV. Knowledge plays a crucial role in an organization's failure or success (Ooi, 2014).

Top management support is a mediating variable between EMA, environmental KM practices, and environmental performance in light of KBV. Even organizations have valuable assets like EMA and environmental KM practices but cannot be implemented without the support of top management. Prior researchers have suggested that the support of top management organizations can increase environmental performance (Kraus et al., 2020; Rehman et al., 2021a). Moreover, researchers reveal that environment-friendly organizations depend on top management support/commitment to attain competitive advantage (Spencer et al., 2013). Our research specifically adds top management support in KBV to determine environmental performance. Finally, GWCP is used as moderating variable between top management support and environmental performance by using KBV. Prior researchers ignored the KBV for this relationship (Dumont et al., 2017).

5.2 Practical Implications

Managerial perspective, our study plays a vital role in determining EP through EMA, environmental KM practices, top management support, and GWCP. If Pakistan's textile, chemicals, and automobile industries want to enhance EP, then focus on the accounting system to record all physical inputs and outputs like energy, wastes, water, emissions, material, and water. Besides, management must recognize product inventory analysis, product improvement analysis, and product environmental impact analysis. Moreover, an accounting system can estimate, recognize, and classify environmental-related costs and liabilities. Organizations should focus on environmental KM practices if their goal is to improve EP. For instance, the management gives importance to information technology to access a wide range of information and knowledge regarding market changes and competitors. Management can generate new ideas to share information and knowledge among employees. The upper management should accept merit and not see who comes up with a new idea. Managers must encourage a culture of knowledge-sharing as new ideas might givedo well for organization success. Top management

must appreciate a knowledge-sharing culture in which employees share information with superiors, subordinates, and even employees in different departments. There should be full support from the top management team to implement EMA. For EMA implementation, if resources are required, top management teams must provide those resources. Thus, with the support of top management, EP can be improved. Finally, management should concentrate on GWCP if they want to enhance EP. The organizations must be interested in environmental causes, and their aim should be to protect the environment. Moreover, management should be concerned about becoming more environmentally friendly. Researchers have confirmed that if management focuses on environmental issues, it can enhance environmental performance (Kraus et al., 2020; Rehman et al., 2021a).

5.3 Conclusion

This study considered the theoretical basise of EMA, environmental KM practices, top management support, GWCP, and environmental performance to build a research framework. After confirmation of the instruments reliability and validity, researchers tested the proposed hypotheses. The results demonstrate that EMA is positively related to environmental performance. Sari et al. (2020) found that the implementation of EMA increases organizational performance. Moreover, this study found that environmental KM practices significantly increase environmental performance. The findings supported by KBV that intangible resources, i.e., EMA and environmental KM practices, can determine environmental performance.

Top management support is significantly related to environmental performance. Perez et al. (2007) found that top management support increases environmental performance. Top management support significantly mediates between EMA, environmental KM practices, and environmental performance. The researchers confirmed that environmentally-friendly organizations depend on top management support that assists in examining a firm's performance (Spencer et al., 2013). GWCP has a direct influence on environmental performance. Prior researchers had overlooked this relationship (Rubel et al., 2021). Finally, GWCP significantly moderates top management support and environmental performance.

5.4 Limitations and Future Research

This study has several limitations. For instance, our research is cross-sectional and it is indecisive that environmental KM practices, EMA, top management support, and GWCP determine environmental performance in the long term. This research on top management supports a mediating construct between EMA, environmental KM practices, and environmental performance. Prior researchers have emphasized that institutional pressure can influence EMA (Wang et al., 2019). Hence, future researchers can see the influence of institutional pressure on environmental performance. From a theoretical perspective, our research focuses on EMA to determine environmental performance. In the future, researchers can use environmental management control system packages to determine sustainable performance. The management of Rawalpindi, Lahore, and Faisalabad, Pakistan organizations can follow EMA and the latest knowledge and information to enhance environmental performance. Future researchers can use green dynamic capabilities as mediating variables between EMA, environmental KM practices, and environmental performance. Tacit knowledge is the greatest asset of entrepreneurs and future researchers can use this and test this framework in SMEs (Mensah et al., 2021). Knowledge hiding is a significant factor for organizations, and future researchers can see this to determine organizational performance (Jafari-Sadeghi et al., 2022). The study is being conducted

in Pakistan and upcoming researchers can use this framework in other countries to see if there is any variation in results.

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Appendix

Green Work Climate Perception Norton et al. (2014)

1. Our organization is interested in supporting environmental causes.
2. Our organization believes it is important to protect the environment.
3. Our organization is concerned with becoming more environmentally friendly.
4. In our organization, employees pay attention to environmental issues.

Environmental Management Accounting Wang et al. (2019)

1. Our organization accounting system recording all physical inputs and outputs (such as energy, water, materials, wastes, and emissions).
2. Our organization accounting system can carry out product inventory analyses, product improvement analysis, and product environmental impacts analysis.
3. Our organization using environmental performance targets for physical inputs and outputs.
4. Our organization accounting system can identify, estimate, and classify environmental-related costs and liabilities.
5. Our organization accounting system can create and use of environmental-related cost accounts.
6. Our organization accounting system can allocate environmental-related costs to products.

Top Management Support Wang et al. (2019)

1. Top management team in our organization is committing to implement environmental management accounting and environmental KM practices.
2. The implementation of environmental management accounting and environmental KM practices can receive full support from our top management team.
3. Top management team can provide adequate resources to support the implementation of environmental management accounting and environmental KM practices.
4. Top management team consistently assesses the business impact on the environment by implementing environmental management accounting and environmental KM practices.

Environmental Knowledge Management Practices Wang et al. (2008)

Environmental Knowledge Absorption

1. We use information technology to access a wide range of external environmental information and knowledge on competitors and market changes, etc.
2. Through sharing environmental information and knowledge, we often come up with new ideas that can be used to improve our business.
3. We have networks of sharing environmental knowledge with other organizations on a regular basis.

Environmental Knowledge Receptivity

1. We hesitate to speak out our ecological ideas because new ideas tend to be highly criticized or ignored (reverse coded).
2. In our organization, we evaluate ideas based on their merits, no matter who comes up with the ideas.
3. In our organization, we evaluate new environmental ideas rapidly on a regular basis.
4. There is a general culture in our organization where people respect environmental knowledge and knowledge ownership

5. People who contribute new ideas are invited to participate in future development and implementation of this new idea.

Environmental Knowledge Sharing

1. We have systems and venues for people to share environmental knowledge and learn from each other in the company
2. We share environmental information and knowledge with our superiors.
3. We share environmental information and knowledge with our subordinates
4. We often share ideas with other people of similar interest, even if they are based in different departments

Environmental Performance Laosirihongthong et al. (2013)

1. Our organization improved compliance with environmental standards.
2. Our organization reduces air emissions.
3. Our organization reduces energy consumption.
4. Our organization reduces material usage.
5. Our organization reduces consumption of hazardous materials.

Table 1 Population of Textile, Chemicals, and Automobile Companies

Chamber of Commerce	Companies			Total
	Textile	Chemicals	Automobile	
Lahore	982	225	347	1554
Rawalpindi	36	48	16	100
Faisalabad	297	31	67	395
Total	**1315**	**304**	**430**	**2049**

Table 2 Demographic Profile of Respondents

Demographics	Frequency	Percentage
Gender		
Male	308	93.62
Female	21	6.38
Hierarchy Level		
Junior Manager	94	28.6
Senior Manager	235	71.4
Chamber of Commerce		
Lahore	185	56.23
Faisalabad	103	31.31
Rawalpindi	41	12.46
Firm Type		
Textile	193	58.7
Chemicals	95	28.9
Automobile	41	12.4
Education Level		
Bachelors	91	27.7
Masters	197	59.9
M.Phil/MS	29	8.8
Others	12	3.6
Firms Strength		
Less than 100 employees	61	18.5
101 to 350 employees	73	22.2
351 to 700 employees	147	44.7
More than 700 employees	48	14.6

Table 3 Common Method Variance

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cum %	Total	% of Variance	Cum %
1	3.272	46.746	46.746	3.272	46.746	46.746
2	1.094	15.629	62.375	1.094	15.629	62.375
3	.794	11.349	73.724	.794	11.349	73.724
4	.714	10.206	83.930	.714	10.206	83.930
5	.486	6.948	90.878	.486	6.948	90.878
6	.403	5.758	96.636	.403	5.758	96.636
7	.235	3.364	100.000	.235	3.364	100.000

Table 4 Convergent Validity (first-order)

Constructs	Items	Factor Loading	AVE	CR	R^2	α	Full collinearity
Environmental Management Accounting	EMA1	0.839	0.629	0.910		0.879	1.411
	EMA2	0.865					
	EMA3	0.788					
	EMA4	0.798					
	EMA5	0.830					
	EMA6	0.619					
Knowledge Absorption	KAB1	0.864	0.720	0.885		0.805	1.284
	KAB2	0.871					
	KAB3	0.809					
Knowledge Receptivity	KR1	0.839	0.679	0.913		0.882	2.605
	KR2	0.886					
	KR3	0.873					
	KR4	0.723					
	KR5	0.783					
Knowledge Sharing	KS1	0.849	0.732	0.916		0.875	2.008
	KS2	0.921					
	KS3	0.892					
	KS4	0.750					
Top Management Support	TMS1	0.834	0.552	0.828		0.720	2.127
	TMS2	0.862					
	TMS3	0.564					
	TMS4	0.672					
Green Work Climate Perception	GWCP1	0.841	0.683	0.896		0.845	1.159
	GWCP2	0.858					
	GWCP3	0.865					
	GWCP4	0.736					
Environmental Performance	EP1	0.818	0.729	0.915	0.465	0.876	1.784
	EP2	0.887					
	EP3	0.866					
	EP4	0.842					

Table 5 Discriminant Validity (HTMT) for first-order

Variables	EMA	EP	GWCP	KAB	KR	KS	TMS
Environmental Management Accounting							
Environmental Performance	0.550						
Green Work Climate Perception	0.256	0.371					
Knowledge Absorption	0.241	0.491	0.333				
Knowledge Receptivity	0.452	0.479	0.227	0.371			
Knowledge Sharing	0.310	0.461	0.124	0.320	0.784		
Top Management Support	0.497	0.690	0.327	0.496	0.839	0.676	

Table 6 Convergent Validity (second-order)

First-Order	Second-Order	Items	Factor Loading	AVE	CR	Full collinearity
	Knowledge Management Practices	Knowledge Absorption	0.608	0.628	0.832	2.001
		Knowledge Receptivity	0.888			
		Knowledge Sharing	0.852			
Environmental Management Accounting		EMA1	0.839	0.629	0.910	1.362
		EMA2	0.865			
		EMA3	0.788			
		EMA4	0.798			
		EMA5	0.830			
		EMA6	0.619			
Top Management Support		TMS1	0.834	0.552	0.828	2.036
		TMS2	0.862			
		TMS3	0.564			
		TMS4	0.672			
Green Work Climate Perception		GWCP1	0.841	0.683	0.896	1.124
		GWCP2	0.858			
		GWCP3	0.865			
		GWCP4	0.736			
Environmental Performance		EP1	0.818	0.729	0.915	1.708
		EP2	0.887			
		EP3	0.866			
		EP4	0.842			

Table 7 Heterotrait-monotrait Ratio (HTMT) for second-order

Variables	EMA	EP	GWCP	KMP	TMS
Environmental Management Accounting					
Environmental Performance	0.550				
Green Work Climate Perception	0.256	0.371			
Knowledge Management Practices	0.480	0.682	0.321		
Top Management Support	0.497	0.690	0.327	0.839	

Table 8 Hypotheses Testing

Hypotheses	Paths	β Value	T-values	P-values	BCI LL	BCI UL	f^2	Remarks
H_1	EMA-->EP	0.267	4.580	0.000	0.161	0.347	0.104	Yes
H_2	KMP-->EP	0.167	2.497	0.016	0.062	0.279	0.026	Yes
H_3	TMS-->EP	0.315	5.153	0.000	0.225	0.425	0.089	Yes
H_4	EMA-->TMS-->EP	0.053	2.564	0.013	0.020	0.088	---	Yes
H_5	KMP-->TMS-->EP	0.207	5.148	0.000	0.147	0.271	---	Yes
H_6	GWCP-->EP	0.144	3.103	0.003	0.078	0.230	0.034	Yes
H_7	TMS*GWCP-->EP	0.090	2.424	0.019	0.019	0.155	---	Yes

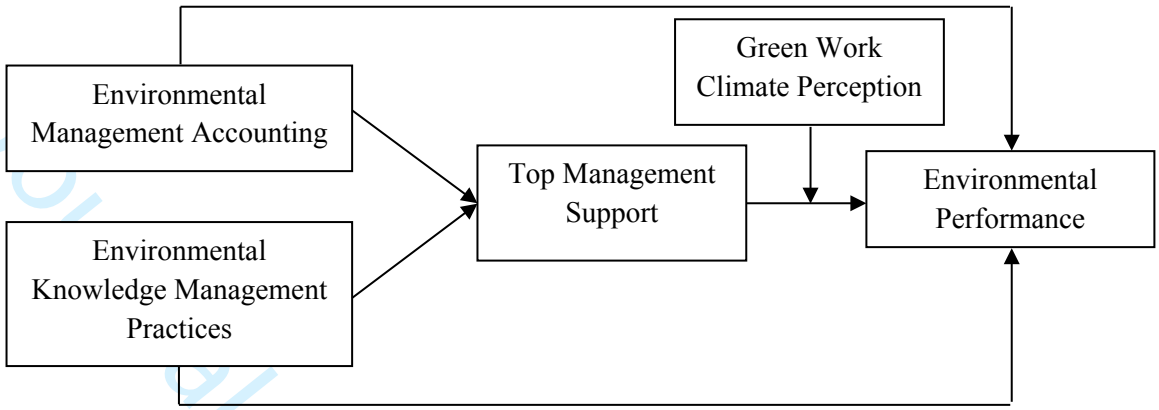

Figure 1 Research Model

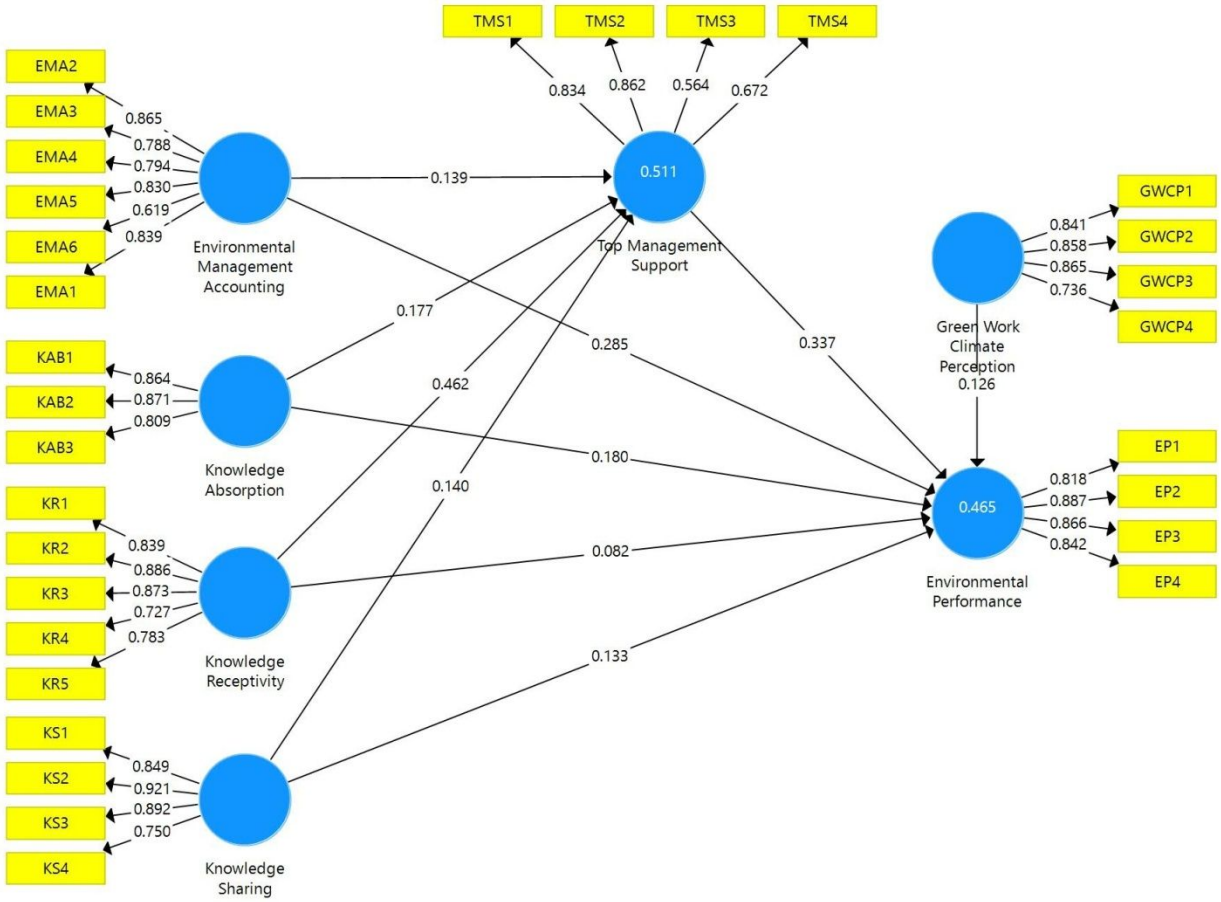

Figure 2 Measurement Model (First-order)

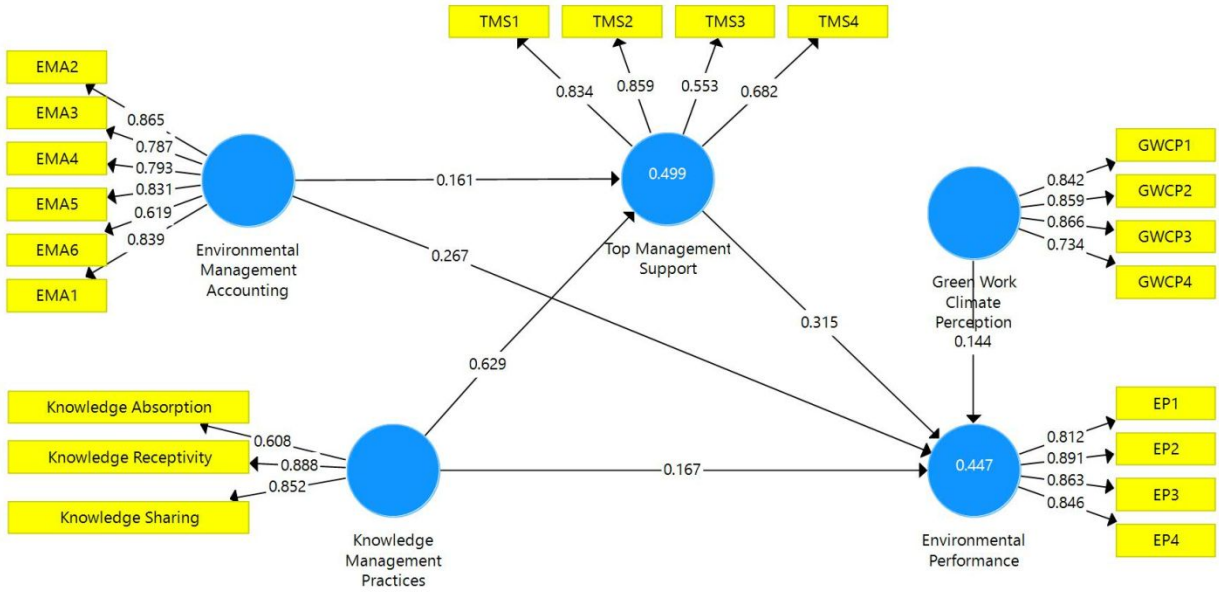

Figure 3 Measurement Model (Second-order)

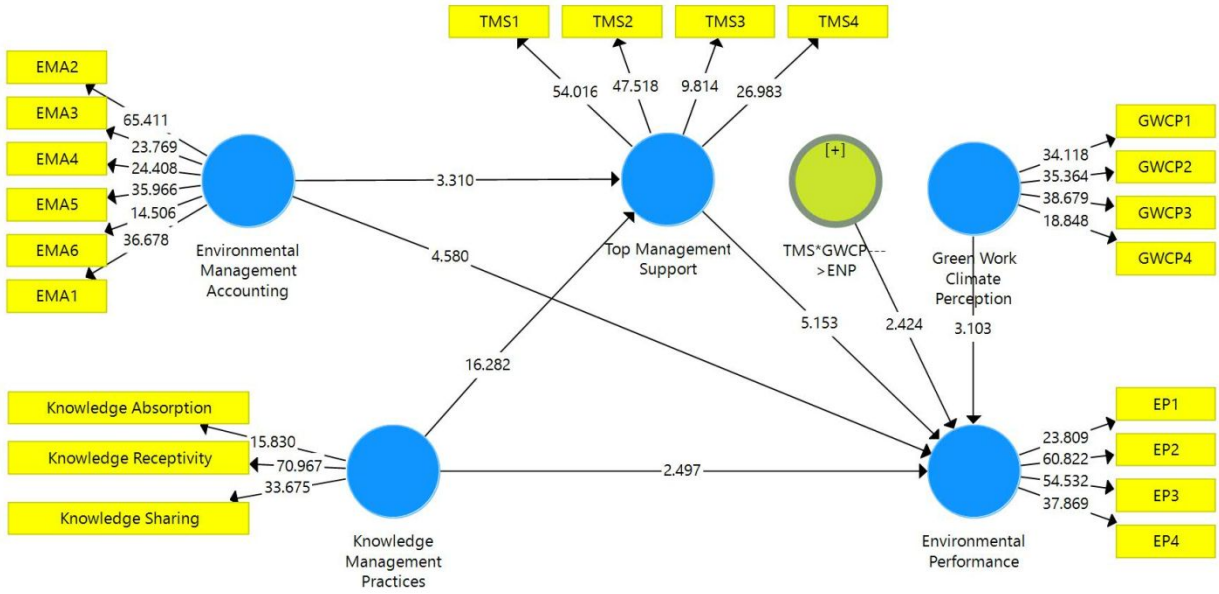

Figure 4 Structural Model

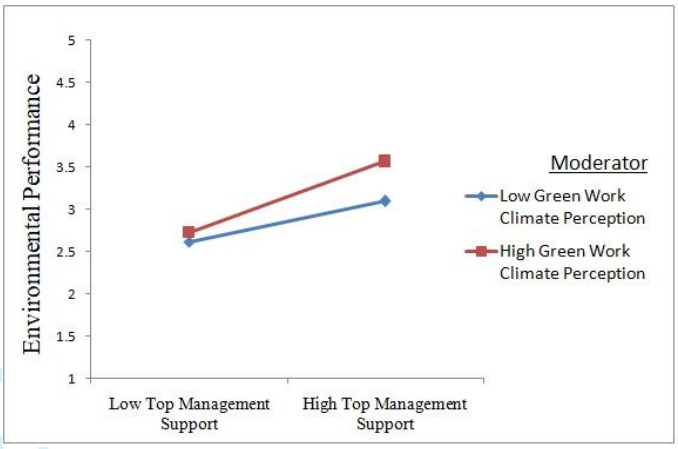

Figure 5 GWCP moderating effect between top management support and EP