Indus Journal of Social Sciences

Online ISSN:2960-219X
Print ISSN:2960-2203
Volume 3, Number1, 2025, Pages 01 – 22
Journal Home Page
https://induspublishers.com/IJSS/about

Unpacking the Mediation of Innovation, Environmental Accounting, and Strategy on the Green Culture-Environmental Performance Relationship, Moderated by Managerial Environmental Knowledge

Samreen Zahir[1], Fahad Zain[2], Muhammad Aslam[3]&Sharjeel Ahmad Shaheer[4]

[1]*Department of Commerce, Bahauddin Zakariya University, Multan, Punjab, Pakistan, Email: samreenzahir30@gmail.com*
[2]*Department of Business Administration, Ghazi University, Dera Ghazi Khan, Punjab, Pakistan. Email: fahadzain90@gmail.com*
[3]*Department of Business Administration, Ghazi University, Dera Ghazi Khan, Punjab, Pakistan. Email: aslammajeed01@gmail.com*
[4]*Department of Business Administration, Ghazi University, Dera Ghazi Khan, Punjab, Pakistan. Email: sheeel420@gmail.com*

ARTICLE INFO

Article History:

Received:	*December*	*24, 2024*
Revised:	*January*	*06, 2025*
Accepted:	*January*	*07, 2025*
Available Online:	*January*	*08, 2025*

Keywords:

Green Organizational Culture, Green Innovation, Environmental Management Accounting, Environmental Strategy, Managerial Environmental Knowledge, Environmental Performance.

Corresponding Author:
Fahad Zain
Email:
fahadzain90@gmail.com

ABSTRACT

The Industrial Revolution is the primary cause of climate change and environmental degradation. Businesses progressively prioritize sustainability and competitiveness by minimizing expenses and attaining sustainable development. This study examines the influence of green organizational culture (GOC) on environmental performance (EP), mediated by green innovation (GI), environmental management accounting (EMA), and environmental strategy (ES). It also investigates the neglected moderating influence of managerial environmental knowledge (MEK) on the relationship between green organizational culture (GOC) and environmental performance (EP). This study utilized a quantitative research methodology to evaluate the theoretical model empirically. Data were gathered from 215 managers in Pakistani manufacturing businesses and analyzed utilizing SmartPLS-3. The results indicate that GOC is a significant predictor of EP. GI, EMA, and ES substantially mediate the relationships between GOC and EP. Nonetheless, MEK substantially moderates the relationship between GOC and EP. These empirical findings enhance the Natural Resource-Based View (NRBV) theory literature and provide concrete suggestions for improving environmental performance, thus promoting sustainable objectives, especially concerning environmental issues.

Introduction

Environmental Performance (EP) is a growing concern for various global stakeholders, including governments, corporations, legislators, and consumers, due to the perceived threat of climate change to the environment. Consequently, it is imperative to implement measures for climate change mitigation, such as decreasing greenhouse gas emissions. “Environmental Performance” denotes the ecological consequences of organizational activities. Firms can improve their environmental performance by integrating recycled materials into their products, employing clean production techniques, and adopting sustainable administrative and operational practices. This results in a decrease in environmentally detrimental emissions and waste materials (Solovida & Latan, 2017; Shah & Soomro, 2021; Wang et al., 2021). Studies demonstrate that when a corporation integrates environmental values into its culture, it can attain superior success and surpass its rivals. Such values provide intangible advantages, granting these organizations a competitive edge by efficiently utilizing environmentally sustainable resources and practices (Aslam et al., 2024; Gürlek & Tuna, 2018; Leal-Rodríguez et al., 2018). Consequently, cultivating a sustainable organizational culture is essential for EP. Since consumers and businesses all over the world are becoming more concerned about societal and environmental issues, there has been an increase in the number of environmentally friendly products (Tahir et al., 2024a; Shaheer et al., 2024a; Jabeen et al., 2023; Zain et al., 2023a). Previous investigations have brought attention to this concern (Tahir et al., 2024b; Jabeen 2024a; Zain et al., 2023b). According to Danyal et al. (2024), businesses strive to create new and loyal customers by providing superior products and services. As a result, businesses are concerned about society and the environment in order to achieve a competitive advantage (Aslam et al., 2024) and to improve their reputation (Zain et al., 2024; Fida et al., 2023) because all of these factors affect the buying behaviour (Jabeen et al., 2024b; Shaheer et al., 2024b) of customers.

Notably, there are presently only a limited number of published studies on green organizational culture (GOC) despite its significance as a research topic in the corporate sector. The definition of the term GOC is somewhat ambiguous. The GOC concept (Gürlek & Tuna, 2018) can be readily adapted and derived from prior organizational culture literature. Schein (1992) posits that organizational culture comprises a collective set of values, beliefs, attitudes, and cognitive assumptions that guide members in determining the appropriateness of their actions and behaviors in diverse contexts. The principles, tenets, and convictions that guide an organization's conduct and operations regarding environmental issues are termed GOC concerning the natural environment (Imran, Arshad, & Ismail, 2021; Imran & Jingzu, 2022).

Environmental Management Accounting (EMA) solutions provide enterprises with an advantageous approach to informing decision-making by highlighting the integration of stakeholders into environmental efficacy (Saeidi et al., 2018; Christine et al., 2019). Moreover, innovation guarantees enhanced long-term organizational performance and, through green innovation (GI), fosters environmental responsibility by adhering to eco-friendly practices (Imran & Jingzu, 2022; Aftab et al., 2023; Khan et al., 2024; Ma et al., 2022; Rauf et al., 2024). Modern researchers and industrial practitioners focus on developing suitable environmental strategies (ES) to attain organizational environmental objectives, incorporating advanced preventive measures and eco-efficient practices (Latan et al., 2018; Kraus, Rehman, & García, 2020). Fousteris et al. (2018) indicate that environmental sustainability (ES) is positively correlated with a firm's financial performance, while a proactive environmental strategy is deemed a crucial factor in evaluating organizations' environmental performance (Solovida & Latan, 2017; Shah & Soomro, 2021). This study examines the interplay of factors such as GOC, GI, EMA, and ES in attaining enhanced EP.

Previous research has established that a green organizational culture positively and significantly correlates with environmental performance (Aslam et al., 2024; García-Machado & Martínez-Ávila, 2019). Limited studies have shown that the integration of GOC within companies markedly enhances their organizational performance (Jabeen et al., 2024a; Wang, 2019). Researchers persist in examining this issue despite numerous studies identifying a correlation between GOC and organizational success, owing to the scarcity of conclusive data. The research revealed no relation between an organization's GOC and environmental performance (Imran & Jingzu, 2022). Furthermore, numerous researchers have proposed the incorporation of moderators or mediators between GOC and performance despite the conclusions of previous studies (Tahir et al., 2019; Imran & Jingzu, 2022). Moreover, research has demonstrated the significance of green innovation for sustained success (Küçükoğlu & Pınar, 2016; Imran et al., 2021). The researchers inadequately addressed green innovation in their evaluation of EP (Imran et al., 2021), highlighting a significant gap in the literature.

Research on the interaction of EMA with EP and FP in South Asian firms is scarce (Deb, Rahman, & Rahman, 2022). Numerous studies have established a connection between EMA and EP; however, all have focused exclusively on developed countries (Liu, Wang, & Li, 2018; Alaeddin, 2019; Christine, 2019; Mayndarto & Murwaningsari, 2021). Moreover, as Niu et al. (2017) and Ong et al. (2019) indicate, the correlation between EP and FP requires validation. Deb et al. (2022) have advocated for further research by future scholars to elucidate the mediating and moderating relationships between EMA and EP (Amir, Malik, & Ali, 2024; Malik et al., 2024). Notwithstanding the significance of environmental strategy (ES) identified by prior researchers, there has been minimal investigation into assessing environmental performance through the lens of environmental strategy. This study aims to address these knowledge gaps by examining the direct and indirect impacts of GOC on the environmental performance of manufacturing businesses in Pakistan. The research explicitly examines the mediating roles of GI, EMA, and ES in the association between GOC and EP.

Managerial Environmental Knowledge (MEK) denotes the comprehension and awareness of environmental issues, concepts, and practices possessed by organizational executives and leaders (Cordano & Frieze, 2000; Sharma & Nguan, 1999). MEK includes expertise in environmental regulations, sustainable practices, and the ecological consequences of organizational activities. MEK is instrumental in formulating business environmental policies and practices. Managers exhibiting elevated levels of MEK are more inclined to adopt environmentally sustainable practices, formulate sustainable business strategies, and enhance environmental performance (Cordano & Frieze, 2000; Ramus & Steger, 2000). MEKs are increasingly essential for companies, influencing customer satisfaction, demand, credibility, and trust in manufacturing firms to achieve competitiveness (Wu et al., 2022; Jabeen et al., 2023; Shaheer et al., 2024a). Research indicates that the relationship between MEK and firm performance may be intricate (Liu et al., 2020). Furthermore, most pertinent studies assert that MEK improves firms' economic performance (Nureen et al., 2023). Limited research has investigated how companies transform their MEK into an edge over the competition and identify the critical resources necessary for enhancing firm performance. Intangible resources are often regarded as more vital than tangible assets (Shoaib et al., 2021). A previous study utilized MEK as a moderator among GI and the performance of the firm (Nureen et al., 2023). We are utilizing MEK as a mediator between the GOC and EP links.

This study offers innovative insights and knowledge on an essential topic for improving corporate performance, thereby significantly enhancing our practical and theoretical comprehension through its research findings. The study offers a novel perspective utilizing rigorous statistical analyses on

GOC, GI, EMA, ES, MEK, and EP. Thus, the hypotheses are crucial in elucidating the connection between GOC and EP via their direct and indirect connections with mediators like GI, EMA, ES, and MEK, thereby establishing the underlying mechanisms at play. This study expands the NRBV by investigating the relationship between GOC and EP, specifically in Pakistan's manufacturing industry. The study's results are significant for industrial policymakers, academics, managers, and practitioners. The objective is to offer direction to manufacturing enterprises of all sizes on cultivating a thriving green organizational culture and its impact on Environmental Sustainability (ES), Green Innovation (GI), and Environmental Management Accounting (EMA) on Environmental Performance (EP), as modern general managers and policymakers emphasize the improvement of environmental performance in light of growing environmental issues. The results are particularly advantageous for the manufacturing sector and other industries in developing economies to implement effective environmental strategies to minimize pollution, waste, and air emissions while conserving water and energy, concurrently focusing on innovation and adopting EMA tools that improve environmental performance.

Literature Review and Hypotheses Development

The following sections will elaborate on the NRBV theory, which is the theoretical foundation for this research, and present the hypotheses formulated from a comprehensive literature review.

Underpinning theory

This research employs the NRBV to achieve the research objectives, which expands the RBV theory. Organizational competencies and resources are essential for attaining an edge over others (Barney, 1991; Barney et al., 2001). Furthermore, NRBV theory is an augmented iteration of the original concept, asserting that enterprises can attain a sustainable competitive advantage by tackling issues associated with the natural environment. Hart (1995) asserts that the RBV theory omits several elements. The connection between the business's natural setting and the organization is omitted. This absence was previously justifiable, yet it is evident that the environment contributes to achieving a competitive advantage. Resources from nature and technological innovations enhance profitability through pollution mitigation. They recognized that organizational capabilities and strategies enhance sustainable performance (Hart & Dowell, 2011). Numerous recent studies have employed NRBV theory (Tahir et al., 2024a; Jabeen et al., 2024a; Aslam et al., 2024; Zain et al., 2023a; Zain et al., 2023b; Zain et al., 2024). This theory evaluates and quantifies firms' environmental performance by concentrating on GOC, GI, EMA, ES and MEK. According to NRBV theory, we anticipate that GOC significantly influences EP by mediating GI, EMA, and ES, with MEK as a moderating factor.

Green Organizational Culture

From a theoretical standpoint, organizational culture is regarded as an intangible resource instrumental in advancing an organization toward improved environmental management and sustainable development (Yang et al., 2017). Consequently, organizational culture plays a critical role in companies' implementing green innovation practices committed to the global trend of more responsible, environmentally friendly conduct. This is becoming more prevalent in organizations dedicated to advancing sustainable growth (Aslam et al., 2024). Green culture is a contemporary environmental ideology that advocates for economically sustainable and ecological development, drawing on aesthetics, politics, and science (García-Machado & Martínez-Ávila, 2019). Prior research has verified that environmental performance is positively and significantly associated with green organizational culture (Aslam et al., 2024; García-Machado & Martínez-Ávila, 2019).

Green organizational culture underscores an organization's unwavering dedication to addressing environmental challenges, irrespective of the situation's complexity. Various terms are employed to identify green organizational cultures, including environmentally friendly culture, sustainability culture, green awareness, and environmentally conscious culture (Imran et al., 2021; Imran & Jingzu, 2022). An organization's employees are deemed to have a "green" culture whenever their actions and thoughts surpass purely economic considerations, as per Roscoe et al. (2019). Instead, they concentrate on minimizing negative environmental consequences and maximizing the organization's beneficial effects (Ali et al., 2023). This could result in effective EMA, effective enforcing efficient environmental initiatives, and improving the performance of firms in innovative ways (Zandi & Lee, 2019; Aftab et al., 2023). This substantiates the notion that manufacturing organizations prioritizing environmental sustainability are motivated and motivated to implement these ethical business practices. Consequently, green culture has been demonstrated to impact the behavior of organizational members by its objectives and stance, thereby enhancing environmental sustainability (Chang & Lin, 2015). Consequently, we deduce our predictions as follows: GOC can substantially impact EP, GI, and ES based on these findings.

H1: Green organizational culture significantly impacts EP.

H2: Green organizational culture significantly impacts EMA.

H3: Green organizational culture significantly impacts environmental strategy.

H4: Green organizational culture significantly impacts green innovation.

Green Innovation

The two methods by which "green innovation" is defined are green process and green product innovations, as per Ferreira et al. (2010). The competitive edge of manufacturing firms is positively correlated with developing environmentally friendly goods and production methods, as per Saeidi et al. (2018). Core competencies refer to an organization's capacity to develop environmentally friendly goods and procedures through innovation. Core competencies were subsequently introduced by Somjai (2020), who proved that the number of green innovation projects that a firm undertakes is correlated with its green core competencies. Green innovation improves the overall performance of a company by increasing its competitive edge and green reputation (Saeidi et al., 2018). Several instances of how green innovation can be implemented include the development of goods, processes, technologies, and practices that influence energy efficiency. Consequently, green innovation has developed into a strategic tool for fostering environmental preservation and achieving sustainable growth in industries like manufacturing (Fernando & Wah, 2017). Studies have demonstrated a direct and indirect, yet substantial, correlation between GI and the firm's performance (Kraus et al., 2020; Imran et al., 2021; Imran & Jingzu, 2022). Based on this, the subsequent hypothesis is put forth:

H5: Green Innovation is significantly impacting environmental performance.

Environment Management Accounting

Deb et al. (2022) define EMA as developing and implementing suitable reporting on sustainability systems and procedures. EMA distinguishes itself from other conventional accounting methods by considering environmental concerns while analyzing data on the environment in the accounts, monitoring ecological metrics to avoid resource and wasteful use of energy, and evaluating information related to the environment. EMA implementation can enhance the company's image

for environmental care and reduce the expense of environmental regulation, as per Solovida and Latan (2017). EMA concentrates on environmental data that influences the environment, enhances the sustainability performance of an enterprise, and facilitates the development of innovative solutions (Deb et al., 2022). In previous research, researchers have investigated the correlation between EMA and various factors, including cost advantage (Christine, 2019), corporate social responsibility (CSR) (Hadj, 2020; Ingrao et al., 2018), environmental strategy, institutional pressures, and performance (Omran et al., 2021), financial performance (Huang & Li, 2017), and environmental performance (Mansoor et al., 2021). They have discovered positive associations. Firms can enhance their financial and environmental performance by reducing expenses through the implementation of EMA, as per Deb et al. (2022) and Latan et al. (2018). Studies conducted by Phan et al. (2018) and Zandi and Lee (2019) yielded comparable results regarding environmental performance and EMA. Therefore, we deduce that EMA is actively involved in environmental performance, and the subsequent hypothesis is formulated:

H6: EMA is significantly impacting environmental performance.

Environmental Strategy

According to Albino et al. (2009), "environmental strategy" refers to the organizational plan and its implementation to reduce production and operations' environmental impact. These strategies are accomplished through programs, policies, and procedures that enhance product development and innovation. Using environmentally friendly organizational resources, such as renewable energy sources and efficient energy management, is another way ES contributes to reducing energy usage and wasted products, which ultimately increases the company's profits (Aftab et al., 2023). It can be deduced from this that organizations have been compelled to develop and implement effective environmental systems due to growing environmental concerns and external forces. The findings of Rodrigue et al. (2013) indicate that businesses that adhere to stringent environmental standards typically have better environmental performance. As an additional point of interest, research conducted by Solovida and Latan (2017) demonstrates that companies that develop and implement efficient environmental standards typically outperform their competitors in accomplishing environmental objectives. According to Kraus et al.'s 2020 research, environmental sustainability (ES) ensures that environmental programs are carried out to achieve sustainability by incorporating ecological considerations into the operational plans of an organization. Studies have shown that environmental sustainability significantly influences environmental performance (Latan et al., 2018; Christine et al., 2019; Kraus et al., 2020). As a result, we contribute to the following hypothesis by utilizing these findings:

H7: Environmental Strategy impact environmental performance.

Mediation of Green Innovation

Establishing clear goals, identifying pertinent personal qualities among staff members, and displaying artifacts in line with the aims of the company for environmentally friendly operations are some of the things that scholars argue are necessary in order to develop a green organizational culture (Tahir et al., 2019; Imran & Jingzu, 2022). According to Scholz and Voracek (2016), businesses have the potential to significantly improve their environmental sustainability by fostering a green organizational culture inside their organizations. In addition, this highlights the significance of cultivating an all-encompassing culture in developing innovative practices. If the objective is to promote environmentally friendly innovation on a more extensive scale, organizations ought to make it their mission to infuse their green values into every facet of their

operations. This will increase productivity and improve environmental protection in 2022, Imran and Jingzu. Therefore, for businesses to get and keep a competitive advantage by achieving higher environmental performance, they need to cultivate a green culture to be able to take part in green innovation efforts effectively. There are additional studies that agree with the findings that have been presented (Küçükoğlu & Pınar, 2016; Gürlek & Tuna, 2018; Imran et al., 2021). Because this conversation has taken place, we can propose that GI has the potential to act as a mediator between GOC and EP, and we propose the following hypothesis:

H8a: Green Innovation has a significant mediating the effect between Green organizational culture and environmental performance.

Mediation of Environmental Management Accounting

EMA and EP are not entirely clear; additional variables, such as environmentally friendly innovation, could be included in order to provide comprehensive results (Huang & Li, 2017; Hadj, 2020). A study by Latan et al. (2018) found that environmental management application (EMA) tools help businesses improve their environmental choices by providing essential environmental information. In transforming raw materials, labor, and other resources into finished goods, for example, several actions have the potential to negatively impact the environment (Phan et al., 2018). However, as a result of EMA, managers can have a better understanding of the activities and procedures that are utilized in the production of outputs.

Furthermore, they can be more aware of the activities that are engaged in daily operations and the effects that these activities have on the environment (Christine et al., 2019; Zandi & Lee, 2019). According to Latan et al. (2018), Phan et al. (2018), and Yaseen, Arshad, and Al-Hyasat (2023), there is a case to be made that businesses that are more conscious of the environmental impact that is connected with the transportation of their goods and/or services will have a greater chance of reducing it, which will lead to improved environmental performance through reductions in resource usage, emissions, as well as reductions in the costs that are associated with complying with environmental regulations. Because the GOC that a company possesses significantly impacts the adoption of EMA, we propose that EMA can serve as the main path in how GOC and EP are associated. Several other studies have produced findings that are consistent with these. Therefore, based on the discussions that have been presented thus far, we can formulate and test the hypotheses that indicate the following mediation effect:

H8b: EMA has a significant mediating effect between Green organizational culture and Environmental performance.

Mediation of Environmental Strategy

According to Zhou et al. (2019), researchers and practitioners have focused their attention on an ecological approach in addition to the resources and capabilities of the environment. As stated by Solovida and Latan (2017), companies with an environmental strategy perform significantly better in terms of sustainability than those that do not have such a strategy. Several recent studies (Kraus et al., 2020; Shah & Soomro, 2021) have demonstrated that business strategy plays a significant role in predicting corporations' operations and the protection of the environment. This finding is consistent with those findings. Although research has shown that environmental sustainability (ES) has a significant influence on the performance of the environment (Latan et al., 2018; Kraus et al., 2020; Fatima et al., 2023), academics have emphasized the importance of monitoring both the direct and indirect effects that ES has on environmental performance due to the complexity of the issue. In addition, the author emphasized the significance of investigating the reasons and

mechanisms behind the impact of ES on EP. Several studies have demonstrated that a robust green culture within an organization can more effectively incorporate environmental strategies and values. Furthermore, it plays a crucial role in implementing green organizational strategy, ultimately improving overall performance. Considering the foregoing, we argue that ES is a variable that acts as an intermediary between GOC and EP. We therefore propose the following hypothesis:

H8c: Environmental strategy has a significant mediating effect between green organizational culture and environmental performance.

Moderation of Managerial Environmental Knowledge

Environmental sustainability has become a significant issue as a result of the ever-increasing concerns regarding the environmental consequences that are caused by commercial activities. Through the implementation of environmentally responsible business practices and standards, company executives and managers have the potential to contribute to the prevention of potential environmental problems (Nureen et al., 2023). According to Amoako et al.'s research from 2020, the adoption of overall quality control and the start of innovative manufacturing techniques are both factors that contribute to the implementation of these processes in contemporary manufacturing units. Issock et al. (2020) suggest that a company that has MEK is more likely to be involved in environmental concerns (such as environmental principles and regulations) and to be more inventive in the process of developing environmentally friendly operations. According to Xue et al. (2019), prominent companies have a greater desire to implement environmentally friendly policies and procedures when they have a higher level of managerial support for their employees. It was determined by Paco and Lavrador (2017) that MEK is one of the most important contributing factors to environmentally friendly practices. It may stimulate innovations, which will ultimately lead to an increase in the businesses' competitiveness and productivity. MEK has a significant effect on the propensity to engage in activities that are friendly to the environment, as demonstrated by the findings of the research carried out by Liu et al. during the year 2020. On the other hand, according to Grafman (2018), the MEK of a company and the specific proactive steps that it takes are designed to develop technologies that are sustainable and friendly to the environment, and they may also help businesses improve their performance. Within the context of an organization, the term GOC refers to the principles, beliefs, and behaviors that encourage environmental sustainability. The term EP refers to the environmental results that are produced by an organization's actions, such as decreased waste, emissions, or energy consumption. MEK is a representation of their knowledge and awareness of ecological problems, which influences the decisions they make and the actions they take. Managers who have a strong understanding of the environment are better able to leverage GOC in order to accomplish superior EP. On the other hand, managers who have a limited understanding of the environment may have difficulty translating this knowledge into successful environmental actions, which would reduce the beneficial effect on environmental performance. MEK can exert influence over the primary concerns and priority of GOC, thereby directing efforts toward environmental strategies that are more effective. We therefore put forward the following hypothesis:

H9: Managerial Environmental Knowledge moderates between green organizational culture and environmental performance.

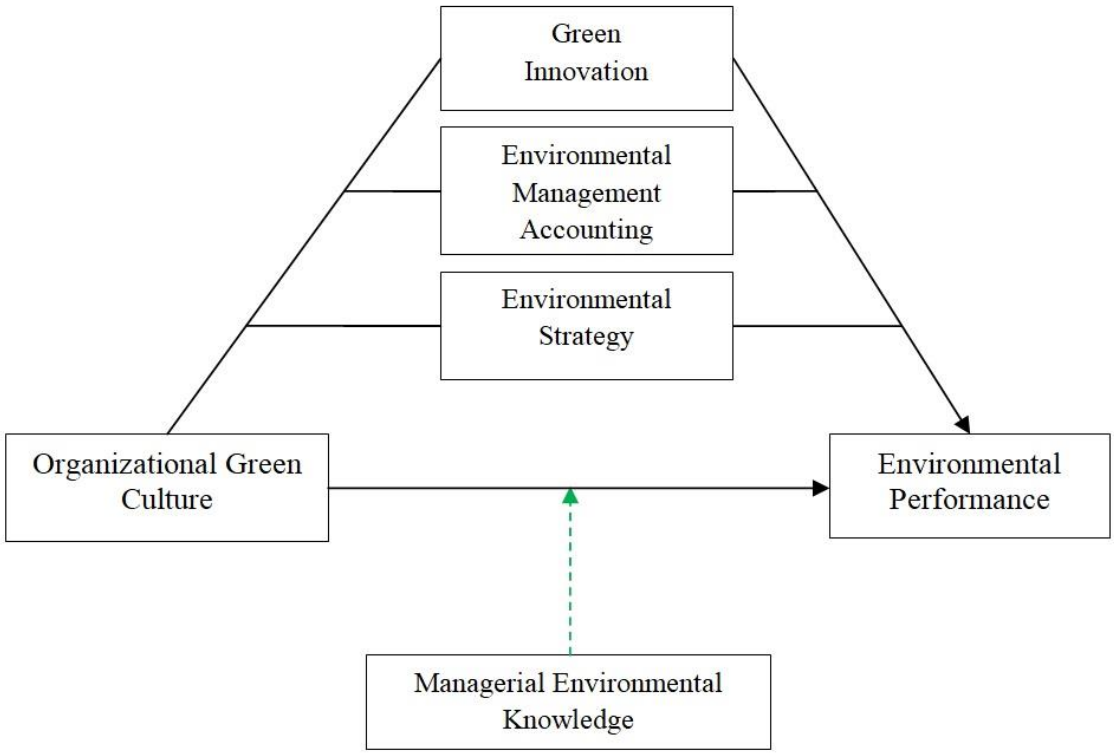

Figure 1: Theoretical framework

Methodology

This investigation makes use of a deductive method by employing NRBV theory. Because the purpose of this study is to determine the connection among the variables that are being studied, the research design that is being used for this investigation is descriptive. In addition, the researchers employed a quantitative approach, which consisted of the collection of numerical data and the utilization of statistical software in order to conduct an empirical test for the purpose of presenting the findings.

Population and sample

The managers who are employed in the textile, pharmaceutical, and chemical manufacturing industries in Pakistan are the individuals who can be considered for this study's target population. Convenience sampling technique is popular and has been utilized in recent investigations (Shaheer et al., 2024a; Aslam et al., 2024). As a result, the sample was chosen from this population for research by employing this sampling technique.

Data collection and analysis

A survey instrument in the form of a questionnaire was distributed to 490 professionals working in the aforementioned sector in order to collect the data that was needed for the study. Through the use of a Likert scale with five points, the sample participants responded to the questions on the questionnaire and then returned it. It was determined that 215 questionnaires, which constitute 43.87% of the total, were suitable for consideration in the analysis. By assessing the hypotheses that were developed through the use of the PLS-SEM technique, SmartPLS-3 was utilized in order to complete the analysis of the data and derive the results.

Survey Instrument

The items that make up the variables were taken right from the earlier studies. Regarding the GOC, responses were measured using the scale that was developed by Wang et al. (2021), which consists of six items. On the other hand, the EP was evaluated using five items from the scale that was developed by Ramanathan (2018). Through the utilization of the scale, GI was evaluated with a total of eight items, with four items each being devoted to green product and process innovation (Chen, 2008). In addition, these scales were utilized in the research conducted by Imran and Jingzu (2022). Christine (2019) and Le, Nguyen, and Phan (2019) extracted six items from the study for the European Medicines Agency (EMA). ES was evaluated using four items that were taken from a scale that was developed by Walls, Phan, and Berrone (2008). This scale was also utilized by Latan et al. (2018) and Christine et al. (2019) in their respective research projects. Five questions from a previous study (Nureen et al., 2023) were used to evaluate MEK. These questions were based on a scale that was developed for earlier research (Sreen et al., 2021). As a result, the instrument consisted of a total of 34 items that were utilized to assess the responsiveness to the variables that were being studied.

Data Analysis

Table 1 illustrates the demographics of the sample respondents, encompassing details regarding their gender, age, educational qualifications, and experience. Approximately 89.9% of the sample's participants are male, while approximately 10.2% are female. The sample is predominantly composed of respondents aged 35 to 44, accounting for 48.4%. Thirteen individuals (6.0%) are over the age of 44, while 98 individuals (45.6%) are aged between 25 and 34. The sample exhibits a high level of education, with 37.7% holding a master's degree and 50.7% possessing a bachelor's degree. Additionally, twenty-five individuals held qualifications exceeding a master's degree. A total of one hundred forty-three respondents (66.5%) possess 5 to 10 years of experience, sixty-seven respondents (31.2%) possess 11 to 15 years of experience, and only five respondents (2.3%) have over 15 years of experience.

Table 1: Demographic profile of participants

Features	Options	Frequencies	Percentage
Gender	Male	193	89.8
	Female	22	10.2
Age	25–34	98	45.6
	35–44	104	48.4
	45 and above	13	6.0
Qualification	Graduation	109	50.7
	Masters	81	37.7
	Above Masters	25	11.6
Experience	5-10 years	143	66.5
	11-15 years	67	31.2
	Above 15 years	5	2.3

Measurement model

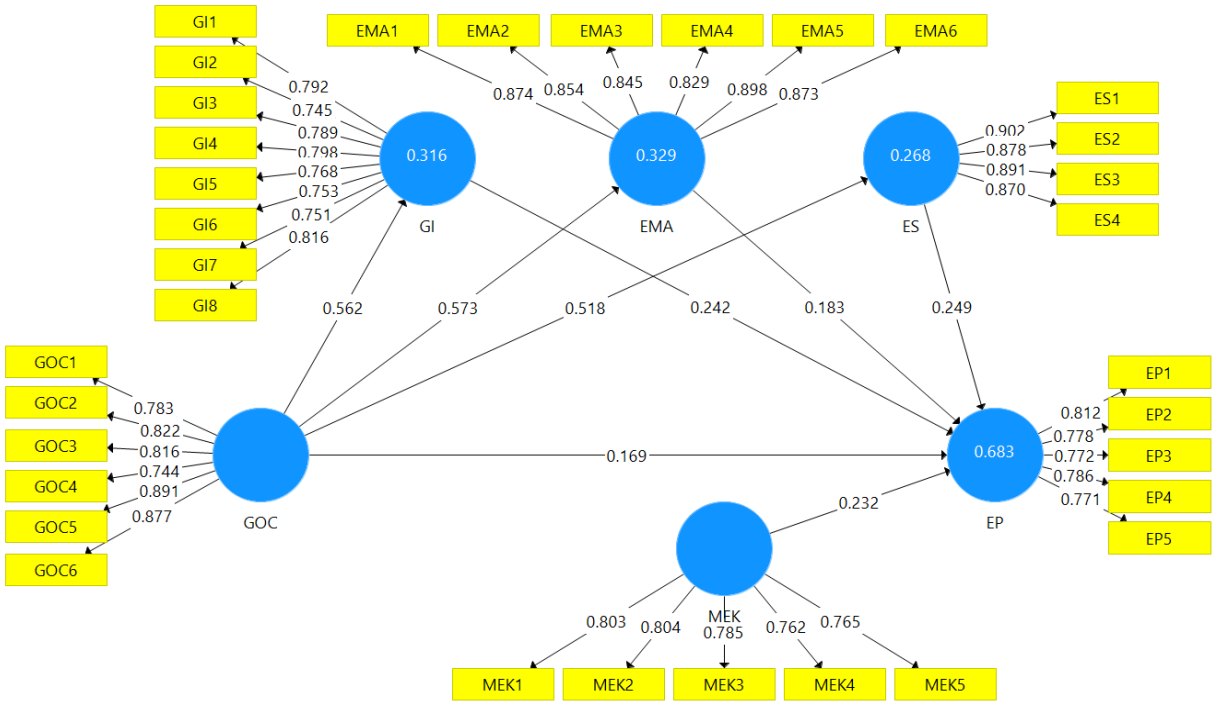

Figure 2: Measurement model

The loadings, Alpha and CR as well as are presented in Table 2. The factor loadings of each of these items are all greater than 0.702, which is a significant amount higher than the threshold of 0.5 required for statistical significance. As a consequence of this, we decided to keep all of these documents for further investigation. While values for the VIF that are near 10 indicate that there is a significant amount of multicollinearity, Table 2 demonstrates that these values are significantly lower than 10, confirming that the data does not contain any instances of this issue. According to the findings of earlier research (Hair et al., 2016; Diamantopoulos et al., 2012), both the Alpha and CR values were higher than the 0.70 threshold. Consequently, the reliability of the scales was established. (Hair et al., 2016) established that convergent validity was present because the AVE was greater than 0.500.

Table 2: Reliability and validity

Constructs	Items	Loadings	VIF	Alpha	CR	AVE
EP	EP1	0.812	1.886	0.843	0.889	0.615
	EP2	0.778	1.737			
	EP3	0.772	1.683			
	EP4	0.786	1.734			
	EP5	0.771	1.679			
GI	GI1	0.792	2.080	0.906	0.924	0.604
	GI2	0.745	3.186			
	GI3	0.789	2.720			
	GI4	0.798	3.071			
	GI5	0.768	2.934			
	GI6	0.753	1.252			

	GI7	0.751	2.450			
	GI8	0.816	3.307			
EMA	EMA1	0.874	2.227	0.931	0.946	0.744
	EMA2	0.854	3.138			
	EMA3	0.845	2.212			
	EMA4	0.829	2.725			
	EMA5	0.898	1.839			
	EMA6	0.873	2.267			
ES	ES1	0.902	3.745	0.908	0.935	0.784
	ES2	0.878	2.323			
	ES3	0.891	3.373			
	ES4	0.870	2.112			
MEK	MEK1	0.803	1.792	0.845	0.889	0.615
	MEK2	0.804	1.813			
	MEK3	0.785	1.616			
	MEK4	0.762	1.820			
	MEK5	0.765	1.814			
GOC	GOC1	0.783	2.062	0.904	0.927	0.678
	GOC2	0.822	2.745			
	GOC3	0.816	2.306			
	GOC4	0.744	1.726			
	GOC5	0.891	2.735			
	GOC6	0.877	1.547			

Table 3 below displays the "Heterotrait-Monotrait Ratio of Correlations (HTMT)," which is used for discriminant validity. The purpose of using discriminant validity is to quantify the discrimination that exists between the variables of the study in order to protect against any multi-relationship errors. The HTMT value must be less than 0.85 in order to demonstrate that the discriminant validity of the test has been demonstrated, as stated by Hensler et al. (2015) and Hamid et al. (2017). According to the findings, all of the HTMT values are lower than 0.85, which demonstrates that discriminant validity has been established.

Table 3: Discriminant Validity – HTMT

Constructs	**EP**	**GI**	**EMA**	**ES**	**MEK**	**GOC**
EP						
GI	0.820					
EMA	0.746	0.745				
ES	0.811	0.838	0.712			
MEK	0.539	0.322	0.264	0.347		
GOC	0.690	0.614	0.621	0.565	0.327	

Hypotheses testing

It is demonstrated in Table 4 and Figure 3 that the SmartPLS-3 program was utilized in order to test the hypotheses of the study by employing the PLS-SEM method in order to obtain the findings. You can also see the structural model in Figure 3, which can be found below. All nine

hypotheses that were proposed for the study were accepted because their significance values were close to zero and their t-values were greater than 1.96. There is a substantial relationship between the GOC and other investigation variables, such as EP, EMA, ES, and GI, respectively, as demonstrated by the fact that hypotheses H1, H2, H3, and H4 have been confirmed accurate. It is clear that these variables have been substantially affected by GOC. Additionally, all three hypotheses, H5, H6, and H7, were accepted because they were within the acceptable range of significance. Therefore, this further substantiates the fact that GI, EMA, and ES have direct effects on EP. Furthermore, the hypotheses H8a, H8b, and H8c were approved because the p-value was less than 0.05, which supported the hypothesis that GI, EMA, and ES partially mediate the relationship between GOC and EP. As far as the indirect effects are concerned, the hypotheses H8a, H8b, and H8c were accepted because they demonstrated significant results. GI, EMA, and ES were shown to be important mediators between GOC and EP, as demonstrated by these findings.

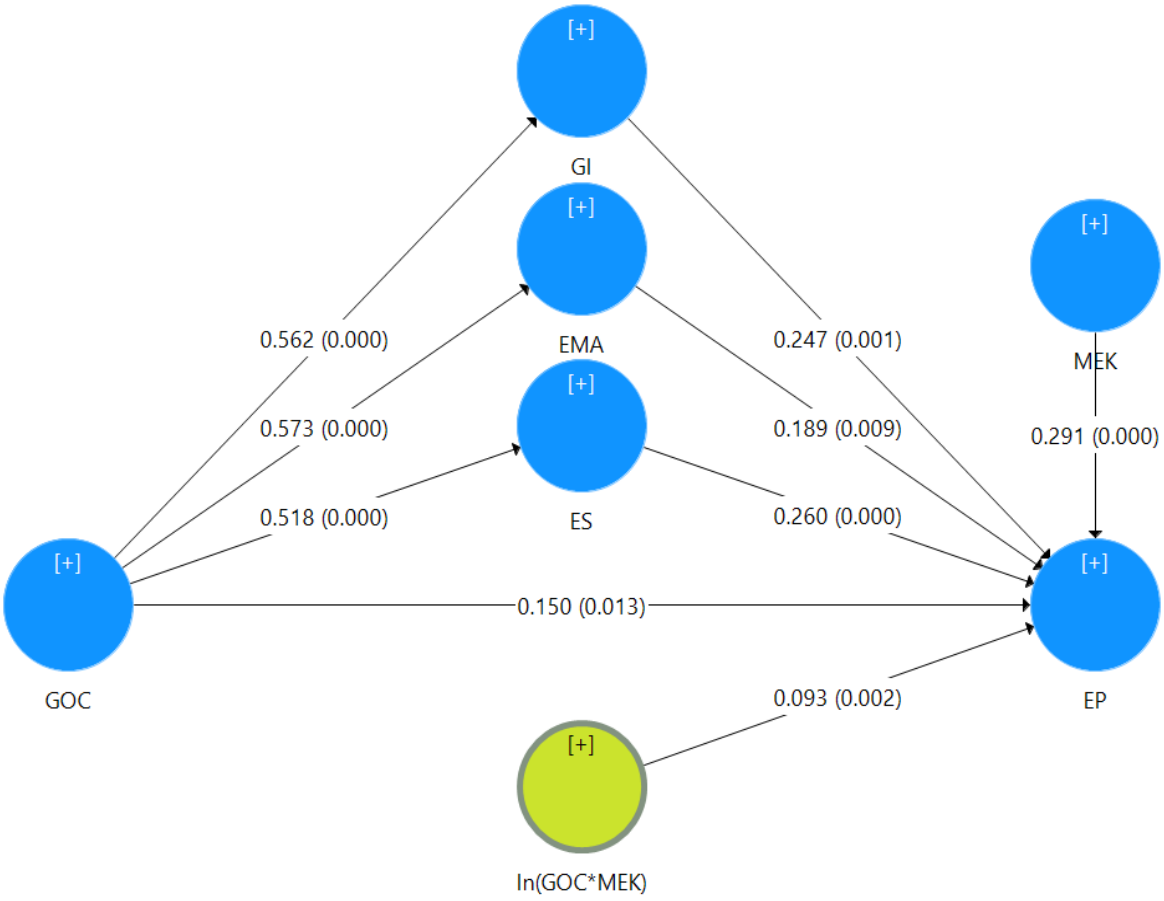

Figure 3: Structural model

The present research also investigated the role that MEK plays in moderating the relationship between the links of GOC and EP. OGC was found to positively moderate the GOC-EP association, as demonstrated by the findings of Hypothesis 9 (Table 4, Figure 3). A high MEK will strengthen or amplify the GOC-EP links, as shown in Figure 4, which also explains the slope analysis conducted. The effect is mitigated by a low MEK that is one standard deviation below the mean. According to the findings, GOC improved EP by an even more significant amount when MEK was higher.

Table 4: Hypothesis Testing

Hypotheses	Construct	β value	SD	T statistics	P values	Decision
H1	GOC -> EP	0.533	0.057	9.304	0.000	Accepted
H2	GOC -> GI	0.562	0.059	9.454	0.000	Accepted
H3	GOC -> EMA	0.573	0.059	9.737	0.000	Accepted
H4	GOC -> ES	0.518	0.052	9.882	0.000	Accepted
H5	GI -> EP	0.247	0.073	3.398	0.001	Accepted
H6	EMA -> EP	0.189	0.072	2.630	0.009	Accepted
H7	ES -> EP	0.260	0.057	4.570	0.000	Accepted
H8a	GOC -> GI -> EP	0.139	0.042	3.330	0.001	Accepted
H8b	GOC -> EMA -> EP	0.108	0.043	2.496	0.013	Accepted
H8c	GOC -> ES -> EP	0.135	0.032	4.241	0.000	Accepted
H9	In(GOC*MEK) -> EP	0.093	0.030	3.076	0.002	Accepted

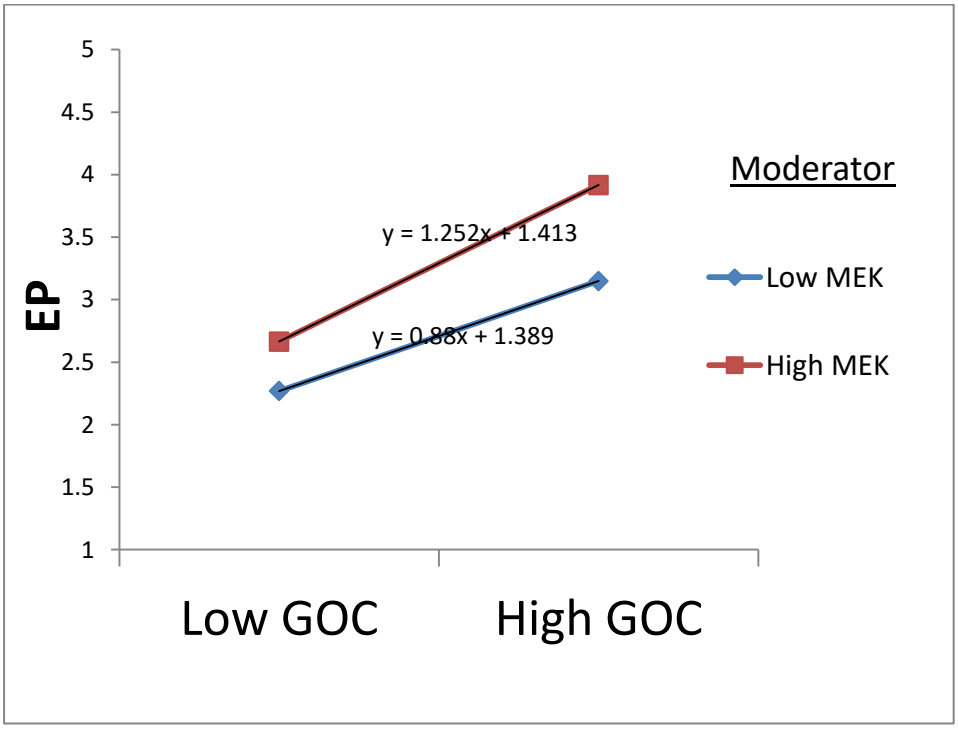

Figure 3: Interaction plot of GOC×MEK on EP

Discussion and Conclusion

The study investigated not only the direct effects of GOC on EP but also the indirect effects of GOC on the firm's EP through GI, EMA, and ES. Both of these aspects were investigated. OGC affects EP (García-Machado & Martínez-Ávila, 2019), GI (Aslam et al., 2024), EMA, and ES (Tan et al., 2024), as demonstrated by the findings. The findings of the study, which are comparable to those of Zandi and Lee (2019), Aftab et al. (2023), and Masood (2024), indicate that GOC is also a significant factor in determining EMA, GI, and ES conditions. Since GOC includes the knowledge and skills of staff regarding environmental issues, research indicates that they are apt to generate creative solutions and thoughts for ecological problems by allocating resources for development and research through R&D teams and partnerships. This is because GOC encompasses the knowledge and expertise of employees regarding environmental issues. Workers are able to share

ideas and work together on green initiatives through the use of an open GOC, which can be used to gauge and monitor environmental performance.

In addition, GOC makes it possible for departments within an organization in order to implement ES more comprehensively. Because of this, the company is able to work through ongoing enhancement and make improvements in order to improve its efforts to be more sustainable. There is a clear indication of commitment from the top management in organizations that have a GOC. These organizations prioritize activities that are friendly to the environment and conduct proactive risk assessments in order to recognize potential environmental risks and create strategies that are appropriate for effectively mitigating those risks. Furthermore, such values are deeply ingrained in the culture of the company, enabling a natural linkage with the principles of EMA. This is because GOC places a high value on environmental responsibility. Because of this, the performance indicators are reported in a transparent manner, which increases the stakeholders' level of trust in the organization. It is accomplished by accurately evaluating and controlling the ecological consequences of business activities. Because a company that engages in GOC practices is more likely to make the staff environmentally conscious, the employees are more likely to take part in and promote EMA practices actively.

Furthermore, GI, EMA, and ES were able to predict EP in a significant way. Presented findings are comparable to prior studies (Latan et al., 2018; Christine et al., 2019). The setting of appropriate environmental goals and the proper implementation of those goals enables businesses to monitor their progress. It leads to the optimization of resources, the utilization of energy-efficient technologies, and the reduction of adverse ecological impacts through the reduction of emissions and waste. Furthermore, environmental sustainability is considered to be an essential instrument for enhancing environmental performance. The literature also suggests that businesses can save money, gain a competitive advantage, increase the demand for environmentally friendly products, and position themselves as ecologically conscious corporate entities by accurately incorporating environmental management accounting (EMA) (Amir, Siddique, & Ali, 2022; Amir et al., 2023). As a result, businesses are able to comply with environmental regulations more effectively, which ultimately results in stronger connections with stakeholders and an increase in performance indicators. As a consequence of this, their economic and ecological performance improves, and they are able to achieve sustainability over lengthy periods. According to the findings of previous research (Ha et al., 2024; Tahir et al., 2024a), it is essential to take note of the fact that the findings demonstrate that GI is contributing to the enterprise's employee performance (EP). Innovation that is environmentally friendly within businesses helps to reduce the negative impact that those organizations' actions have on the environment. Since GI is so important in today's world, manufacturing industries ought to place a strong emphasis on incorporating such practices into their core business strategies in order to achieve improved environmental performance. In addition to the direct effects that were discussed earlier, this study also investigated the potential roles that GI, EMA, and ES play in mediating the relationship between GOC and EP. According to the findings of the empirical tests, GI, EMA, and ES, all played a part in bringing about EP from GOC. The entirety of these served as potent mediators between them. As a result, we assert that GOC is capable of effectively promoting GI and EMA practices, as well as effectively enforcing ES, which ultimately results in an increase in the performance of the firms with regard to the environment.

As a consequence of the increasing demand for environmental protection, businesses are under constant pressure to mitigate the adverse effects of their activities while simultaneously improving their environmental performance. This pressure will continue until the environment is protected.

Therefore, the purpose of this study was to investigate the conditions and methods by which GOC can alter EP. A total of nine hypotheses were formulated and statistically tested after an exhaustive empirical investigation was conducted with a representative sample of manufacturing enterprises belonging to Pakistan. The study came to the result that GOC has substantial direct impacts on EMA, GI, ES, and EP, while also indirectly contributing to EP through GI, EMA, and ES. This conclusion was reached when the results and discussion of the study were taken into consideration. As a result, manufacturing companies that are pushed to run activities in an environmentally responsible manner by incorporating an organizational culture that encourages green innovation are likely to increase their revenues and also advance sustainable development. This is because strong practices of managerial accounting and strategies that are friendly to the environment are likely to be implemented.

Research Implications

This research has significant theoretical implications, as it contributes to the literature on the Resource-Based View and the NRBV philosophy by highlighting the factors that are most likely to increase a firm's EP. Secondly, the study improves upon previous research on the concept of EP by illustrating the beneficial impact that GOC has on EP. Thirdly, the present study contributes by inferring the path taken by GI, EMA, and ES to establish links between GOC and EP. Fourthly, it investigates the moderating effect of MEK in the relationship between EP and GOC. Fifth, the paper contributes another substantial contribution to the existing body of knowledge by integrating these variables in a novel manner in relation to context. To the best of the author's knowledge, no study has ever employed a sample from Pakistan for a combination of characteristics, rendering the study original and valuable. Consequently, this research contributes to the body of work on EP predictors and enhances academic knowledge.

The study provides managers and policymakers with critical findings that will inform their decision-making and determination in advancing the environment. Initially, the research emphasizes the necessity for managers to foster a green culture within their organizations in order to enhance performance by reducing emissions, ensuring the efficient consumption of resources, and reducing waste generation. Secondly, firms' reputations may be enhanced by showing their devotion to sustainability through the development of effective strategies. Consequently, stakeholders and customers will encourage businesses that prioritize environmental concerns, which will result in increased customer loyalty. Third, firms can mitigate risks and eliminate the likelihood of loss by monitoring G, metrics, and ES, and by implementing EMA tools. Lastly, managers can motivate their employees to pursue innovative strategies for mitigating environmental impacts in order to establish a more sustainable, accountable business system.

In summary, the implementation of these practices can result in tangible advantages, including increased efficiency and cost savings, in addition to promoting societal well-being and broader environmental objectives. In the same way, governments can motivate businesses to implement sustainable practices by providing them with incentives, such as tax breaks, grants, or subsidies. Policymakers can establish regulations for business environmental reporting that mandate the disclosure of ecological performance. Consequently, the transparency and accountability of the reporting will be enhanced, and firms will adhere to the law in order to achieve greater profitability and sustainability.

Limitations and Future Indications

Although the present study has yielded substantial findings, the constraints of our findings necessitate additional research. The initial focus of our research was to identify the factors that determined the environmental performance of manufacturing enterprises. However, it is possible that other factors, including firm size, green transformational leadership, and organizational support, may further enhance the impact of EP. The literature on EP and business strategy may be fortified if the subsequent research incorporates firm-level constructs from our analysis. Secondly, despite our investigation of the potential role of EMA, GI, and ES in mediating the linkage between GOC and EP, additional factors must be considered. Consequently, future research may incorporate pertinent moderators. Thirdly, the study investigated the moderating influence of MEK on the relationship between GOC and EP. Other variables, like stakeholder pressure, financial resources, and environmental dynamism, may be investigated as moderators. Fourth, future research may incorporate a moderator between the links of GI, EMA, ES, and EP. Fourth, we restricted our investigation to Pakistan, a region that has recently emerged but has received minimal research. Despite the fact that the sample was restricted to single country, future researchers must expand the sample size by including more countries or performing an across-the-country comparison. They must also consider the variety of contextual distinctions between developed and emerging nations that can improve the environmental performance of businesses. Lastly, an intra-industry assessment may also be beneficial in gaining insight into the unique contributions of each manufacturing sector to firm performance.

References

1. Aftab, J., Abid, N., Cucari, N., & Savastano, M. (2023). Green human resource management and environmental performance: The role of green innovation and environmental strategy in a developing country. Business Strategy and the Environment, 32(4), 1782-1798.
2. Alaeddin, O., Shawtari, F. A. M., Salem, M. A., & Altounjy, R. (2019). The effect of management accounting systems in influencing environmental uncertainty, energy efficiency and environmental performance. International Journal of Energy Economics and Policy, 9(5), 346-352.
3. Albino, V., Balice, A., &Dangelico, R. M.(2009).Environmental strategies and green product development: an overview on sustainability-driven companies. *Business Strategy and the Environment, 18*(2), 83-96. https://doi.org/10.1002/bse.638
4. Ali, K., Amir, M., & Malik, M. S. (2023). Strategic motives, proactive environmental strategies and corporate performance: Role of business model innovation and competitive intensity. Pakistan Journal of Commerce and Social Sciences (PJCSS), 17(2), 348-369.
5. Amir, M., Malik, M. S., & Ali, K. (2024). Unlocking green growth: an ARDL estimation of pollution prevention practices for economic and environmental sustainability. Environment, Development and Sustainability, 26(8), 19983-20000.
6. Amir, M., Siddique, M., & Ali, K. (2022). Responsible leadership and business sustainability: Exploring the role of corporate social responsibility and managerial discretion. Business and Society Review, 127(3), 701-724.
7. Amir, M., Siddique, M., Ali, K., & Kausar, N. (2023). Environmental Awareness During COVID-19: Spur Organizational Performance through Environmental Motivation and Environmental Management System. South Asian Journal of Management Sciences, 17(2).

8. Amoako, G. K., Dzogbenuku, R. K., & Abubakari, A. (2020). Do green knowledge and attitude influence the youth's green purchasing? Theory of planned behavior. International Journal of Productivity and Performance Management, 69(8), 1609-1626.
9. AnthonyJr,B.(2019).Greeninformationsystemintegrationforenvironmentalperformanceinorganizations:An extension of belief–action–outcome framework and natural resource-based view theory. *Benchmarking: An International Journal, 26*(3), 1033-1062. https://doi.org/10.1108/BIJ-05-2018-0142
10. Aslam, M., Zain, F., Qasim, M., Leghari, M. A., & Abbas, M. Z. (2024). Does Organizational Green Culture Impact Competitive Advantage and Green Performance with Mediation of Green Innovation?. Journal of Social Sciences Review, 4(4), 1-15.
11. Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management, 17*(1), 99-120. https://doi.org/10.1177/014920639101700108
12. Barney,J.,Wright,M.,&KetchenJr,D.J.(2001).Theresource-basedviewofthefirm:Tenyearsafter1991. Journalofmanagement,27(6),625-641.
13. Chen,Y.-S.(2008).Thedriverofgreeninnovationandgreenimage–greencorecompetence. *Journal of Business Ethics, 81*, 531-543. https://doi.org/10.1007/s10551-007-9522-1
14. Christine, D. (2019). The relationship of environmental management accounting, environmental strategy and managerial commitment with environmental performance and economic performance.
15. Christine, D., Yadiati, W., Afiah, N. N., & Fitrijanti, T. (2019). The relationship of environmental management accounting, environmental strategy and managerial commitment with environmental performance and economic performance. *International Journal of Energy Economics and Policy, 9*(5), 458-464.
16. Cordano, M., & Frieze, I. H. (2000). Pollution reduction preferences of US environmental managers: Applying Ajzen's theory of planned behavior. Academy of Management journal, 43(4), 627-641.
17. Danyal, A., Zain, F., Fida, I., Abbas, M. Z., & Ali, M. R. (2024). Does Service Quality Impact Word of Mouth, Customer Loyalty and Customer Retention Through Consumer Engagement: Evidence from Pakistan. PAKISTAN JOURNAL OF LAW, ANALYSIS AND WISDOM, 3(7), 84-101.
18. Deb, B. C., Rahman, M. M., & Rahman, M. S. (2022). The impact of environmental management accounting on environmental and financial performance: empirical evidence from Bangladesh. Journal of Accounting & Organizational Change, 19(3), 420-446.
19. Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. J. J. o. t. A. o. M. S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective. 40, 434-449.
20. Fatima, K., Ahmed, A., & Mahnoor, A. H. S. (2023). Green Intellectual Capital Driving Environmental Performance: The Mediating Role of Green Ambidexterity and Moderating Influence of Environmental Ethics. *Sustainable Trends and Business Research, 1*(2), 62-75. https://doi.org/10.70291/stbr.1.2.2023.7
21. Fernando, Y., & Wah, W. X. (2017). The impact of eco-innovation drivers on environmental performance: Empirical results from the green technology sector in Malaysia. Sustainable Production and Consumption, 12, 27-43.
22. Fida, I., Ziaullah, M., Zain, F., Danyal, A., & Sattar, Y. (2023). Investigation of customer experience, customer engagement, corporate reputation and word of mouth in banking sector: evidence from Pakistan. Journal of Social Sciences Review, 3(1), 846-858.
23. Fousteris, A. E., Didaskalou, E. A., Tsogas, M. M. H., & Georgakellos, D. A. (2018). The environmental strategy of businesses as an option under recession in Greece. Sustainability, 10(12), 4399.

24. García-Machado, J. J., & Martínez-Ávila, M. (2019). Environmental performance and green culture: The mediating effect of green innovation. An application to the automotive industry. Sustainability, 11(18), 4874.
25. Grafman, J. (2018). Plans, actions, and mental sets: Managerial knowledge units in the frontal lobes. In Integrating theory and practice in clinical neuropsychology (pp. 93-138). Routledge.
26. Gürlek, M., & Tuna, M. (2018). Reinforcing competitive advantage through green organizational culture andgreen innovation. *The service industries journal*, *38*(7-8), 467-491. https://doi.org/10.1080/02642069.2017.1402889
27. Ha, N. M., Nguyen, P. A., Luan, N. V., & Tam, N. M. (2024). Impact of green innovation on environmental performance and financial performance. Environment, Development and Sustainability, 26(7), 17083-17104.
28. Hadj,T.B.(2020).Effectsofcorporatesocialresponsibilitytowardsstakeholdersandenvironmentalmanagement on responsible innovation and competitiveness. *Journal of cleaner production*, *250*, 119490. https://doi.org/10.1016/j.jclepro.2019.119490
29. Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). A primer on partial least squares structural equation modeling (PLS-SEM) Sage Publications. Thousand Oaks, CA, USA.
30. Hamid, M., Sami, W., & Sidek, M. M. (2017). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. *Journal of Physics: Conference Series*, 840(1), 012163. http://doi.org/10.1088/1742-6596/890/1/012163
31. Hart, S. L. (1995). A natural-resource-based view of the firm. Academy of management review, 20(4), 986-1014.
32. Hart, S. L., & Dowell, G. (2011). Invited editorial: A natural-resource-based view of the firm: Fifteen years after. Journal of management, 37(5), 1464-1479.
33. Henseler,J.,Ringle,C.M.,&Sarstedt,M.(2015).Anewcriterionforassessingdiscriminantvalidityinvariance- based structural equation modeling. *Journal of the academy of marketing science*, *43*(1), 115-135. https://doi.org/10.1007/s11747-014-0403-8
34. Huang, J. W., & Li, Y. H. (2017). Green innovation and performance: The view of organizational capability and social reciprocity. Journal of business ethics, 145, 309-324.
35. Imran, M., & Jingzu, G. (2022). Green organizational culture, organizational performance, green innovation, environmental performance: Amediation-moderationmodel.*JournalofAsia-PacificBusiness*,*23*(2),161-182. https://doi.org/10.1080/10599231.2022.2072493
36. Imran, M., Arshad, I., & Ismail, F. (2021). Green organizational culture and organizational performance: The mediating role of green innovation and environmental performance. *Jurnal Pendidikan IPA Indonesia*, *10*(4), 515-530.
37. Issock Issock, P. B., Mpinganjira, M., & Roberts-Lombard, M. (2020). Modelling green customer loyalty and positive word of mouth: Can environmental knowledge make the difference in an emerging market?. International Journal of Emerging Markets, 15(3), 405-426.
38. Jabeen, R., Khan, K. U., Zain, F., & Atlas, F. (2023). Buy green only: Interplay between green marketing, corporate social responsibility and green purchase intention; the mediating role of green brand image. Business Strategy & Development, 6(3), 503-518.
39. Jabeen, R., Khan, K. U., Zain, F., & Atlas, F. (2024b). Investigating the impact of social media advertising and risk factors on customer online buying behavior: A trust-based perspective. Available at SSRN 4889354.

40. Jabeen, R., Kijkasiwat, P., Zain, F., & Liew, C. Y. (2024a). Organisational Greening Process and SMEs' Performance in the Textile Industry: Evidence from Pakistan. Thammasat Review, 27(1), 77-108. *Journal of management, 37*(5), 1464-1479.
41. Khan, M. K., Ahmad, I., e Ali, M. S., & Azhar, U. (2024). Role of Climate Policies and Environmental Regulations for Business Growth: Evidence from Sustainable Development Perspective. *iRASD Journal of Economics*, *6*(1), 199-214.
42. Kraus, S., Rehman, S. U., & García, F. J. S. (2020). Corporate social responsibility and environmental performance: The mediating role of environmental strategy and green innovation. Technological forecasting and social change, 160, 120262.
43. Küçükoğlu,M.T.,&Pınar,R.İ.(2016).Themediatingroleofgreenorganizationalculturebetween sustainability and green Innovation: A research in Turkish companies.
44. Latan, H., Jabbour, C. J. C., de Sousa Jabbour, A. B. L., Wamba, S. F., & Shahbaz, M. (2018). Effects of environmental strategy, environmental uncertainty and top management's commitment on corporate environmental performance: The role of environmental management accounting. *Journal of Cleaner Production, 180*, 297-306.
45. Le, T.T., Nguyen, T. M. A., &Phan, T. T. H. (2019). Environmental management accounting and performance efficiency in the Vietnamese construction material industry—A managerial implication for sustainable development. *Sustainability, 11*(19), 5152.
46. Leal-Rodríguez, A. L., Ariza-Montes, A. J., Morales-Fernández, E., & Albort-Morant, G. (2018). Green innovation, indeed a cornerstone in linking market requests and business performance. Evidence from the Spanish automotive components industry. Technological Forecasting and Social Change, 129, 185-193.
47. Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions. Science of the total environment, 728, 138126.
48. Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions. Science of the total environment, 728, 138126.
49. Liu, Z., Wang, H., & Li, P. (2018). The antecedents of green information system and impact on environmental performance. *International Journal of Services, Economics and Management, 9*(2), 111-124. https://doi.org/10.1504/IJSEM.2018.096074
50. Ma, X., Akhtar, R., Akhtar, A., Hashim, R. A., & Sibt-e-Ali, M. (2022). Mediation effect of environmental performance in the relationship between green supply chain management practices, institutional pressures, and financial performance. *Frontiers in Environmental Science*, *10*, 972555.
51. Malik, M. S., Ali, K., Amir, M., Tariq, K., & Ramzan, M. (2024). Green transformational leadership, environmental strategy, and green innovation: Mediated moderation of knowledge sharing and green absorptive capacity. *Pakistan Journal of Commerce and Social Sciences (PJCSS), 18*(2), 503-526.
52. Masood, F. (2024). Optimizing Accounting-Based Financial Performance: The Role of Corporate Social Responsibility and Independent Board Structures in Pakistan. *Sustainable Trends and Business Research, 2*(1). https://doi.org/10.70291/stbr.2.1.2024.14
53. Mayndarto, E. C., & Murwaningsari, E. (2021). The effect of environmental management accounting, environmental strategy on environmental performance and financial performance moderated by managerial commitment. *Journal of Industrial Engineering & Management Research, 2*(2), 35-38.
54. Niu, J., Chang, C.-P., Yang, X.-Y., &Wang, J.-S. (2017). The long-run relationships between energyefficiency and environmental performance: Global evidence. *Energy & Environment, 28*(7), 706-724. https://doi.org/10.1177/0958305X17724210

55. Noor, A., & Bano, A. (2024). Impact of Green Intellectual Capital and Environmental Management Accounting on Sustainable Performance: The Moderating Role of Stakeholder Pressure. *Sustainable Trends and Business Research, 2*(1).
56. Nureen, N., Liu, D., Irfan, M., Malik, M., & Awan, U. (2023). Nexuses among green supply chain management, green human capital, managerial environmental knowledge, and firm performance: evidence from a developing country. Sustainability, 15(6), 5597.
57. Ong,T.S.,Lee,A.S.,Teh,B.H.,&Magsi,H.B.(2019).Environmental innovation, environmental performance and financial performance: Evidence from Malaysian environmental proactive firms. *Sustainability, 11*(12), 3494.
58. Paço, A., & Lavrador, T. (2017). Environmental knowledge and attitudes and behaviours towards energy consumption. Journal of environmental management, 197, 384-392.
59. Phan,T.N.,Baird,K.,&Su,S.(2018). Environmental activity management:its use and impact on environmental performance. *Accounting, Auditing & Accountability Journal, 31*(2), 651-673.
60. Ramanathan, R. (2018). Understanding complexity: The curvilinear relationship between environmental performance and firm performance. *Journal of Business Ethics, 149*, 383-393.
61. Ramus, C. A., & Steger, U. (2000). The roles of supervisory support behaviors and environmental policy in employee "Ecoinitiatives" at leading-edge European companies. Academy of Management journal, 43(4), 605-626.
62. Rauf, F., Wanqiu, W., Naveed, K., Qadri, S. U., & Ali, M. S. E. (2024). How ESG reporting is effected by sustainable finance and green innovation: moderating role of sales growth. *Environmental Science and Pollution Research, 31*(5), 7246-7263.
63. Saeidi, S. P., Othman, M. S. H., Saeidi, P., & Saeidi, S. P. (2018). The moderating role of environmental management accounting between environmental innovation and firm financial performance. *International Journal of Business Performance Management, 19*(3), 326-348.
64. Schein,E.H.(1992).HowcanorganizationslearnfasterP:theproblemofenteringtheGreenRoom.
65. Scholz, P., & Voracek, J. (2016). Organizational culture and green management: innovative way ahead in hotel industry. *Measuring Business Excellence, 20*(1), 41-52.
66. Shah, N., & Soomro, B. A. (2021). Internal green integration and environmental performance: The predictive power of proactive environmental strategy, greening the supplier, and environmental collaboration with the supplier. *Business Strategy and the Environment, 30*(2), 1333-1344.
67. Shaheer, S. A., Zain, F., Aslam, M., & Abbas, M. Z. (2024b). The Triadic Effect of Electronic Word of Mouth, Brand Image, and Trust on Purchase Intention. Policy Journal of Social Science Review, 2(4), 803-827.
68. Shaheer, S.A., Zain, F., Aslam, M., & Abbas, M. Z. (2024a). Enhancing customer loyalty through brand image, customer satisfaction, green marketing, and corporate social responsibility: a mediated moderation model. Advance Social Science Archive Journal, 2(4), 729–752.
69. Shoaib, M., Abbas, Z., Yousaf, M., Zámečník, R., Ahmed, J., & Saqib, S. (2021). The role of GHRM practices towards organizational commitment: A mediation analysis of green human capital. Cogent Business & Management, 8(1), 1870798.
70. Solovida, G. T., & Latan, H. (2017). Linking environmental strategy to environmental performance: Mediation role of environmental management accounting. *Sustainability Accounting, Management and Policy Journal, 8*(5), 595-619.

71. Sreen, N., Dhir, A., Talwar, S., Tan, T. M., & Alharbi, F. (2021). Behavioral reasoning perspectives to brand love toward natural products: Moderating role of environmental concern and household size. Journal of Retailing and Consumer Services, 61, 102549.
72. Tahir, M. A., Yousaf, T., Shahzad, M. F., Zain, F., & Ain, Q. U. (2024b). Does organizational agility mediate between artificial intelligence and sustainable performance: Moderating role of organizational culture. In 2024 Artificial Intelligence for Business (AIxB) (pp. 58-63). IEEE.
73. Tahir, M.A., Zain, F.U., & Ali, K. (2024a). Green Practices to Enhance Firm performance: The Moderating Role of Organizational Green Culture. Australian Journal of Business and Management Research, 8(2), 79-100.
74. Tahir, R., Athar, M.R., Faisal, F.,& Solangi, B.(2019).Green organizational culture: A review of literature and future research agenda. *Annals of Contemporary Developments in Management & HR (ACDMHR), Print ISSN*, 2632-7686.
75. Tan, Q., Ali, K., Tahir, M.A & Rasheed, M.H. (2024). Green Organizational Culture and Firm's Environmental Performance: Assessing the role of Green Innovation, Environmental Management Accounting and Environmental Strategy. Australian Journal of Business and Management Research, 8(2), 66-78.
76. Walls, J. L., Phan, P., & Berrone, P. (2008). *Assessment of the construct validity of environmental strategy measures*: Ross School of Business Ann Arbor, MI.
77. Wang,H.,Khan,M.A.S.,Anwar,F.,Shahzad,F.,Adu,D.,&Murad,M.(2021).Greeninnovationp racticesand its impacts on environmental and organizational performance. *Frontiers in Psychology*, *11*, 553625.
78. Wu, R., Huo, B., Yu, Y., & Zhang, Z. (2022). Quality and green management for operational and environmental performance: relational capital in supply chain management. International Journal of Logistics Research and Applications, 25(4-5), 471-492.
79. Xue, M., Boadu, F., & Xie, Y. (2019). The penetration of green innovation on firm performance: Effects of absorptive capacity and managerial environmental concern. Sustainability, 11(9), 2455.
80. Yang, Z., Sun, J., Zhang, Y., & Wang, Y. (2017). Green, green, it's green: A triad model of technology, culture, and innovation for corporate sustainability. Sustainability, 9(8), 1369.
81. Yaseen, A., Arshad, S., & Al-Hyasat, S. S. M. (2023). Corporate Environmental Ethics: Catalyst for Green Innovation and Business Performance in Pakistan's Health care Manufacturing Sector. *Sustainable Trends and Business Research*, *1*(2).
82. Zain, F., Abbas, M. Z., & Ali, M. R. (2023b). Achieving sustainable business performance through green transformational leadership, green innovation & corporate social responsibility. Journal of Social Research Development, 4(1), 201-216.
83. Zain, F., Ali, M. R., & Abbas, M. Z. (2023a). Linking Green Human Resource Management, Green Innovation and Environmental Performance to Sustainable Business Performance: Evidence from Pakistan. Journal of Managerial Sciences, 17(2), 19-39.
84. Zain, F., Aslam, M., Zahir, S., Leghari, M. A., & Abbas, M. Z. (2024). Impact of Green Innovation and Corporate Social Responsibility on Firm Reputation with Mediation of Environmental Performance. Journal of Social Sciences Review, 4(3), 1-19.
85. Zandi, G., & Lee, H. (2019). Factors affecting environmental management accounting and environmental performance: An empirical assessment. *International Journal of Energy Economic sand Policy*, *9*(6), 342.