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Towards Sustainable Development - From Drivers to Performance: Evidence from Pakistani FMCGs

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Abstract: *Relatively little research exists on the novel role of real-world drivers of corporate sustainability, limiting our understanding of how various internal and external factors shape sustainable business practices and organizational strategies. Academicians have initiated efforts to create awareness among diverse stakeholders. However, an in-depth association of key drivers to enhance sustainable business practices and ultimately on firm performance requires more investigation. This study aims to assess the influence of ethical considerations, stakeholder engagement, legal compliance, and competitive pressures to address the systemic issues hindering the adoption of sustainable practices in Pakistani FMCG organizations. Specifically, this academia-industry project aims to provide fresh insights into the current market conditions and outlook regarding factors influencing adoption of sustainable business practices and their impact on firm performance. Data were gathered between March 2022 and August 2023 from 289 supply chain professionals of Pakistani FMCG firms. Statistical analysis adopted the method of PLS-SEM and results were reinforced empirically by the rank-based techniques known as grey relational analysis and Ridit analysis. The study found that all drivers except stakeholder's pressure were positively significant towards ESP adoption. Whereas, competitive pressure and stakeholders pressure found influential in driving GIP. Further, ESP and GIP both positively enhances FP. The study serves as a guide for organizations seeking effective and informed approaches to enhance their sustainability practices and, consequently, their overall performance. Additionally, the theoretical propositions of sustainable development theory and grey system theory are rigorously tested, enhancing the depth and breadth of existing knowledge*

Keywords: Corporate Sustainability Drivers, Environmental Sustainability Practices, Green Investment Practices, Firm Performance.

Introduction

Sustainable development, defined by the World Commission on Environment and Development in 1987, emphasizes meeting present needs without compromising the ability of future generations (WCED, 1987). Corporate Sustainability, as redefined by the Commission, involves a triple bottom line (TBL) encompassing economic, social, and environmental components (Crace & Gehman, 2023). Recent studies in corporate sustainability predominantly focus on conceptual, case study, survey, and review type contributions. A comprehensive literature review by Bastas and Liyanage (2018) on TBL

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in supply chain operations reveals that only 43% of research in the past 20 years focused holistically on all the three pillars of TBL. Whereas, the rest of 40% body emphasizes on environment-related issues, 2% on social dimensions, and remaining 15% on both social and environmental factors. Notably, China, India, and the United States were the countries with the most studies on sustainability in supply chain management (Bastas & Liyanage, 2018; Gupta & Gupta, 2020). Pakistan, amid rapid industrialization, faces significant environmental challenges, particularly in the mismanagement of plastic and industrial waste. The country ranks sixth globally in plastic waste generation, producing 30 million tons of solid waste annually, with 9% being plastic (UN-HABITAT, 2023). Karachi, its former capital, is identified as one of the top 10 marine litter hotspots in Africa and South Asia, generating 12,067 tonnes of municipal solid waste daily, with only 81% collected and none effectively managed. Despite national policies, challenges persist due to unsustainable production, inadequate legal frameworks, weak enforcement, and limited financial resources, contributing to heightened greenhouse gas emissions and plastic pollution.

Large organizations are considered primary responsibles of the corporate sustainability concept (Borgert et al., 2020). A global report on five years of holding plastic polluters accountable points to leading FMCG companies, including Coca-Cola Company, PepsiCo, and Nestlé, as major contributors to plastic pollution (Brand-Audit, 2022). However, implementing sustainable business practices poses multiple challenges, requiring companies to transparently disclose their carbon footprint, significantly optimize production operations, and innovate packaging for reusability or plastic-free alternatives. A long prohibited industrial use of sodium tripolyphosphate (STPP) chemical, highly dangerous for marine life, is extensively underestimated by detergent manufacturers in Pakistan including the market leaders (Crace, 2014; Morse et al., 1995). Similarly, while addressing SDG 12 responsible production and consumption, Unilever highlights the affordability concern in plastic free packaging particularly for low-income countries like Pakistan on purchase of small amounts of products in sachet keeping hygiene's and nutritious intact (Unilever, 2024). Indeed, a range of drivers may act as catalysts for leveraging corporate sustainability in these large organization. A thorough literature review highlights that ethical, stakeholder, legal and competitive pressures are key drivers of corporate sustainability (Lin, 2013; Lozano, 2015). These drivers can effectively bring ESP and transform the production and consumption such that they no longer pose any danger to the environment (Shen et al., 2023).

This research study is mainly focused on the environmental component of sustainable development. In developed nations, there is a noticeable emphasis on environmental sustainability practices (ESP). Government compliances, severe environmental penalties, increased awareness of sustainable development among stakeholders, including suppliers and customers, and the company's intangible reputation as a "go-green entity" were the main arguments in favor of this obvious emphasis on the environment (Góes et al., 2023; Wei et al., 2023; Xu et al., 2024). As a result of growing global trade, developing economies like Pakistan have been receiving a flood of foreign direct investments, imposing an increased pressure of corporate sustainability on practitioners (Burbano et al., 2022). Companies have realized the importance of incorporating sustainable practices into their manufacturing to minimize the impact of their activities on the environment (Qu et al., 2017). This increase in the trend of ESP has also led to the emergence of the concept of green investment practices (Zhang et al., 2023).

Green investment, a monetary support committed to encourage environmentally friendly practices, has become increasingly popular (Lyeonov et al., 2019). Thus, GIP

involves an investment practice that aims to replace the existing unsustainable methods of production and consumption so that the natural resources can be protected. While the literature extensively explores the relationship between the implementation of green investment practices and overall firm performance, previous research has primarily concentrated on the influence of environmental regulations on firm performance, with limited attention given to the direct link between green investments and firm performance (Chen & Ma, 2021).

Considering the growing importance of ESP and GIP, there is limited research on the relationship of these sustainable business practices with firm performance (FP), especially in Pakistan (Mumtaz et al., 2018). This study contributes to the literature in the two novel ways. Firstly, to the best of our knowledge, it is the first attempt to investigate the impact of four key drivers of corporate sustainability on ESP as well as on GIP. Most of the previous approaches to corporate sustainability drivers have focused on a single dimension at a time, either on internal or external driver. However, this attempt will provide a more holistic perspective of the four key corporate sustainability drivers simultaneously in order to better catalase change from the unsustainable status quo to a more sustainable business-oriented state. Secondly, this paper further evaluates the relationship of sustainable business practices with the firm performance. Here, measuring the effect of green investment practices on key indicators of firm performance is a vertical addition to previous research by Gupta and Gupta (2020) that merely assessed the impact of environmental sustainability on firm performance. Therefore, this paper has following research questions:

a) How does the key drivers of corporate sustainability (ethical, stakeholders, legal and competitive) impact on sustainable business practices (ESP and GIP) in Pakistan?

b) What is the impact of sustainable business practices (ESP and GIP) on firm performance?

The article provides a detailed literature review in the next section, followed by methods, results and discussion.

Literature Review

Sustainable Development Theory and Green Investment

The concept of sustainable development has a long-standing roots in the field of physical, biological and engineering sciences (Steer & Wade-Gery, 1993). The Fourth Industrial Revolution, or Industry 4.0, is accelerating progress in our world. This revolution is reshaping businesses and presents new opportunities for sustainable development. Sustainable business practices have become crucial for addressing global challenges, gaining praise from environmentalists for fostering economic and environmental growth (Li et al., 2023). Sustainable development (SD) theory aligns with these principles, emphasizing the integration of economic, social and environmental sustainability into organizational decision-making (WCED, 1987). The "green investment theory" emphasizes environmentally friendly policies and practices, reflecting the integrative approach to sustainability, particularly ESP (Bansal, 2005). GIP are rooted in the idea of sustainable development, aiming to mitigate organizational activities posing negative environmental impact (Khan et al., 2023). These practices aim to

minimize adverse effects, such as excessive water and energy use, and waste generation. Scholars have explored various factors influencing ESP and GIP. Ethical practices in environmental matters have been linked significantly to sustainable corporate performance as studied by Nicolaides (2017), and stakeholders play a positive role in enhancing corporate environmental sustainability (Góes et al., 2023). Environmental protection acts and regulations set by the state agencies are widely recognized as primary forces to foster corporate environmental practices (Tang et al., 2023). Lastly, market competition positively impact sustainable business practices (Danso et al., 2019). Despite an extensive body of literature on ESP and GIP, there is a gap in understanding their impact on the firm performance. This study suggests that environmental sustainability and green investment practices are significant predictors of firm performance.

Ethical, Stakeholders, Legal and Competitive Pressures

Organizations are increasingly recognizing their critical responsibility in mitigating the environmental impact of their operations. ESP in the supply chain has emerged as a crucial consideration for businesses and consumers, driven by factors like business ethics, regulatory mandates, market trends, and pressure from stakeholders.

Studies reveal a rising trend in environmental responsibility as businesses strive to avoid unethical practices leading to environmental damage. For instance, companies are actively managing waste and emissions to prevent environmental harm, showcasing their commitment to ethical environmental practices (Fritz, 2024). However, the patterns of environmental ethics vary across industries, influencing organizational strategies. Management plays a pivotal role in environmental ethics, with beliefs varying among organizations and their demographics. As market competition intensifies, there is a noticeable inclination towards environmental ethics among organizational leaders, contributing to the overall sustainability practices of firms (El-Kassar & Singh, 2019).

H1a: Ethical Pressure drives positive Environmental Sustainability Practices.
H1b: Ethical Pressure drives positive Green Investment Practices.

Stakeholders, individuals or groups with an interest in business actions, exert influential pressure on businesses to adopt environmental friendly practices. According to the stakeholder theory, businesses are motivated to implement various ecological practices for sustainable environmental performance in response to pressure exerted from various stakeholders (Darnall et al., 2010). Activism, advocacy, and the use of purchasing power are key avenues through which stakeholders drive businesses to adopt sustainable practices (Shubham et al., 2018). For instance, consumers' choices for environmentally sustainable products create market demand, compelling businesses to align with sustainability goals. Stakeholders' investment decisions and regulatory tools further incentivize businesses to adopt sustainable practices and technologies. A real-world example is the increasing influence of environmentally conscious investors, prompting businesses to enhance their sustainability practices.

H2a: Stakeholder Pressure drives positive Environmental Sustainability Practices.
H2b: Stakeholder Pressure drives positive Green Investment Practices.

Laws and regulations for environment protection are instrumental in setting legal standards for businesses, to minimize their negative ecological impact, such as the Clean Air Act and Clean Water Act (Epstein & Buhovac, 2014). Legislation like the

Resource Conservation and Recovery Act governs hazardous waste, preventing harmful chemical releases. These laws, coupled with global agreements like the Paris climate accords 2015, create a framework for businesses to address climate change and reduce greenhouse gas emissions. A practical example is how companies, to comply with environmental laws, invest in technologies that reduce air and water pollution, showcasing their commitment to legal sustainability. State and municipal regulations also contribute to environmental sustainability.

H3a: Legal Pressure drives positive Environmental Sustainability Practices.
H3b: Legal Pressure drives positive Green Investment Practices.

Market competition, driven by the pressure to reduce costs, encourages businesses to adopt ESP and GIP to remain competitive (Wilburn Green et al., 2015). Transparency in environmental performance influences consumer choices, creating market pressure for businesses to enhance their sustainability practices. For example, companies striving for a competitive edge may invest in sustainable sourcing and procurement practices, reducing their carbon footprint and attracting environmentally conscious consumers and investors (Chen et al., 2017). Strong environmental regulations can further influence the relationship between market competition and sustainability practices.

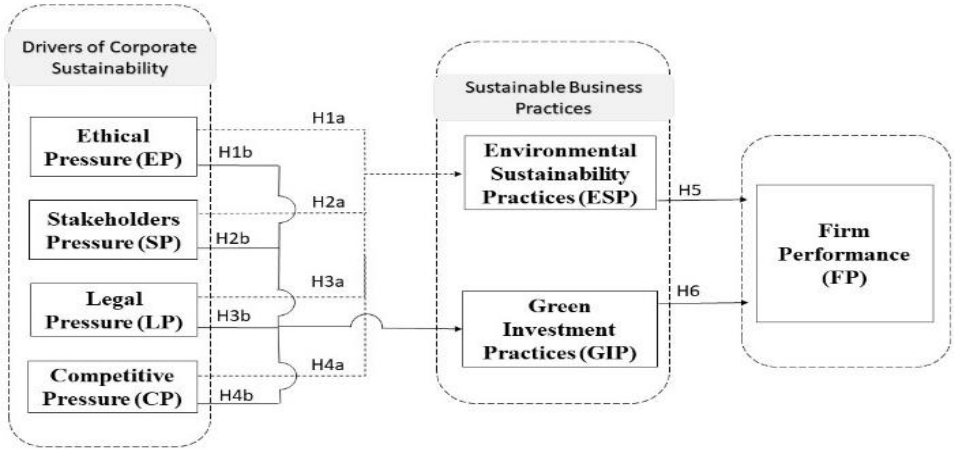
H4a: Competitive Pressure drives positive Environmental Sustainability Practices.
H4b: Competitive Pressure drives positive Green Investment Practices.

Firm Performance

The adoption of sustainable business practices not only aligns with environmental goals but also rewards with competitive advantages, including cost savings, enhanced brand reputation, and expanded market access (Wang & Zhi, 2016). This integration not only reduces environmental footprints but also brings about financial benefits (Kasztelan, 2017). The emphasis on ESP enables businesses to address global challenges like climate change and resource protection, fostering a more sustainable future. In the realm of green investment, various strategies, including direct investment in sustainable firms and funds focused on eco-friendly industries, prove financially viable (Lee & Min, 2015). Robust Environmental, Social, and Governance (ESG) performance is correlated with positive investment outcomes. Despite concerns about ESG data reliability, literature suggests that GIP serves as a viable avenue for investors seeking both financial returns and environmental sustainability (Huang et al., 2016). Supporting environmentally sustainable companies through financial investments can drive the development and adoption of eco-friendly technologies, contributing to a more sustainable future. From above discussion we can lead to the formulation of following hypothesis, also summarized in Fig. 1.

H5: Environmental Sustainability practices drives positive Firm Performance.
H6: Green Investment practices drives positive Firm Performance.

Figure 1
Conceptual model of the study.



Grey System Theory

Proposed by the scientists of China in the 1980s, Grey System Theory (GST) encompasses flagship models known as Grey Relational Analysis (GRA), in which Deng's GRA model serve as a foundational approach (Rajesh & Ravi, 2015). Deng Julong articulated GST, integrating space theory, control theory, and system theory to analyse grey sets, classifying systems into black, white, and grey based on the completeness of information (Javed et al., 2019). One key advantage of GST is its result reliability, even in situations with insufficient sample size and unclear probability distributions (Javed et al., 2018; Liu & Yang, 2017).

Grey data analysts widely employ GRA models to explore relationships within uncertain systems, finding applications across diverse domains such as healthcare, project management, sustainable supply chains and construction industry (Arce et al., 2015; Diba & Xie, 2019; Javed et al., 2019; Sheikh et al., 2019). While Deng's classical GRA model and Liu's Absolute GRA model were capable of predicting associations between data, they were limited in revealing how factors complement each other or the circumstances under which they are mutually inclusive (Javed et al., 2019). To address this limitation, the Second Synthetic GRA (SSGRA) model emerged as a significant advancement in GRA research. By combing Deng's GRA model and Liu Sifeng's Absolute GRA methodology, the SSGRA model provides decision-makers with a comprehensive assessment tool, offering a thorough measure of proximity for system evaluation.

For the two datasets $Y_i = (y_i(1), y_i(2), \ldots, y_i(n))$ and $Y_j = (y_j(1), y_j(2), \ldots, y_j(n))$, the Grey Relational Grade (GRG) of the two variables associated with a system, is presented by:

$$\gamma_{0i} = \frac{1}{n}\sum_{k=1}^{n} \gamma(y_o\,(k), y_i(k))$$

Another popular GRA model, to find the correlation between different uncertain data series, the Absolute Grey Relational Analysis (AGRA) model is given by expression:

$$\varepsilon_{ij} = \frac{1 + |s_i| + |s_j|}{1 + |s_i| + |s_j| + |s_j - s_i|}$$

Lastly, the Second Synthetic Grey Relational Analysis (SSGRA) can be calculated using

below mathematical equation for systematically evaluating a complex system using the above discussed GRA models.

$$\rho_{ij} = \theta\left|\varepsilon_{ij}\right| + (\mathrm{i} - \theta)\gamma_{ij}, \theta \in [0,1]$$

Here ε is denoting the Absolute GRG, γ is denoting the GRG, and ρ is denoting the SSGRG. Where θ value is set as 0.5 for current study.

Ridit Analysis Model

Ridit analysis, a new application of very old idea of probability transformation, was conceived by Bross in 1958. So far it has been applied to various business management and behaviour studies but in the beginning, it has been successfully applied to the study of cancer, schizophrenia and automobile accidents. This ranking-based technique is distribution free, such that it puts no condition about distribution of the sample. It tests the following hypothesis:

$$H_0: \forall_{i,}\Gamma_{\mathrm{i}} = \mathbf{0.5} \text{ and} H_a: \exists_{i,}\Gamma_{\mathrm{i}} \neq \mathbf{0.5}$$

By using Kruskal-Wallis statistics W

$$W = 12\sum_{i=1}^{m}(\pi_i\,(\Gamma\mathrm{i} - \mathbf{0.5})^2$$

Here, χ^2 distribution with (m-1) degrees of freedom are followed by W.

Methodology of Research

Constructs and Validity

First discuss the constructs and their measures; every construct has four items to measure each of the four pressure variables (EP, SP, LP and CP), environmental sustainability practices (ESP), green investment practices (GIP) and firm performance (FP). In order to predict ESP, a critical component of corporate sustainable development in prior researches, we adopted four measure items from Bansal (2005) to develop a construct. For the next crucial factor ESP, we adopt items from (Gupta & Gupta, 2020) study based on balanced scorecard approach proposed by (Kaplan & Norton, 1992) to draft the essential framework for firm performance. It focuses on four major performance outcomes including financial, customer, internal business process performance, and learning and growth perspectives. Finally, the complete survey consists of 28 items in total having all of its constructs adapted from previous publications (see Appendix A). While tailoring the scale items from mentioned approaches before hooking onto the context of this study, the author implemented minor adjustments under the guidance from an expert panel comprised of subject professors and industry professionals. The deliberate exclusion of certain items from the aforementioned studies was based on the assessment to avoid duplication and redundancy within the framework of our investigation. By refining the scale in this manner, our objective was to streamline the survey instrument, ensuring clarity and avoid redundancy. Prior to this, it also inquires about the age, gender information, job title, years of experience and other necessary details. Likert scale survey of five points was used for the study in which "05" measures Strongly Agree and "01" signifying Strongly Disagree. We also verify the pilot testing using a small sample size of 30 responses.

Results

Data Collection and Survey Demographics

This study follows a quantitative approach to examine the relationship between four key drivers of corporate sustainability on sustainable business practices, to check the further impact on firm performance of sampled FMCG sector organizations in Pakistan. To collect data, the researchers carefully approached professionals working at FMCG organizations in Pakistan through work emails. A survey questionnaire was filled between Match 2023 to August 2023 by a total of 289 respondents. In addition to online forms, working professionals enrolled in Executive Master of Business Administration (EMBA) class of 2023, particularly in Supply Chain concentration, at 3 top Pakistani business schools were approached physically to fill the survey. Table 1 provides valuable insights of the demographic and professional association of the respondents.

Table 1
Respondents Description

Particulars	Description	Values	Percentage
Response rate	Questionnaire	513 sent	
		289 received	56.33%
Gender	Female	152	52.6%
	Male	137	47.4%
Respondent Ages	24 - 35	95	32.87%
	36 – 45	121	41.86%
	46 and above	73	25.25%
Job Position	Lower management	123	42.56%
	Middle management	142	49.13%
	Upper management	24	8.30%
Years of Experience	Less than 5	78	26.98
	5 – 10	144	49.82
	11 – 15	53	18.33
	More than 15	14	4.84

Data Analysis

Data was analysed using Smart PLS version 4.0.9.6 software. In this investigation, Partial least squares structural equation modeling (PLS-SEM) was employed for the following reasons. This method works best for the prediction and evaluation of the dependent variables in order to comprehend the higher amount of variance. According to Roldán and Sánchez-Franco (2012), PLS-SEM is the best prediction-oriented technique because it is capable of handling structural model and measurement model both at the same time. Another important feature of this technique is being highly suitable to manage complex path models (Hair Jr et al., 2021). Last but not the least, even small sample size can be employed in this technique to get accurate results. Therefore, PLS-SEM appears to be the best approach for this analysis, further comparison can be seen in Table 2. Additionally, the calculation of Deng's GRG, AGRG and SSGRG was conducted using the grey system modeling software developed by Nanjing University of Aeronautics and Astronautics (NUAA).

Table 2
Comparison of different statistical techniques

Approach Issues	Partial Least Square	Common Variance Based	Regression
Minimum Dataset	Minimum responses are 10 for an item	Minimum 100 sample size	A sample of 30 values is sufficient to analyse
Analysis Procedure	Path Specific for rejecting Null hypothesis	Null hypotheses rejection is path specific. Also, entire model is valid for null hypothesis	Path Specific for rejecting Null hypothesis
How variance analysis is explained	The higher the R^2	Complete fit model, such as X^2 is not significant or high AGFI	The higher the R^2
Theoretical foundation	An exploratory as well as confirmatory research can be performed and in this technique not even a definite theoretical foundation is required	confirmatory type of research is supported only with strong theoretical base.	Exploratory as well as confirmatory research can be performed and in this technique not even a definite theoretical foundation is required
Distribution	Robust technique for multivariate analysis	If ML is used for estimation, then multivariate normal. Additional estimating methods are used to justify deviations from the multivariate normal.	This approach is more reliable when applied to multivariate analysis, as there are well-established techniques for managing non-multivariate distributions.

Statistical Analysis Using Smart PLS

Analyzing the Measurement Model

Prior testing the hypothesis, we examine the measurement model for average variance extracted (AVE) along with factor loadings and composite reliability (CR) to assess convergent validity. Table 3 displays the convergent validity results. According to the criteria of Hair Jr et al., (2021), with a few exceptions, every item's loading and CR value is higher than 0.70 limit. AVE also satisfies the criteria and is greater than the prescribed 0.50 values. Items with factor loadings slightly lower than <0.70 are kept because of their satisfied AVE values of the construct (refer Table 3).

Table 3 - Reliability and validity

Variables	Items	F.Loadings	V.I.F	T-values	Cα	C.R	A.V.E
Ethical Pressure	EP1	0.809	1.969	28.037	0.792	0.815	0.616
	EP2	0.682	1.379	11.762			
	EP3	0.820	1.584	39.584			
	EP4	0.821	2.019	31.573			
Stakeholders Pressure	SP1	0.787	1.467	17.274	0.686	0.698	0.516
	SP2	0.750	1.310	12.827			
	SP3	0.623	1.183	8.904			
	SP4	0.704	1.319	11.362			
Legal Pressure	LP1	0.827	2.704	25.420	0.756	0.781	0.574
	LP2	0.885	4.147	42.151			
	LP3	0.773	2.398	17.160			
	LP4	0.884	4.231	47.060			
Competitive Pressure	CP1	0.826	1.568	42.967	0.865	0.878	0.712
	CP2	0.763	1.419	25.154			
	CP3	0.703	1.510	12.857			
	CP4	0.731	1.503	15.335			
Environmental Sustainability	ESP1	0.853	2.817	44.860	0.877	0.878	0.731
	ESP2	0.854	2.864	46.519			
	ESP3	0.867	3.008	56.956			
	ESP4	0.845	2.786	35.287			
Green Investment Practices	GIP1	0.806	1.508	29.613	0.764	0.776	0.582
	GIP2	0.768	1.418	17.808			
	GIP3	0.738	1.539	15.447			
	GIP4	0.738	1.538	14.245			
Firm Performance	FP1	0.824	1.682	39.320	0.730	0.803	0.548
	FP2	0.840	1.795	45.855			
	FP3	0.612	1.481	10.386			
	FP4	0.659	1.449	10.761			

Discriminant validity is confirmed using the Fornell–Larcker criteria and the technique known as Heterotrait–Monotrait (HTMT) ratios. Table 4a shows that the top most values of all columns are the highest, indicating that the Fornell–Larcker criteria verify discriminant validity (Hair Jr et al., 2021; Henseler et al., 2015). The Fornell–Larcker criterion is effective in evaluating discriminant validity, but it may not be able to detect its absence. As per the criteria, Table 4b displays HTMT values of each variable less than 0.90 (Hair Jr et al., 2021)

Analysis of Structural Model

Assessment of the structural model is the next step in PLS-SEM evaluation. After assessing the structural model, the results were interpreted using general recommendations from (Hair Jr et al., 2021). Here, first we check the multicollinearity through variance inflation factor (VIF), should be below 0.4 value as per recommended guidelines. It confirms the robustness of the model and demonstrates that there is no collinearity in the data utilized in this investigation. Next, we check predictive relevance of our model consists of three endogenous constructs (see Figure1). We found the R^2 value of ESP as 0.435 (Q^2 = 0.388), R^2 for GIP as 0.245 (Q^2 = 0.208) and for FP as 0.541 (Q^2 = 0.504) which shows that the variance explained by the predictors of respective constructs is equal to 43.5%, 24.5%, and 54.1%. The values of Q^2 higher than 0.10 also confirm satisfactory predictive relevance (Falk & Miller, 1992). Table 5 and Figure 2 denotes the results of hypothesis evaluation for the structural relationship between the latent variables in our conceptual model. The findings of bootstrapping results with 5000 resamples indicate that H1a hypothesis of Ethical pressure and ESP with $\beta = 0.287$, $t = 3.217$; $p < 0.001$ revealed the impact as significant. Whereas the H1b hypothesis of Ethical pressure and GIP with $\beta = -0.105$, $t = 1.485$; $p < 0.138$ revealed the insignificant impact and does not support the relationship. Similarly, the H2a hypothesis of Stakeholders pressure with ESP with $\beta = 0.05$, $t = 1.174$; $p < 0.24$ revealed the insignificant impact and does not support the relationship. However, the relationship determined by H2b between Stakeholders Pressure and GIP revealed as significant with $\beta = 0.201$, $t = 2.632$; $p < 0.009$. The relationship between Legal pressure and ESP in H3a hypothesis revealed the significant impact with $\beta = 0.207$, $t = 2.296$; $p < 0.022$. On the other hand, the H3b hypothesis between Legal pressure and GIP with $\beta = -0.049$, $t = 0.87$; $p < 0.384$ holds the relationship as not significant. Hypothesis H4a and H4b of Competitive pressure with ESP and GIP were revealed as significant with $\beta = 0.288$, $t = 3.016$; $p < 0.003$ and $\beta = 0.469$, $t = 5.64$, $p < 0.000$ respectively. Finally, the Firm performance has found a positive impact by ESP and GIP with $\beta = 0.68$, $t = 10.247$; $p < 0.000$ and $\beta = 0.159$, $t = 2.64$, $p < 0.000$ that supports H5 and H 6 respectively.

Table 4a Discriminant Validity (Fornell-Larcker Criterion)

	EP	SP	LP	CP	ESP	GIP	FP
EP	**0.757**						
SP	0.673	**0.785**					
LP	0.577	0.581	**0.855**				
CP	0.450	0.260	0.249	**0.763**			
ESP	0.677	0.657	0.719	0.326	**0.740**		
GIP	0.380	0.402	0.433	0.091	0.359	**0.844**	
FP	0.346	0.341	0.251	0.327	0.348	0.020	**0.719**

Table 4b
Discriminant Validity (Heterotrait-Monotrait (HTMT) Ratio)

	EP	SP	LP	CP	ESP	GIP	FP
EP							
SP	0.829						
LP	0.684	0.686					
CP	0.562	0.303	0.299				
ESP	0.831	0.810	0.829	0.398			
GIP	0.492	0.493	0.493	0.111	0.456		
FP	0.456	0.459	0.327	0.419	0.460	0.096	

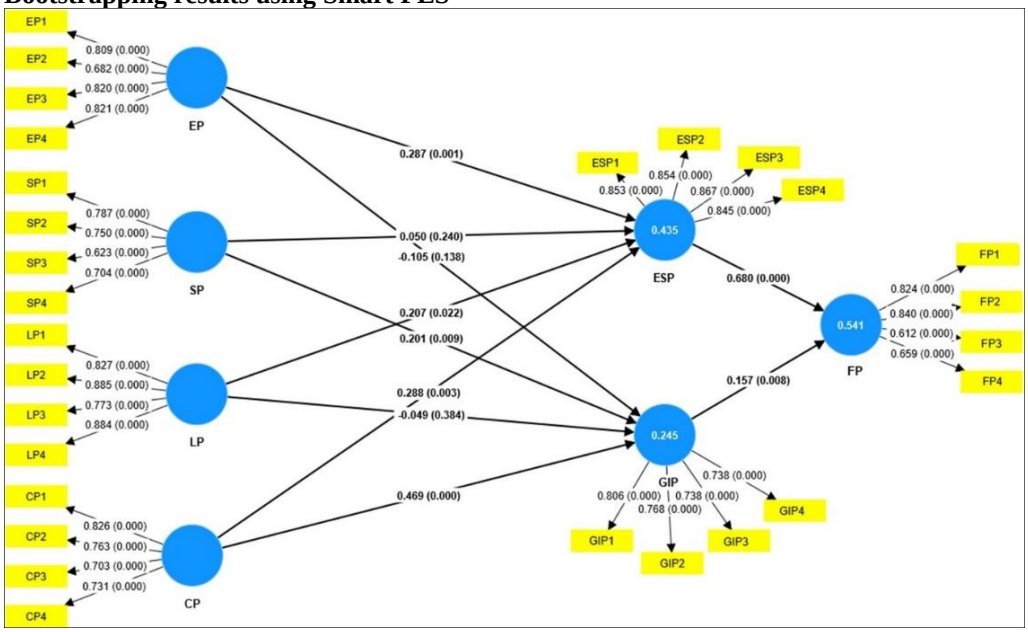
Table 5
Coefficient of determination and predictive relevance

Endogenous Constructs	R^2	Q^2
ESP	0.435	0.388
GIP	0.245	0.208
FP	0.541	0.504

Table 6
Path Coefficients – Mean, Standard Deviations, T values, P values.

Hypothesis	Original sample (O)	Sample mean (M)	Std. Dev	T statistics	P values	Decision
EP -> ESP	0.287	0.288	0.089	3.217	0.001	Supported
EP -> GIP	-0.105	-0.104	0.071	1.485	0.138	Not Supported
SP -> ESP	0.05	0.052	0.042	1.174	0.24	Not Supported
SP -> GIP	0.201	0.209	0.077	2.632	0.009	Supported
LP -> ESP	0.207	0.203	0.09	2.296	0.022	Supported
LP -> GIP	-0.049	-0.047	0.057	0.87	0.384	Not Supported
CP -> ESP	0.288	0.291	0.095	3.016	0.003	Supported
CP -> GIP	0.469	0.469	0.083	5.64	0.000	Supported
ESP->FP	0.68	0.682	0.066	10.247	0.000	Supported
GIP -> FP	0.157	0.159	0.059	2.64	0.008	Supported

Figure 2
Bootstrapping results using Smart PLS



GRA Findings

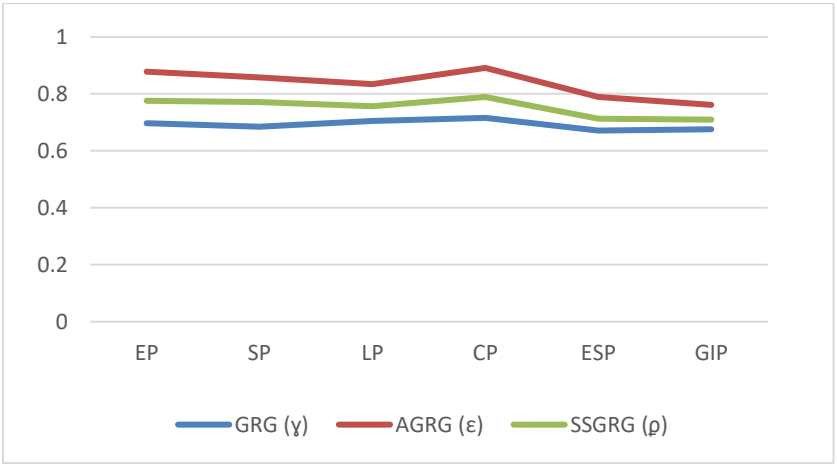
The most influential drivers towards ESP and GIP, shown in the results of Deng's GRA model analysis in Table 7, are Competitive Pressure followed by Legal Pressure, Ethical Pressure, and Stakeholder Pressure. Secondly, the rank results of AGRA and SSGRA models also show Competitive Pressure (ε=0.8913, ρ=0.7891) as most influential towards ESP and GIP followed by Ethical, Stakeholder and Legal pressures. Further, ESP and GIP are strongly associated with Firm performance. The order in which the pressure variables have most vicinity with the ESP and GIP as per the second synthetic grey relational grades is CP> EP> SP> LP. Finally, the ranking as per the beta coefficients values from structural modelling are CP> EP> LP> SP. Above result insights shows that the rank positions of 1st and 2nd pressure variables are same in both rankings, whereas, 3rd and 4th are switching their positions. In both methodologies, Competitive pressure shows the highest association with ESP and GIP.

Table 7 - Grey Relational Evaluation - *Response variable (DV) = Firm Performance

	Ridit Mean (Γ)	Ranks	Beta Value (β)	Ranks	GRG (γ)	Ranks	A.GRG (ε)	Ranks	SS.GRG (ρ)	Ranks
EP	0.5855	2	0.2871	2	0.6977	3	0.8776	2	0.7763	2
SP	0.5990	4	0.0556	4	0.6845	4	0.8584	3	0.7717	3
LP	0.5943	3	0.2074	3	0.7045	2	0.8345	4	0.7564	4
CP	0.5613	1	0.2881	1	0.7158	1	0.8913	1	0.7891	1
ESP*	0.5866	-	0.6893	-	0.6712	-	0.7892	-	0.7126	-
GIP*	0.5674	-	0.1570	-	0.6756	-	0.7615	-	0.7096	-

The three grey model ranks are also shown in a graphical representation in Figure 3.

Figure 3
Three grey models showing the Grey relational comparative evaluation



Ridit Analysis Findings

Selecting a reference data set to use in the Ridit calculation process is the first stage in this analysis. In this research, the complete survey dataset is chosen as the reference dataset. Table 8 shows the frequencies of the responses and various ridits for the complete data set. The Ridit value is calculated for each category from "strongly agree" to "strongly disagree".

The 95% confidence interval is calculated by expression $\mathbf{\Gamma i} \pm \frac{1}{\sqrt{3\pi_i}}$

Table 8
Ridit Analysis

Table 8 – Ridit Analysis

	S.Agree (5)		Agree (4)		Neutral (3)		Disagree (2)		S.Disagree (1)		π_i	Mean Ridit (Γ_i)	Rank	L.B	U. B
	Ref Ridit	Comp Ridit	Ref Ridit	Comp Ridit	Ref Ridit	Comp Ridit	Ref Ridit	Comp Ridit	Ref Ridit	Comp Ridit					
EP	154	0.139	256	0.144	232	0.173	31	0.030	4	0.013	289	0.5855	2	0.483	0.687
SP	143	0.129	334	0.186	168	0.125	80	0.067	1	0.003	289	0.5990	4	0.496	0.701
LP	141	0.127	367	0.204	174	0.128	43	0.036	3	0.010	289	0.5943	3	0.491	0.697
CP	167	0.151	227	0.126	209	0.155	36	0.030	5	0.017	289	0.5613	1	0.458	0.664
fj	605		294		195		49			13	1156				
fj/2	302.5		147		97.5		24.5			6.5					
Fj	302.5		752		996.5		1118			1149					
Rj	0.261		0.650		0.862		0.967			0.994					

As a generic nonparametric test for comparing more than two independent samples, the Kruskal-Wallis test is very helpful. It can be applied to determine if these samples are representative of the same distribution. It provides a strong substitute to one-way ANOVA test. If results of Kruskal-Wallis test are significant then analysis through non-parametric multiple comparison test is useful for further investigation.

Kruskal-Wallis value after calculation (W=103.160) is significantly greater than $\chi^2(4 -$

1) = 7.815, it can be concluded that the opinions among the respondents about the pressure variables (EP, CP, LP and SP) are someway different, as proved statistically. It is clear from Table 8, showing confidence intervals, respondent's opinion about competitive pressure is significantly different from SP. The probability to disagree with the significance of CP, compared to reference data, is low. Alternatively, it can be written as the respondents are more likely to anticipate that ESP and GIP are significantly impacted by competitive pressure. On the other hand, respondents have higher probability of disagreeing with stakeholders' pressure. Furthermore, respondents are more agreeable to CP (**I**=0.5613) than SP ($\boldsymbol{\Gamma_i}$=0.5990) making a positive impact on environmental sustainability and green investment practices. Eventually, the following order results from a straight sorting of mean ridits according to the likelihood of being in a favorably impacting propensity:

CP(0.5613)>EP(0.5855)>LP(0.5943)> SP(0.5990).

Selection of Appropriate Technique

Here the question arises that results from which technique results are more reliable? The answer can be found by analyzing the theoretical underpinnings of these two approaches: while statistical methods and probability theory deploy large samples while taking data distribution into account. Whereas GST methods, typically used to analyze systems with high uncertainty, are specifically intended for small samples irrespective of its distribution (Javed et al., 2018; Liu & Yang, 2017). Therefore, if there is an insufficient dataset, one can easily be guided through the ranks provided by SSGRA model; if not, then results acquired from structural modeling can be trusted. However, we are mostly surrounded by systems with uncertainty. Amidst increasing complexity and uncertainty in organizational environments due to new challenges, unconventional approaches are essential for analyzing green investment practices. The evolving landscape, further intensified by the anticipated rise of machine learning algorithms and artificial intelligence, underscores the potential relevance of intelligent methodologies like GST in upcoming applications.

In addition to Table 2 highlighting PLS approach, the characteristics of other two methods are summarized in below Table 10. Each method has its pros and cons

Table 10
GRA characteristic comparison with RIDIT analysis

	GRA	**RIDIT analysis**
Assuming distribution	Not required	Not required
Dataset condition	Interval based	Ordinal based
Data series for reference	Required	Required
Difficulty	Medium	High
Weight categories	Applicable	Not Applicable
Partiality indicators	GRG grades	Means
Critics/Drawbacks	Interval argument of item responses	Ridits interpretation is complex

Discussion

Despite the existing research suggesting that ESP and GIP are positively correlated with various internal as well as external drivers, till date, no prior study has examined

the above constructed correlations empirically in a comprehensive model. To check the hypothesis, data was collected by the researchers from experienced professionals of Pakistan's FMCG industries working at upper, middle and junior level management positions.

Impacts of Ethical, Stakeholder, Legal and Competitive Pressures

This study revealed that Ethical pressure has a considerable impact on organizational behaviors and practices in terms of environmental sustainability. Organizations have a substantial influence on the environment, and environmental sustainability practices are important for the healthiness and prosperity of the enterprises and planet both. Customers and workers, for example, might put ethical pressure as they are becoming more conscious about the environmental effects of the products and services. Customers may opt to support companies that prioritize ecologically friendly practices. Employees may also exert ethical pressure on businesses to prioritize ESP, either individually or through employee groups or unions (Desore & Narula, 2018). However, this study has found that ethical pressure does not have a significant effect on GIP. Hence, organizations are likely to adopt environmental sustainability due to ethical pressure without making much investment. Thus, H1a is accepted, and H1b is rejected.

Stakeholder pressure may have a big impact on how corporations behave and invest in terms of environmental sustainability. Investors and industry groups are two examples of stakeholders that may put pressure on firms to prioritize ESP. Industry groups may set environmental sustainability standards and best practices, and companies that do not adhere to them may suffer repercussions like losing membership or reputational harm (Corral Verdugo, 2012). This study found that H2b i-e impact of stakeholder pressure on pushing GIP in businesses to be significant, as businesses feel the pressure to adopt green practices in order to meet the expectations of the stakeholders. This is consistent with the recent study by Lyulyov et al., (2023) revealing stakeholder's involvement draws in substantial impact on green investment practices with appreciable position in global market. Engaging stakeholders also develops both party's confidence and transparency, essential criteria of sustainable development. As a result, it can increase the company's market valuation and create new opportunities by getting listed on national and international stock exchanges as green certified entities for potential investors. However, this study has also found that the role of stakeholders H2b in pushing organizations toward ESP in the sampled organizations is not significant.

This study find that Legal pressure significantly influences how firms behave and operate in relation to environmental sustainability. Governments have enacted regulations that require businesses to minimize their environmental impacts, such as regulations on pollution, waste management, and natural resource use. While considering fairness concerns, a recent study suggested an improvement in the holistic and refined collaborative governance mechanism near Yangtze river to control industrial pollution by means of joint environmental law enforcement, such as off-site enforcement, cross enforcement, and roving enforcement (Qu & Cang, 2022). However, our study also finds that there is an insignificant impact of legal pressure on green investment practices. This is someway inconsistent with the previous study by Lai and Sohail (2022) which found that Legal pressure has a positive and significant impact on Green investment practices and innovation performance as per Chinese time-series data from 1998 to 2020. Therefore, H3a is accepted, while H3b is rejected. This means that legal factors are growing in popularity and organizations with more comprehensive

environmental policies, laws and regulations, employee unions, and rights for consumers Deswanto and Siregar (2018) exert greater stress on decision-makers to adopt eco-friendly practices. Additionally, FMCG companies across Pakistan should engage effectively in CSR activities as part of their moral duty of giving back to society by creating environmentally aware and healthy community.

Competitive pressure has been found to be the strongest on ESP and GIP supporting both H4a and H4b. This terms that businesses feel pressure to adopt environmentally sustainable approach in order to remain competitive and attract customers, investors, and other stakeholders. Competitive pressure has a variety of effects on ESP in enterprises. Consumer preferences, investor interests, and industry standards are all important considerations. Consumers may opt to support firms that prioritize ecologically friendly practices as they become more conscious of the environmental effect of the products and services they purchase. In addition, investors are also becoming more aware of the environmental impact of the businesses in which they invest, and they may choose to invest in companies that have strong records of ESP (Pujara et al., 2019). Besides this, industry associations may establish standards and best practices for environmental sustainability, and businesses that fail to meet these standards may face consequences such as reputational damage or loss of membership. This can create competitive pressure for businesses to adopt ESP in order to remain competitive within their industry (Chen et al., 2017).

Impact of ESP on Firm Performance

This study finds H5 as significant relationship between environmental sustainability practices and firm performance. Companies are increasingly adopting sustainability metrics and reporting to monitor and communicate their advancements in environmental sustainability within the supply chain. This shift is motivated by the imperative to exhibit transparency and accountability to stakeholders, showcasing the impact of sustainability initiatives. Metrics including greenhouse gas emissions, energy consumption, and waste reduction are now pivotal in tracking and reporting sustainability performance. A notable trend is the move toward sustainable sourcing and procurement practices, where companies prioritize environmentally friendly suppliers. This involves efforts to minimize the environmental impact of packaging, such as utilizing biodegradable materials and reducing packaging waste. In addition, many companies are now adopting closed-loop packaging systems, where packaging is recycled and reused rather than discarded as waste. This not only helps to reduce waste but also supports the development of a circular economy. Another key trend in environmental sustainability in the supply chain is the application of green logistics and green transport-operation practices (Marshall et al., 2015). Supply chain companies are now seeking out ways to reduce the environmental impact of transportation and logistics, such as using fuel-saving vehicles, improving transportation routes, and minimizing plastic. In addition, organizations are now looking for ways to use alternative modes of transportation, such as rail or sea transportation, which have a lower carbon footprint and economic benefits than air transportation (Anthony Swaim et al., 2016).

Impact of GIP on Firm Performance

This study has found H6 as significant with strong impact of green investment practices on firm performance. These findings are consistent with previous study by

Indriastuti and Chariri (2021) showing green investment positively affect firm performance in Indonesian manufacturing firms. This translates that companies with strong financial muscles for environmentally and socially responsible practices tend to outperform their peers financially over the long term. This can be achieved by considering factors such as green R&D and increased customer and investor demand for environmentally sustainable products and services (Martins et al., 2021). Also, companies that prioritize environmentally and socially responsible practices may be viewed more favorably by customers, investors, and other stakeholders, which can enhance the company's reputation and brand value. Besides this, firms that prioritize environmentally and socially responsible practices may also experience higher levels of employee engagement and retention, as employees may be more motivated and satisfied when working for an organization that aligns with their values.

Conclusion

By using the methodologies of GRA, SEM, and Ridit analysis with a sample of 289 respondents drawn from Pakistan's FMCG sector, this study adds to the expanding body of research on environmental sustainable development by examining the effects of four critical pressures of corporate sustainability on sustainable business practices, further examine the relationship with firm performance. Ten hypotheses were established based on the theoretical concept of sustainable development and available literature. Our study has found that all the drivers except stakeholder pressure were found positively significant towards environmental sustainability practices. Whereas, competitive pressure and stakeholders pressure found influential in driving green investment practices. Further, it was found that ESP and GIP positively enhances firm performance. The research findings suggest that, considering the significant impact of key corporate sustainability drivers, the sustainable business practices ESP and GIP should be benchmarked and encoded in an organizational strategic goals, as they have positive relationships with firm performance indicators.

Also, the outcomes of the GRA and Ridit analysis confirm the robustness of our results analysed through SEM. These insightful findings offer developing nations like Pakistan a path forward for incorporating the influence of these critical pressures while devising the corporate policies to attain sustainable development objectives. Though, to gain an environmentally friendly competitive edge, FMCG organization needs to develop green products for its consumers, adopting environmentally savvy technological advancements more than the competitors, does not ignore the environment for market pricing and increasing customers' environmental awareness.

Research Implications and Limitations

This paper significantly contributes to the existing research by expanding insights into environmental sustainability practices, green investment practices, and firm performance within the FMCG sector of Pakistan. Addressing a critical gap, the research introduces a comprehensive model that empirically analyzes the substantial role of four key drivers of corporate sustainability and the extent to which they influence business practices, guided by the sustainable development theory. This research study aligns with the UN Sustainable Development Goal 13, emphasizing urgent actions against global warming. The "go-green" approach, emphasizing carbon-free growth, emerges as a pivotal strategy, with green investment playing a crucial role. The study explores the

influence of green investment practices on firm performance in highly polluted Asian economies, providing valuable insights into environmental protection by conserving energy resources and reducing pollution, CO2 emissions, industrial waste. The findings of this research have practical implications for organizations aspiring to become eco-innovative firms committed to ecological sustainability. Regulatory bodies, government entities, and top leadership are urged to commit to environmental sustainability and translate this commitment into renewed interest and actions. The study emphasizes that commitment to environmental sustainability and green investment practices is pivotal in driving actual sustainability results. Many organizations around the world especially MNCs allocate budget and resources to create awareness of environmental issues, but their efforts in Asia seem to be less effective as most business do not take environmental issues seriously (Farooq et al., 2014). It is recommended that states and lawmakers take remedial actions to stop environmental deterioration, improve industrial standards, and support environmental friendly ventures through green investment funds. Such actions are essential in countries that are developing economies such as Pakistan, where green investment practices are just beginning to emerge. The study provides valuable guidance for environmentally conscious investors, recommending a focus on investments in green projects and R&D for eco-friendly supply chains. Such investments are not only crucial for achieving business sustainability through environmental management but also translate into enhanced financial returns, brand equity, and customer engagement. While the study primarily focuses on supply chain activities in the Pakistani FMCG sector, the results can be cautiously extrapolated to companies in different operational domains. Future research endeavors could expand the study's scope by incorporating a diverse and large sample size to facilitate meaningful comparisons. Additionally, a longitudinal and experimental approach is recommended for a more conclusive understanding of causal relations. The study encourages further exploration of economic measures of firm performance to evaluate monetary returns, particularly related to green innovations, such as Internal rate of return (IRR), Return on Investment (ROI) and Payback period and weighted average cost capital (WACC) to evaluate firm performance across different contexts and countries.

References

Anthony Swaim, J., Maloni, M. J., Henley, A., & Campbell, S. (2016). Motivational influences on supply manager environmental sustainability behavior. *Supply Chain Management: An International Journal*, *21*(3), 305-320.

Arce, M. E., Saavedra, Á., Míguez, J. L., & Granada, E. (2015). The use of grey-based methods in multi-criteria decision analysis for the evaluation of sustainable energy systems: A review. *Renewable and Sustainable Energy Reviews*, *47*, 924-932.

Bansal, P. (2005). Evolving sustainably: A longitudinal study of corporate sustainable development. *Strategic management journal*, *26*(3), 197-218.

Bastas, A., & Liyanage, K. (2018). Sustainable supply chain quality management: A systematic review. *Journal of cleaner production*, *181*, 726-744.

Borgert, T., Donovan, J. D., Topple, C., & Masli, E. K. (2020). Impact analysis in the assessment of corporate sustainability by foreign multinationals operating in emerging markets: Evidence from manufacturing in Indonesia. *Journal of cleaner production*, *260*, 120714.

Brand-Audit. (2022). *Five Years of Holding Plastic Polluters Accountable. Branded. Brand Audit Report 2022 By Break Free From Plastic. (2022, March).*

Burbano, V. C., Delmas, M. A., & Cobo, M. J. (2022). The past and future of corporate sustainability research. *Organization & Environment*, 10860266231213105.

Chen, L., Zhao, X., Tang, O., Price, L., Zhang, S., & Zhu, W. (2017). Supply chain collaboration for sustainability: A literature review and future research agenda. *International Journal of Production Economics*, *194*, 73-87.

Chen, Y., & Ma, Y. (2021). Does green investment improve energy firm performance? *Energy Policy*, *153*, 112252.

Corral Verdugo, V. (2012). The positive psychology of sustainability. *Environment, Development and Sustainability*, *14*, 651-666.

Crace, J. (2014). *Procter & Gamble touts 'win-win' of cutting phosphates in all laundry soaps*. https://www.theguardian.com/sustainable-business/proctor-gamble-remove-phosphates-laundry-soap

Crace, L., & Gehman, J. (2023). What really explains ESG performance? Disentangling the asymmetrical drivers of the triple bottom line. *Organization & Environment*, *36*(1), 150-178.

Danso, A., Adomako, S., Amankwah-Amoah, J., Owusu-Agyei, S., & Konadu, R. (2019). Environmental sustainability orientation, competitive strategy and financial performance. *Business strategy and the environment*, *28*(5), 885-895.

Darnall, N., Henriques, I., & Sadorsky, P. (2010). Adopting proactive environmental strategy: The influence of stakeholders and firm size. *Journal of management studies*, *47*(6), 1072-1094.

Desore, A., & Narula, S. A. (2018). An overview on corporate response towards sustainability issues in textile industry. *Environment, Development and Sustainability*, *20*, 1439-1459.

Deswanto, R. B., & Siregar, S. V. (2018). The associations between environmental disclosures with financial performance, environmental performance, and firm value. *Social Responsibility Journal*, *14*(1), 180-193.

Diba, S., & Xie, N. (2019). Sustainable supplier selection for Satrec Vitalait Milk Company in Senegal using the novel grey relational analysis method. *Grey Systems: Theory and Application*, *9*(3), 262-294.

El-Kassar, A.-N., & Singh, S. K. (2019). Green innovation and organizational performance: The influence of big data and the moderating role of management commitment and HR practices. *Technological forecasting and social change*, *144*, 483-498.

Epstein, M. J., & Buhovac, A. (2014). Making sustainability work 2nd edition: Best Practices in managing and measuring corporate social, environmental, and economic impacts. *San Francisco (CA, US): Berrett-Koehler Publishers*.

Falk, R. F., & Miller, N. B. (1992). *A primer for soft modeling*. University of Akron Press.

Farooq, M., Farooq, O., & Jasimuddin, S. M. (2014). Employees response to corporate social responsibility: Exploring the role of employees' collectivist orientation. *European Management Journal*, *32*(6), 916-927.

Fritz, M. M. (2024). Ethical supply chain practices to achieve supply chain resilience. In *Research Anthology on Business Law, Policy, and Social Responsibility* (pp. 574-594). IGI Global.

Góes, H. A. d. A., Fatima, G., Santos Jhunior, R. d. O., & Boaventura, J. M. G. (2023). Managing for stakeholders towards corporate environmental sustainability. *Corporate Social Responsibility and Environmental Management*. *30*(4), 1561-1572.

Gupta, A. K., & Gupta, N. (2020). Effect of corporate environmental sustainability on dimensions of firm performance–Towards sustainable development: Evidence from India. *Journal of cleaner production*, *253*, 119948.

Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., Ray, S., Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). An introduction to structural equation modeling. *Partial least squares structural equation modeling (PLS-SEM) using R: a workbook*, 1-29.

Han, S.-R., Li, P., Xiang, J.-J., Luo, X.-H., & Chen, C.-Y. (2020). Does the institutional environment influence corporate social responsibility? Consideration of green investment of enterprises—evidence from China. *Environmental Science and Pollution Research*, *29*, 12722–12739.

Helmig, B., Spraul, K., & Ingenhoff, D. (2016). Under positive pressure: How stakeholder pressure affects corporate social responsibility implementation. *Business & Society*, *55*(2), 151-187.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, *43*, 115-135.

Huang, X.-x., Hu, Z.-p., Liu, C.-s., Yu, D.-j., & Yu, L.-f. (2016). The relationships between regulatory and customer pressure, green organizational responses, and green innovation performance. *Journal of cleaner production*, *112*, 3423-3433.

Indriastuti, M., & Chariri, A. (2021). The role of green investment and corporate social responsibility investment on sustainable performance. *Cogent Business & Management*, *8*(1), 1960120.

Javed, S. A., Liu, S., Mahmoudi, A., & Nawaz, M. (2019). Patients' satisfaction and public and private sectors' health care service quality in Pakistan: Application of grey decision analysis approaches. *The International journal of health planning and management*, *34*(1), e168-e182.

Javed, S. A., Syed, A. M., & Javed, S. (2018). Perceived organizational performance and trust in project manager and top management in project-based organizations: comparative analysis using statistical and grey systems methods. *Grey Systems: Theory and Application*, *8*(3), 230-245.

Kaplan, R. S., & Norton, D. P. (1992). The Balanced Scorecard—Measures that Drive Performance. Harv. Bus. Rev.

Karpen, I. O., Bove, L. L., Lukas, B. A., & Zyphur, M. J. (2015). Service-dominant orientation: measurement and impact on performance outcomes. *Journal of Retailing*, *91*(1), 89-108.

Kasztelan, A. (2017). Green growth, green economy and sustainable development: terminological and relational discourse. *Prague Economic Papers*, *26*(4), 487-499.

Khan, S. A. R., Tabish, M., & Zhang, Y. (2023). Embracement of industry 4.0 and sustainable supply chain practices under the shadow of practice-based view theory: ensuring environmental sustainability in corporate sector. *Journal of cleaner production*, *398*, 136609.

Lai, Y., & Sohail, M. T. (2022). Revealing the Effects of Corporate Governance on Green Investment and Innovation: Do Law and Policy Matter? *Frontiers in Psychology*, *13*, 961122.

Latif, M. S., Wang, J.-J., & Shahzad, M. (2024). Do ethics drive value co-creation behavior in online health communities? *Information Technology & People*, *37*(1), 1-28.

Lee, K.-H., & Min, B. (2015). Green R&D for eco-innovation and its impact on carbon emissions and firm performance. *Journal of cleaner production*, *108*, 534-542.

Li, M., Badeeb, R. A., Dogan, E., Gu, X., & Zhang, H. (2023). Ecological footprints and sustainable environmental management: A critical view of China's economy. *Journal of Environmental Management*, *347*, 118994.

Lin, R.-J. (2013). Using fuzzy DEMATEL to evaluate the green supply chain management practices. *Journal of cleaner production*, *40*, 32-39.

Liu, S., & Yang, Y. (2017). Explanation of terms of grey forecasting models. *Grey Systems: Theory and Application*, *7*(1), 123-128.

Lozano, R. (2015). A holistic perspective on corporate sustainability drivers. *Corporate Social Responsibility and Environmental Management*, *22*(1), 32-44.

Lyeonov, S., Pimonenko, T., Bilan, Y., Štreimikienė, D., & Mentel, G. (2019). Assessment of green investments' impact on sustainable development: Linking gross domestic product per capita, greenhouse gas emissions and renewable energy. *Energies*, *12*(20), 3891.

Lyulyov, O., Chygryn, O., Pimonenko, T., & Kwilinski, A. (2023). Stakeholders' Engagement in the Company's Management as a Driver of Green Competitiveness within Sustainable Development. *Sustainability*, *15*(9), 7249.

Marshall, D., McCarthy, L., Heavey, C., & McGrath, P. (2015). Environmental and social supply chain management sustainability practices: construct development and measurement. *Production Planning & Control*, *26*(8), 673-690.

Martins, L. S., Guimarães, L. F., Junior, A. B. B., Tenório, J. A. S., & Espinosa, D. C. R. (2021). Electric car battery: An overview on global demand, recycling and future approaches towards sustainability. *Journal of Environmental Management*, *295*, 113091.

Morse, G. K., Perry, R., & Lester, J. N. (1995). The impact of sodium tripolyphosphate substitution in Western Europe. *Ambio*, 112-118.

Mumtaz, U., Ali, Y., Petrillo, A., & De Felice, F. (2018). Identifying the critical factors of green supply chain management: Environmental benefits in Pakistan. *Science of the Total Environment*, *640*, 144-152.

Nicolaides, A. (2017). Ethical practices, eco-centric business and environmental sustainability. *Journal of Human Ecology*, *57*(1-2), 1-10.

Pujara, Y., Pathak, P., Sharma, A., & Govani, J. (2019). Review on Indian Municipal Solid Waste Management practices for reduction of environmental impacts to achieve sustainable development goals. *Journal of Environmental Management*, *248*, 109238.

Qu, Y., & Cang, Y. (2022). Cost-benefit allocation of collaborative carbon emissions reduction considering fairness concerns—A case study of the Yangtze River Delta, China. *Journal of Environmental Management*, *321*, 115853.

Qu, Y., Yu, Y., Appolloni, A., Li, M., & Liu, Y. (2017). Measuring green growth efficiency for Chinese manufacturing industries. *Sustainability*, *9*(4), 637 - 654.

Rajesh, R., & Ravi, V. (2015). Supplier selection in resilient supply chains: a grey relational analysis approach. *Journal of cleaner production*, *86*, 343-359.

Roldán, J. L., & Sánchez-Franco, M. J. (2012). Variance-based structural equation modeling: Guidelines for using partial least squares in information systems research. In *Research methodologies, innovations and philosophies in software systems engineering and information systems* (pp. 193-221). IGI global.

Shahzad, M., Qu, Y., Javed, S. A., Zafar, A. U., & Rehman, S. U. (2020). Relation of environment sustainability to CSR and green innovation: A case of Pakistani manufacturing industry. *Journal of cleaner production*, *253*, 119938.

Shahzad, M., Qu, Y., Zafar, A. U., Ding, X., & Rehman, S. U. (2020). Translating stakeholders' pressure into environmental practices–The mediating role of knowledge management. *Journal of cleaner production*, *275*, 124163.

Sheikh, A. H. A., Ikram, M., Ahmad, R. M., Qadeer, H., & Nawaz, M. (2019). Evaluation of key factors influencing process quality during construction projects in Pakistan. *Grey Systems: Theory and Application*, *9*(3), 321-335.

Shen, Q., Pan, Y., & Feng, Y. (2023). Identifying and assessing the multiple effects of informal environmental regulation on carbon emissions in China. *Environmental Research*, *237*, 116931.

Shubham, Charan, P., & Murty, L. (2018). Secondary stakeholder pressures and organizational adoption of sustainable operations practices: The mediating role of primary stakeholders. *Business strategy and the environment*, *27*(7), 910-923.

Steer, A., & Wade-Gery, W. (1993). Sustainable development: Theory and practice for a sustainable future. *Sustainable development*, *1*(3), 23-35.

Tang, P., Wang, C., Jiang, Q., Liu, X., & Wang, J. (2023). Symbol or substance? Environmental regulations and corporate environmental actions decoupling. *Journal of Environmental Management*, *346*, 118950.

UN-HABITAT. (2023). *UN HABITAT PAKISTAN COUNTRY REPORT 2023*. https://unhabitat.org/sites/default/files/2023/06/4. pakistan country report 2023 b5 final compressed.pdf

Unilever. (2024). *Rethinking Plastic Packaging*. https://www.unilever.com/planet-and-society/waste-free-world/rethinking-plastic-packaging/

Wang, Y., & Zhi, Q. (2016). The role of green finance in environmental protection: Two aspects of market mechanism and policies. *Energy Procedia*, *104*, 311-316.

WCED. (1987). Our common future. By World commission on environment and development.(London, Oxford University Press, 1987).

Wei, F., Abbas, J., Alarifi, G., Zhang, Z., Adam, N. A., & de Queiroz, M. J. (2023). Role of green intellectual capital and top management commitment in organizational environmental performance and reputation: Moderating role of pro-environmental behavior. *Journal of cleaner production*, *405*, 136847.

Wilburn Green, K., Toms, L. C., & Clark, J. (2015). Impact of market orientation on environmental sustainability strategy. *Management Research Review*, *38*(2), 217-238.

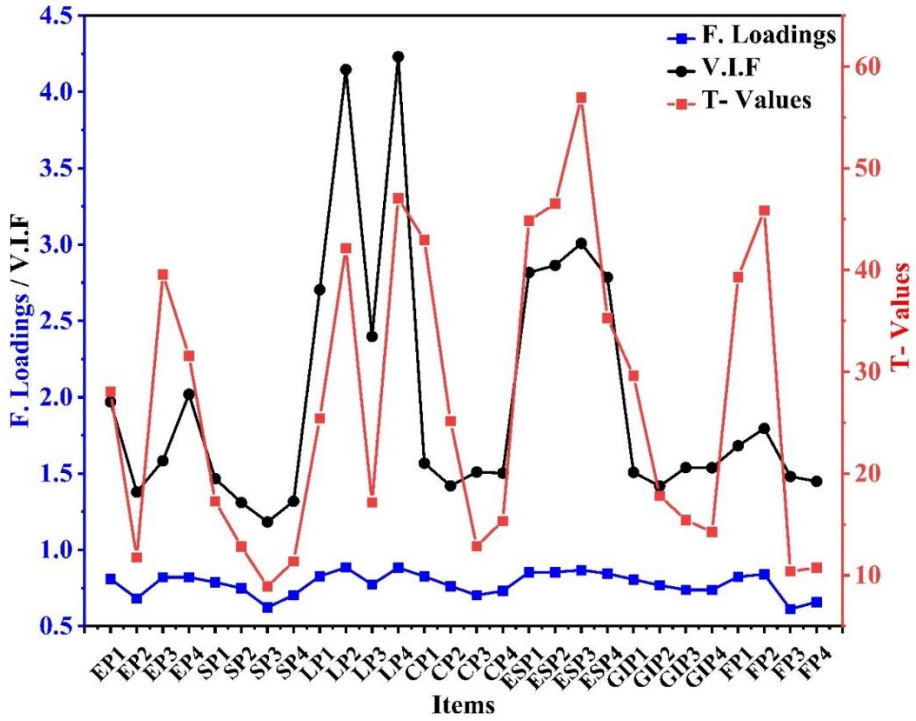
Xu, Y., Liao, X., He, R., & Liu, S. (2024). Impact of environmental regulation intensity on the efficiency of sustainable economic growth in the European Union. *Journal of cleaner production*, *434*, 140047.

Zhang, X., Song, Y., & Zhang, M. (2023). Exploring the relationship of green investment and green innovation: Evidence from Chinese corporate performance. *Journal of cleaner production*, *412*, 137444.

Appendix A – Survey Items

Quantifying the degree of agree or disagree using a 5-point Likert-scale (StA=5, SD=1)	Factor Loadings
Drivers of Corporate Sustainability - (Lozano, 2015)	
EP, SP, LP, CP are estimated on Likert-scale of 5 points (Strongly Agree=5, Strongly Disagree=1)	
Ethical Pressure (EP) – (Karpen et al., 2015; Latif et al., 2024)	
EP1: My organization is ethically responsible and does not pressure anyone to bypass environmental standards	0.809
EP2: My organization does not mislead its stakeholders and follow transparent environmental practices.	0.682
EP3: My organization protect environment and does not manipulate its employees, customers and others.	0.82
EP4: My organization does not take advantage of others for company's benefit to harm environment.	0.821
Stakeholder Pressure (SP) - (Shahzad, Qu, Zafar, et al., 2020)	
SP1: My organization's employees expect the firm to implement environmental protection practices.	0.787
SP2: My organization's customer support green practices and demands product with standards.	0.75
SP3: My organization conducts business as per environmental laws and standards of government.	0.623
SP4: My organization ensures transparency and builds healthy partnership with NGOs and Media.	0.704
Legal Pressure (LP) - (Helmig et al., 2016)	
LP1: My organization take initiatives forced by government to ensure transparent environmental practices.	0.827
LP2: My organization follows environmental laws pass by government to increase transparency in our sector.	0.885
LP3: My organization conduct CSR activities as initiated by government.	0.773
LP:4 My organizations have valid compliance certifications from environmental regulatory bodies.	0.884
Competitive Pressure (CP) - (Helmig et al., 2016)	
CP1: My organization is achieving customer satisfaction through green products to gain a competitive edge.	0.826
CP2: My organization provides increased value for customers through green initiatives than its competitors.	0.763
CP3: My organization adopt environmental practices to attain desired growth and market share.	0.703
CP4: My organization successfully retain existing and attract new environment conscious customers.	0.731
Environmental Sustainability Practices (ESP) - (Bansal, 2005; Shahzad, Qu, Javed, et al., 2020)	
ESP is estimated on Likert-scale of 5 points (Strongly Agree=5, Strongly Disagree=1)	
ESP1: My organization make products with less adverse environmental effects than others or than before.	0.853
ESP2: My organization make products using unharmful raw materials or processes than others or than before.	0.854
ESP3: My organization protects environment by reducing waste and by properly disposing off toxic waste.	0.867
ESP4: My organization improved its processes to reduce impact and likelihood of environmental accidents.	0.845
Green Investment Practices (GIP) - (Han et al., 2020)	
GIP is estimated on Likert-scale of 5 points (Strongly Agree=5, Strongly Disagree=1)	
GIP1: My company gives priority to environment while making decisions of green investment practices.	0.806
GIP2: My company's primary reason of green investment practices is to secure planet and society.	0.768
GIP3: My organization has attractive financial performance ofits green investment practices.	0.738
GIP4: My company consistently adopt green investment practices and does not ignore to cut costs.	0.738
Firm Performance (FP) - (Gupta & Gupta, 2020; Kaplan & Norton, 1992)	
FP is estimated on Likert-scale of 5 points (Strongly Agree=5, Strongly Disagree=1)	
FP1: My company has a positive financial return for past sustainable business practices.	0.824
FP2: My organization has enhanced customer performance; generate new sales and retain existing customers.	0.84
FP3: My company has improved internal business processes including production costs & management.	0.612
FP4: My organization has enhanced learning & growth performance including employee productivity and continuously changing market requirements.	0.659

Appendix B - Graphical representation of Item-wise factor loadings, V.I.F and T-values



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Ethical Declarations
Ethical approval: Not Applicable
Consent to participate: Not Applicable
Consent to publish: Not Applicable
Competing Interest: The authors declare no competing interests
Data availability: On reasonable request, the data will be provided.