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## Investigating the Confluence Between Environmental Accounting, Sustainable Manufacturing, and Financial Effectiveness: An evaluation of the Textile Sector

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**Abstract** This research explores the intricate nexus among ecological accounting, sustainable manufacturing, and fiscal efficacy within the textile sector, with a specific focus on Bhilwara, Rajasthan. Employing partial least squares structural equation modelling (PLS-SEM), the results show that environmental cost assessment leads to a positive increase in financial performance, although its impact on sustainable production remains relatively unchanged. However, environmental bookkeeping techniques, including expense examination, carbon footprint evaluation, and sustainability disclosure, wield a significant impact on improving financial results in the textile sector of Bhilwara, Rajasthan. An essential component that both directly improves financial outcomes and serves as a bridge between environmental accounting techniques and financial outcomes is sustainable production. The study emphasises the significance of strategically embracing environmental accounting, investing in sustainable manufacturing, and identifying the mediating function of sustainable practices. These findings are highly important to textile firms. Managerial suggestions endorse a data-focused strategy, leveraging insights garnered from environmental cost assessment, prioritizing transparency in sustainability reporting, and implementing operational improvements aligned with sustainability objectives. Fundamentally, this investigation underscores the pragmatic significance of adopting a comprehensive, data-driven, and open management strategy to attain enduring financial viability in the textile industry.

**Keywords** Environmental accounting, Sustainable production, Financial performance, Textile industry, Bhilwara Rajasthan

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### Introduction

In the evolving panorama of the global textile trade, the emergence of environmental concerns alongside the intertwined imperatives of sustainability and financial viability has compelled textile enterprises to embrace conscientious practices. The changing landscape emphasizes the importance of investigating the connection between environmental bookkeeping, sustainable manufacturing, and financial results, especially relevant for textile companies operating in Bhilwara, Rajasthan.

Bhilwara, Rajasthan's textile sector stands as a pivotal pillar of the regional economy, wielding considerable influence on GDP and offering livelihoods to a vast workforce. Yet, this industry grapples with the dual pressures of meeting escalating product demand while mitigating environmental repercussions inherent in manufacturing processes. Striking equilibrium between expansion and sustainability hinges on dissecting how environmental stewardship harmonizes with fiscal prosperity.



Amidst this quest for equilibrium, environmental accounting emerges as a pivotal instrument, encompassing facets like environmental cost assessment, sustainability disclosure, and carbon footprint evaluation—an integral strategy in combatting climate change. Teamed up with environmental bookkeeping, sustainable manufacturing practices exemplify a forward-thinking strategy adopted by textile businesses to reduce environmental impacts, adopting fair labour standards, eco-friendly technology, and ethical resource management. These methods not only conform to international demands for environmental responsibility but also have the capacity to strengthen financial positions

Comprehending the intricate correlation among ecological accounting, sustainable production, and economic prosperity is of paramount significance for textile companies in Bhilwara, Rajasthan. This investigation seeks to shed light on how ecological accountability can stimulate financial stability amidst the sector's drive for expansion, profitability, and enduring sustainability, with the goal of providing a nuanced comprehension of the compromises and challenges connecting these domains. Through meticulous analysis and practical investigation, this study strives to provide practical insights guiding the sector towards a sustainable and financially resilient path.

Embedded in the intricate dynamics of the textile sector in Bhilwara, Rajasthan, exists a narrow line that must be drawn between the needs of economic resilience and sustainability. The goal of this research is to unravel the many subtleties that characterise the local textile scene. Through intensive examination of sustainable manufacturing, financial performance, and environmental accounting using advanced methods like structural equation modelling using partial least squares (PLS-SEM), this research seeks to provide detailed insights that address crucial gaps in understanding and steer strategic directions. Ultimately, this study seeks to empower Bhilwara, Rajasthan's textile enterprises to navigate the labyrinthine arenas of global expansion, sustainability, and economic resilience, bolstering the industry's competitive edge and fortifying its positive contribution to the regional economy.

## Literature Review

### H1. Environmental cost accounting influences sustainable production

Sygulla, R., Götze, U., & Bierer, A. (2014) In the domain of developing modern and competitive production systems, enterprises face a twofold challenge: aligning with the rising environmental expectations of stakeholders and consumers, while navigating the constraints imposed by limited resources, all while striving for economic prosperity. A tactical method to address these paired goals encompasses elevating both material and energy effectiveness. This aim finds robust backing through the implementation of material stream expenditure estimation (MFCA), targeting the recognition of ineffectiveness in material and energy procedures and evaluating their financial repercussions throughout the complete process sequence. This section initiates by elucidating the core principles of MFCA. It subsequently explores advancements in modeling loops and reserves, integrating energy considerations, and proposes a framework for a forward-thinking MFCA. Lastly, it discusses practical considerations for the implementation of MFCA.

### H2. Sustainability reporting influences sustainable production

Dissanayake, D., Tilt, C., & Qian, W. (2019) " This paper's goal is to investigate the variables affecting sustainability disclosure. in publicly traded firms within Sri Lanka. Utilizing panel data analysis, it assesses the sustainability reporting tendencies of 84 such entities spanning from 2012 to 2015. The results show that the size of the organisation and the degree to which GRI guidelines are followed are important factors influencing the sustainability reporting practices of Sri Lankan listed corporations. Interestingly, variables such as ownership structure and industry sectors demonstrate less pronounced effects on sustainability reporting compared to earlier studies. The study highlights that larger corporations adhering to GRI guidelines tend to engage in more extensive reporting practices, indicating the impact of international standards on corporate



reporting in Sri Lanka. This underscores the country's alignment with global business standards, particularly noteworthy given Sri Lanka's post-conflict reconstruction phase. By exploring sustainability reporting in the context of a nation undergoing post-war recovery in the South Asian region, This study broadens our present understanding of the subject. Additionally, it expands on earlier studies by looking at elements like business ownership, adherence to GRI guidelines, company size, and industry sector within the framework of a developing country.

### **H3. Carbon accounting influences sustainable production**

Schaltegger, S., & Csutora, M. (2012) This article provides an overview of carbon assessment, highlighting its emergence as a swiftly evolving domain within sustainability administration, particularly underscored in this unique edition. Given the worldwide extent of greenhouse gas emissions and the escalating repercussions of climate variation, there exists an urgent necessity for thorough methodologies to alleviate its unfavorable consequences. These mandates enhanced techniques to predict and fulfill changing informational requisites, while furnishing direction on employing developing accounting methodologies for openness, responsibility, and decision-making throughout governmental, corporate, scholarly, and non-profit domains. Various forms of carbon assessment—scientific, governmental, economic, and corporate—are advancing, yet integration into policy or strategies remains fragmented. Within corporate realms, carbon evaluation plays a pivotal role in bolstering carbon management via two key approaches: monitoring unsustainable carbon practices and promoting progress towards sustainability. These techniques are becoming more and more prevalent in the manufacturing, distribution, procurement, supply chain management, innovation, communication, and marketing departments of enterprises. Whether it's making sure that regulations are followed, maximising energy and material flows to significantly reduce emissions, or pursuing environmental efficiency, product development, or reputation enhancement, carbon management accounting helps decision-making at every level of the organisation. The paper delineates diverse internal corporate practices and methodologies related to carbon measurement, advocating for an eco-management accounting system to offer organized perspectives, discerning between tangible and financial carbon appraisal methods. As carbon evaluation extends its reach to cover supply networks and the life spans of products, scholars grapple with the challenge of devising inventive strategies, such as input-output-facilitated integrated bookkeeping.

### **H4. Environmental cost accounting influences financial performance.**

Al-Mawali, H. (2021) The aim of this study is to investigate the interconnectedness among Environmental Cost Evaluation (ECE), Environmental Effectiveness (EE), and Financial Effectiveness (FE). The focus of the study is on industrial enterprises that are listed on the Amman Stock Exchange. It employs surveys to collect subjective data on Environmental Corporate Engagement (ECE) and Economic Efficiency (EE), while objective information extracted from annual reports assesses Financial Efficiency (FE). Structural modeling methodologies are employed to analyze the data. Findings reveal a positive correlation between ECE and both EE and FE, with EE acting as a mediator in the interaction between FE and ECE. This investigation bridges a void in the literature of managerial accounting and contingency theory by employing structural modeling to scrutinize these correlations, which have been disregarded in prior research. Furthermore, it provides insights grounded in recent data from the perspective of a developing nation. The findings have pragmatic implications for stakeholders in Jordan, notably management within industrial enterprises and the Ministry of Environment.

### **H5. Sustainability reporting influences financial performance.**

Aggarwal, P. (2013) In the contemporary landscape, sustainability emerges as the foremost challenge confronting enterprises, exerting considerable influence over their overall efficacy and economic viability. Through a review of the literature, the aim of this study is to assess how sustainability reporting affects a company's financial performance. In recent times, there have been several investigations into this connection,



resulting in diverse outcomes, spanning from positive to negative to statistically insignificant. These outcomes hinge on factors such as the metrics employed in sustainability reporting, financial performance indicators, demographic characteristics of samples, temporal scopes, and controlling variables. Nonetheless, a prevailing tendency observed in most studies indicates a positive association. This manuscript aims to critically assess existing research to delineate avenues for more robust and coherent results in future investigations. Furthermore, given the impending likelihood of stricter regulatory frameworks mandating sustainability reporting, enterprises are advised to embrace this practice expeditiously to forestall regulatory repercussions. A concurrent apprehension pertains to the credibility of sustainability reports. To mitigate this concern, organizations should solicit external validation from reputable entities such as KPMG, EY, among others, to augment their credibility as reliable reporters in the estimation of stakeholders, whose confidence and trust are indispensable for the realization of sustainable business practices.

#### **H6. Sustainable production influences financial performance.**

Baah, C., Agyabeng-Mensah, Y., Afum, E., & Lascano Armas, J. A. (2024) Amid escalating concerns raised by stakeholders regarding environmental degradation in developing economies, businesses are progressively embracing eco-conscious paradigms and fostering inventive environmentally friendly strategies to meet stakeholders' environmental demands. Simultaneously, they strive to gain a competitive advantage through green initiatives, better financial outcomes and environmentally friendly industrial techniques. The aim of this study is to examine the connections between green innovation and corporate environmental ethos and its implications for competitiveness, sustainable production, and financial well-being in the context of developing markets. Through the use of SmartPLS 3.0 software to analyse information from 290 manufacturing firms that are small and medium-sized, the research reveals the important roles that eco-friendly innovation and corporate environmental values play in achieving sustainable manufacturing practices, green competitive advantage, and financial prosperity. It's interesting to note that although green innovation and corporate environmental principles directly affect these results, green competitive advantage and sustainable manufacturing function as intermediate processes that further amplify their impact on financial performance. This study reveals an unexpected negative link between company environmental ideals and financial performance, which defies prior data and suggests a complicated relationship that merits more exploration. A viable method for reducing environmental hazards and the integration of environmental concepts improves financial performance, sustainable production, and green competitive advantage simultaneously. and eco-friendly innovation. This investigation adds to the body of knowledge by integrating perspectives from the viewpoint based on natural resources (NRBV) and organisational ethics to clarify the intricate relationships between business success measures, green innovation, and corporate environmental values. It provides practical implications for corporate leaders, policymakers, and researchers, while identifying avenues for future inquiry in this field.

#### **H7. Sustainable production mediates the nexus of environmental cost accounting and financial performance.**

#### **H8. Sustainable production mediates the nexus of sustainability reporting and financial performance.**

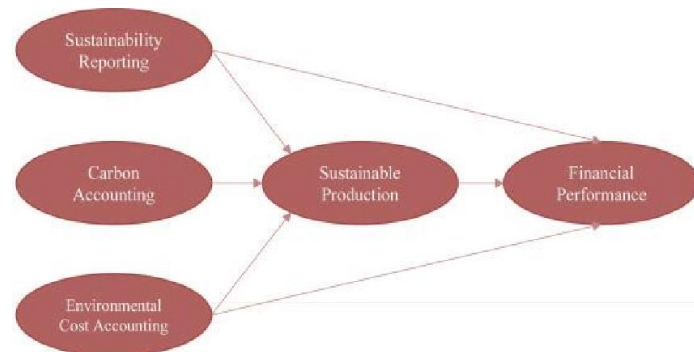
#### **H9. Sustainable production mediates the nexus of carbon accounting and financial performance.**

The purpose of this research is to find out how long-term ISO 14001 adoption affects Malaysian enterprises' financial outcomes (FO). heavily dependent on carbon emissions. Examining a dataset comprising carbon-intensive entities listed on the Main Board of Bursa Malaysia spanning from 2010 to 2020, both accounting-derived and market-centric metrics are utilized to gauge FP. Panel data regression analysis is deployed to scrutinize the correlation between ISO 14001 adoption and FP. The results demonstrate a lack of significant connection between the implementation of ISO 14001 and financial measures derived from accounting methods, while a clear association exists between ISO 14001 adoption and financial indicators focused on the market. These discoveries enhance the existing literature concerning environmental management systems and financial



outcomes, emphasizing the efficacy of ISO 14001 certification in improving financial performance. The study carries pragmatic implications for a myriad of stakeholders keen on companies' adherence to Sustainable Development Goals (SDGs). What sets this research apart is its amalgamation of accounting-derived and market-centric parameters to probe the longitudinal ramifications of ISO 14001 on financial performance in the Malaysian milieu.

Drawing from the current literature review and stakeholder theory, the research formulated a conceptual framework, in Fig. 1.



## Methodology

### Data

Careful selection of samples is crucial to maintain the trustworthiness and strength of study outcomes. In this inquiry, data from 152 textile firms in Bhilwara were collected. Choosing Bhilwara companies deliberately aimed to guarantee a level of financial transparency and compliance with regulations, thereby enhancing the reliability of the data. Employing a systematic method, 58 companies were chosen randomly using a number generator, ensuring impartiality and fairness and improving sample representation.

A strict technique was applied throughout the data gathering phase, which involved distributing three questionnaires to each of the 58 organisations that were chosen. This interdisciplinary approach aimed to gather a varied dataset, facilitating a thorough exploration of viewpoints within each organization. To gain a comprehensive understanding of the complex linkages between environmental accounting, sustainable manufacturing, and financial performance, different questionnaires were chosen for each organisation. This approach not only enriched the dataset but also offered a comprehensive perspective on how various departments or interested parties see and interact with sustainable practices, thereby enhancing the validity and breadth of the results.

Despite an impressive response rate, 8 incomplete responses were excluded, resulting in a final dataset exceeding the suggested cutoff for Structural Equation Modelling using Partial Least Squares (PLS-SEM) with 152 answers. Noteworthy gender diversity was noted, with 43% female respondents, making certain that any potential gender-related differences in responses are investigated. The sample also encompassed diverse professional roles, including 28% managers, 37% senior executives, and others, ensuring a thorough comprehension of viewpoints from various hierarchical levels. Regarding age, the sample was diverse, spanning various age groups, contributing to the richness and complementarity of the research.

### Measurement Items

The study's evaluation approach is explained in Section 3.2, wherein a 5-point Likert scale is utilised as the main tool for assessing the many constructs that are being studied. This approach guarantees a thorough comprehension of the viewpoints of the individuals involved.



It is easier to convert qualitative data into quantitative measurements when a Likert scale is used, enabling a qualitative evaluation of participants' perspectives on diverse constructs.

The evaluation of carbon accounting consists of five items, drawn from He et al. (2022), specifically selected for their relevance to the textile sector in Bhilwara, Rajasthan. By utilizing items established in previous research, The study guarantees a thorough evaluation of the tested textile companies' carbon accounting procedures.

Similarly, the evaluation of sustainable production incorporates four factors that have been carefully selected to include ecologically sustainable practices, responsible resource management, and moral labour practices. These items have been taken from Bradley (2021). The study's validity and reliability are increased by using approved metrics.

The main topic of this investigation, environmental accounting, is defined by means of three items that have been modified from Rahman and Islam (2023) in order to represent the particular subtleties of environmental accounting in the textile sector in Bhilwara, Rajasthan. These items' succinct yet thorough nature guarantees congruence with particular levels of inquiry.

Evaluation of financial performance, crucial for understanding the impacts of sustainability efforts, uses three things that are modified from Deb et al. (2023). Utilising this reliable source increases the study's validity Its relevance within the framework of Bhilwara, Rajasthan's textile industry.

Ultimately, three items that have been carefully chosen to address the operationalization of sustainability reporting includes the disclosure and transparency aspects of sustainability reporting procedures inside the selected textile businesses. These items are adopted from Tiwari and Khan (2020).

### **Data Analysis**

To thoroughly investigate the intricate relationships that exist We use a thorough analytical method to examine the relationship between environmental accounting, sustainable production, and financial performance in textile firms located in Bhilwara, Rajasthan. Our preferred approach, partial least squares structural equation modelling (PLS-SEM), forms the basis of our investigation. Because PLS-SEM can handle complex and exploratory research frameworks effectively, it is the ideal method for our investigation because it includes a variety of latent components and complex relationships. This methodology permits the concurrent assessment of structural models and measurements, offering adaptability in managing restricted sample numbers. It's crucial to be aware of several restrictions, though, namely the possibility of overfitting with lower sample sizes and the vulnerability to outliers. Despite these difficulties, PLS-SEM's advantages—such as its capacity to deal with intricate frameworks and offer insights into both measurement and structural aspects—making it a priceless tool for exploratory analysis of proposed relationships.

### **Results**

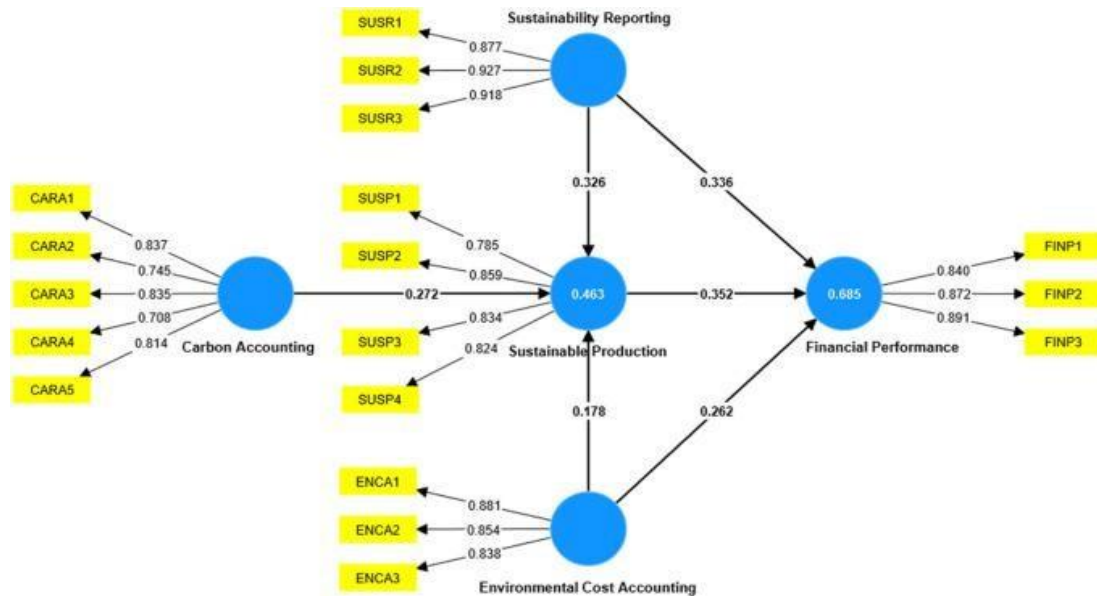
The study is done in three steps using partial least squares structural equation modelling (PLS-SEM). Initially, the emphasis rests on assessing measurement models to ensure their reliability and validity. This entails closely examining reliability indices, convergent and discriminant validity, and external loadings to ensure that the measuring instruments reliably and efficiently capture the required constructs. Next, attention shifts to the assessment of structural models, where several goodness-of-fit metrics and consistency indices are used to evaluate the overall sufficiency and predictive power of the model. The relevance of path coefficients is examined in order to clarify the direction and intensity of links amongst latent variables. Lastly, hypothesis testing is done to validate if the discovered pathways match empirical data and to determine the statistical significance of the claimed correlations. In the textile industry, especially in Bhilwara, Rajasthan, this methodical methodology guarantees a thorough comprehension of the interrelated dynamics between environmental accounting, sustainable manufacturing, and financial performance.



This inquiry highlights the intricate connections among various constructs within the textile industry. Through meticulous analysis, several key findings surface. First, analysis of carbon accounting, as shown by items CARA1 through CARA5, reveals strong external loadings between 0.708 and 0.837, suggesting a significant relationship between the dynamics of the textile sector and carbon accounting procedures. Similarly, environmental cost accounting, evaluated through items ENCA1 to ENCA3, demonstrates significant external loadings ranging from 0.838 to 0.881, underscoring its importance in the industry. Financial performance, assessed via items FINP1 to FINP3, exhibits noteworthy external loadings ranging from 0.840 to 0.891, implying a clear correlation between financial performance metrics and the textile sector. The components SUSP1 through SUSP4, which represent sustainable production, also exhibit significant external loadings between 0.785 and 0.859, highlighting the importance of sustainable production techniques in the sector. Lastly, substantial external loadings ranging from 0.877 to 0.927 are seen in sustainability reporting, represented by SUSR1 to SUSR3, highlighting the pivotal role of transparent sustainability reporting in the textile sector. Overall, these findings underscore the interplay between The textile industry's financial performance, sustainable production, and environmental accounting providing valuable insights for stakeholders and policymakers.

Table 1: Outer loadings and VIF

Constructs	Items	Outer Loadings	VIF	Constructs	Items	Outer Loadings	VIF
Carbon Accounting	CARA1	0.837	2.147	Environmental Cost Accounting	ENCA1	0.881	1.775
	CARA2	0.745	1.854		ENCA2	0.854	1.887
	CARA3	0.835	2.104		ENCA3	0.838	1.907
	CARA4	0.708	1.647	Financial Performance	FINP1	0.840	1.784
	CARA5	0.814	1.890		FINP2	0.872	2.015
Sustainable Production	SUSP1	0.785	1.684	FINP3	0.891	2.173	
	SUSP2	0.859	2.165	Sustainability Reporting	SUSR1	0.877	2.240
	SUSP3	0.834	1.925		SUSR2	0.927	3.213
	SUSP4	0.824	1.887		SUSR3	0.918	2.974



Note: VIF: Variance inflation factor.

Figure 2: Measurement model result

Table 2 illustrates the assessment of each construct across various dimensions:  $\alpha$  (Cronbach's alpha), CR (composite reliability), and AVE (average variance extracted).

Carbon tracking manifests robust internal coherence, boasting an  $\alpha$  coefficient of 0.849, indicative of high reliability. Its composite reliability (CR) stands at 0.892, accompanied by an AVE of 0.623, signifying commendable convergent validity.

Similarly, the environmental cost dimension exhibits robust internal consistency, registering an  $\alpha$  value of 0.823 and a CR of 0.893, thereby affirming its reliability. The AVE value of 0.736 underscores its satisfactory level of convergent validity.

Financial performance reflects strong internal coherence, with an  $\alpha$  coefficient of 0.836 and a CR of 0.902, affirming its reliability. The AVE value of 0.754 suggests robust convergent validity.

Stability reporting demonstrates exemplary internal consistency, boasting an  $\alpha$  coefficient of 0.893 and a CR of 0.933, thus affirming its reliability. The AVE value of 0.824 further supports its robust convergent validity.

Lastly, sustainable production showcases robust internal coherence, with an  $\alpha$  coefficient of 0.844 and a CR of 0.896, attesting to its reliability. Its AVE value of 0.682 indicates satisfactory convergent validity.

Conclusively, these results emphasize the robust credibility and congruent authenticity of carbon monitoring, environmental expense calculation, fiscal effectiveness, consistency disclosure, and eco-friendly manufacturing. This corresponds with prior investigations delving into the interaction amidst environmental bookkeeping, sustainable manufacturing, and fiscal efficacy in the textile domain.

**Table 2:** Construct reliability and validity (Fornell-Larcker criterion)

Empty Cell	Constructs	$\alpha$	CR	AVE	(1)	(2)	(3)	(4)	(5)
(1)	C A	0.849	0.892	0.623	0.789				
(2)	E C A	0.823	0.893	0.736	0.584	0.858			
(3)	F P	0.836	0.902	0.754	0.637	0.705	0.868		
(4)	S R	0.893	0.933	0.824	0.622	0.719	0.744	0.908	
(5)	S P	0.844	0.896	0.682	0.579	0.572	0.712	0.624	0.826

Note:  $\alpha$ : Cronbach's alpha, CR: Composite reliability, AVE: Average variance extracted

Table 3 The table illustrates the interconnectedness among various factors – carbon tracking, environmental expenditure tracking, financial outcomes, sustainability disclosure, and eco-friendly manufacturing – within the textile sector. Each cell signifies the magnitude and orientation of the relationship between the respective elements.

Commencing with carbon tracking, there are moderate positive associations observed with environmental expenditure tracking (0.690), financial outcomes (0.747), sustainability disclosure (0.710), and eco-friendly manufacturing (0.669). This indicates a concurrent rise in these factors alongside increased carbon tracking practices.

Transitioning to environmental expenditure tracking, robust positive correlations emerge with financial outcomes (0.832) and moderate positive correlations with sustainability disclosure (0.825) and eco-friendly manufacturing (0.667). This implies that heightened environmental expenditure tracking aligns with improved financial outcomes and greater emphasis on sustainability disclosure and eco-friendly manufacturing.

Regarding financial outcomes, substantial positive correlations are evident with sustainability disclosure (0.861) and moderate positive correlations with carbon tracking (0.747) and environmental expenditure tracking (0.832). This suggests a linkage between superior financial outcomes, robust sustainability disclosure, and elevated levels of both carbon and environmental expenditure tracking.





Sustainability disclosure displays significant positive correlations with financial outcomes (0.861) and moderate positive correlations with carbon tracking (0.710) and environmental expenditure tracking (0.825). This underscores the parallel progress of comprehensive sustainability disclosure with enhanced financial outcomes and a heightened focus on carbon and environmental expenditure tracking.

Lastly, eco-friendly manufacturing demonstrates moderate positive correlations with financial outcomes (0.845), sustainability disclosure (0.719), and environmental expenditure tracking (0.667), with a marginally lower correlation with carbon tracking (0.669). This implies a favorable connection between eco-friendly manufacturing practices and financial outcomes, sustainability disclosure, and environmental expenditure tracking in the textile domain.

In essence, the correlations depicted underscore the intertwined nature of environmental accounting, eco-friendly manufacturing, and financial results within the textile sector, underscoring the necessity of a comprehensive sustainability approach to attain favorable financial results.

**Table 3: HTMT-matrix**

Empty Cell	CA	ECA	FP	SR	SP
CA					
ECA	0.690				
FP	0.747	0.832			
SR	0.710	0.825	0.861		
SP	0.669	0.667	0.845	0.719	

Note: HTMT: Heterotrait-monotrait ratio

A structural model's overall adequacy and explanatory power may be evaluated using a number of critical indicators. The R-squared value, which falls between 46% and 69%, shows the amount the variance in endogenous constructions is clarified by external structures. R-squared doesn't have a set threshold, yet its values tend to decrease. Values in this range are generally considered positive, suggesting a significant capacity for explanation (see Figure 3). The size of effects is measured by F-scores, which range from 0.084 to 228. Higher values indicate greater significance impacts of endogenous predictors components. Although there's no hard cut cut limit, F-scores greater than 0.1 are frequently associated with large effect sizes. Lower numbers indicate better fit in the standardised root mean square residual (SRMR), which assesses the model's fit quality with a threshold of 0.05. Furthermore, the normed fit index (NFI) evaluates overall model fit; values above this level indicate adequate fit (Sarstedt et al., 2020). The NFI has a threshold of 0.85. All these metrics add up to a thorough assessment of the structural model, confirming its overall fit, effect magnitude, fit quality, and explanatory power in the textile industry in Bhilwara, Rajasthan.

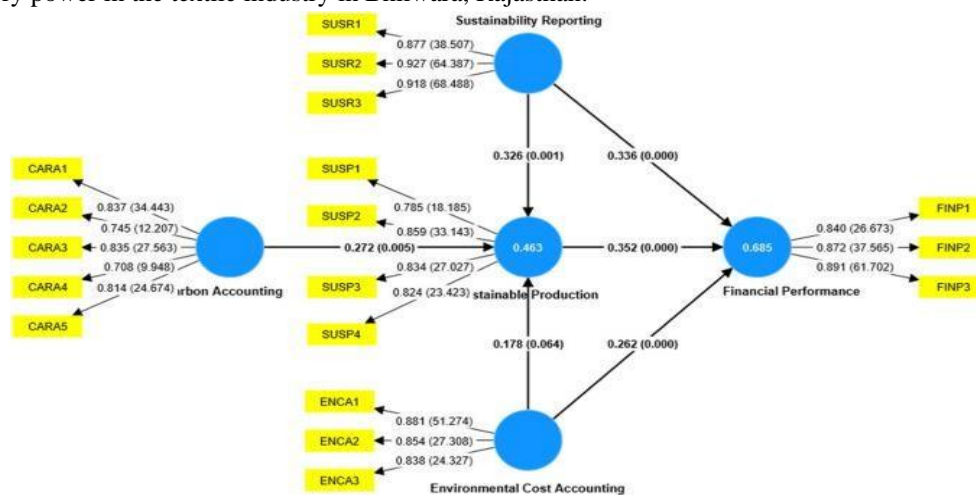


Figure 3: Structural model result.

Table 4 presents the hypothesis testing results and offers insights into the linkages and intermediate effects found in the structural framework. According to Empirical evidence does not support the association between environmental cost evaluation (ENCA) and sustainable production (SUSP) (H1), with a coefficient of 0.178 and a t-statistic of 1.853. This implies that the assessment of environmental costs could not have a direct bearing on sustainable production in the particular situation under investigation. On the other hand, there is a statistically significant correlation between sustainability reporting (SUSR) and sustainable production (SUSP) (H2, coefficient = 0.326, t-statistic = 3.333), highlighting the beneficial impact that comprehensive sustainability reporting plays in advancing sustainable production practices. Likewise, sustainable production is highly impacted by carbon assessment (CARA) (H3, coefficient = 0.272, t-statistic = 2.820), highlighting the vital role that the role that carbon assessment plays in encouraging environmentally friendly textile production.

**Table 4:** Hypothesis testing results

Relationship	Coefficients	SD	T-statistics	R-square	f-square	Hypothesis testing
H1: ENCA →SUSP	0.178	0.096	1.853	0.463	0.027	Unsupported
H2: SUSR →SUSP	0.326***	0.098	3.333	0.463	0.084	Supported
H3: CARA →SUSP	0.272***	0.096	2.820	0.463	0.079	Supported
H4: ENCA →FINP	0.262***	0.070	3.742	0.685	0.100	Supported
H5: SUSR →FINP	0.336***	0.079	4.247	0.685	0.149	Supported
H6: SUSP →FINP	0.352***	0.063	5.631	0.685	0.228	Supported
<b>Mediating Effects</b>						
H7: ENCA → SUSP → FINP	0.063	0.035	1.804			Unsupported
H8: SUSR → SUSP → FINP	0.115***	0.039	2.934			Supported
H9: CARA → SUSP → FINP	0.096**	0.043	2.240			Supported

\*\*\*=p < 0.01, \*\*=p < 0.05, ENCA: environmental cost accounting, SUSP: sustainable production, SUSR: sustainability reporting, CARA: carbon accounting, and FINP: financial performance.

### Discussion

**Using PLS-SEM, or partial least squares structural equation modelling, the following results are obtained from a comparison analysis:**

Environmental cost evaluation has a favorable effect on financial performance but does not extend its influence on sustainable production.

### In the domain of the textile industry:

Embracing environmental accounting practices (covering cost analysis, carbon footprint measurement, and sustainability reporting) significantly amplifies financial efficacy.

Sustainable manufacturing not only directly uplifts financial results but also serves as an intermediary between environmental accounting initiatives and financial outcomes.



**For textile enterprises in Bhilwara, Rajasthan, tailored recommendations include:**

Strategically integrating environmental accounting practices, such as:

Evaluating financial implications through environmental cost assessment.

Managing emissions and reducing costs through carbon accounting.

Transparently communicating environmental performance through sustainability reporting.

Giving precedence to investments in sustainable manufacturing through embracing environmentally conscious methods such as employing sustainable materials and implementing energy-efficient procedures.

Recognizing the pivotal role of sustainable manufacturing in strengthening financial outcomes and the impact of environmental bookkeeping.

**From a managerial perspective, advocating for a data-driven strategy entails:**

Utilizing observations garnered from environmental expense evaluation to make informed decisions and streamline expenditures while staying in line with sustainability goals.

Emphasizing transparency in sustainability reporting to enhance organizational credibility.

Exploring and executing operational optimization strategies aligned with sustainable practices to ensure enduring financial success.

To conclude, the research underscores the practical significance of an all-encompassing, management approach that is data-driven, transparent, and integrates sustainability into operational strategies and decision-making processes.

**Conclusion**

- In essence, this study investigates the complex connections that exist between environmental accounting, sustainable manufacturing, and monetary success in the textile industry.
- It draws attention to the beneficial effects on financial results of environmental accounting techniques including carbon monitoring, environmental cost assessment, and sustainability reporting.
- The link between environmental accounting practices and financial success is shown to be mediated by sustainable manufacturing, which is seen as a crucial component that directly improves financial performance.
- In light of the changing textile sector, the study highlights the need for sustainable manufacturing, transparent sustainability reporting, and the strategic integration of environmental accounting methods to achieve long-term financial success.
- This research offers recommendations for strategic planning and well-informed decision-making as firms negotiate the confluence of sustainability and financial objectives to guarantee a prosperous and sustainable future for the textile industry.
- By filling important knowledge gaps and offering useful advice to businesses, this study considerably advances sustainable business practices in Bhilwara, Rajasthan's textile sector.
- It addresses a research void unique to this setting by examining the effects of environmental accounting techniques, such as carbon monitoring, sustainability disclosure, and environmental cost assessment.
- By exploring how By acting as a bridge between environmental accounting and financial performance, sustainable manufacturing advances our understanding of how interconnected dynamics operate.
- Bhilwara, Rajasthan's textile industry analysis benefits from methodological innovation brought about by cutting-edge approaches such as partial least squares structural equation modelling (PLS-SEM).
- The practical consequences highlight the strategic combination of investments in sustainable production, environmental accounting methods, and the understanding of the mediating function of sustainable practices.



- The study's rigorous approach to data collecting, which uses three questionnaires for each firm, guarantees a comprehensive dataset and supports conclusions about the textile industry in Bhilwara, Rajasthan.
- Nevertheless, the study's narrow emphasis on the textile sector in Bhilwara, Rajasthan restricts its applicability, and its reliance on self-reported data from questionnaires runs the risk of response bias.
- It is more difficult in order to record the dynamic evolution of sustainability practices and their temporal consequences with the cross-sectional approach.
- In spite of these drawbacks, the study offers insightful information that paves the way for further investigation to surmount these obstacles and expand knowledge of the dynamics of financial performance, sustainable production, and environmental accounting.
- Future studies in the textile sector in Bhilwara, Rajasthan, should concentrate on longitudinal analyses to evaluate the consequences throughout time of sustainable production on financial performance.
- While investigating the integration of cutting-edge technology like blockchain and artificial intelligence provides creative possibilities, comparative investigations across industries would improve generalizability.
- To provide a more nuanced picture of organisational decision-making, qualitative investigations conducted quantitative results are enhanced by in-depth interviews and case studies.
- Analysing consumer attitudes and sustainability programmes in the textile sector in Bhilwara, Rajasthan, might help stakeholders develop resilient strategies by illuminating the complex relationship between consumer expectations and environmental responsibilities.

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