



## THE ASIAN BULLETIN OF GREEN MANAGEMENT AND CIRCULAR ECONOMY

<http://abgmce.com/10.62019/abgmce.v3i1.53>

ISSN (online): 2959-0035

ISSN (Print): 2959-0027

### Sustainable Practices in the Textile Industry of Pakistan: Challenges and Opportunities.

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#### Chronicle

##### Article history

**Received:** January 6, 2024

**Received in the revised format:**

January 9, 2024

**Accepted:** January 10, 2024

**Available online:** January 10, 2024

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#### Abstract

In an era where sustainability is paramount, this study ventures into assessing the complex factors influencing sustainability in Pakistan's textile industry. Given its economic significance and environmental impact, the research focuses on unraveling how governmental policies, technological innovations, management practices, and consumer awareness collectively shape sustainability outcomes. Central to this exploration is the mediating role of organizational commitment. Employing a structured survey among diverse industry stakeholders, the study uncovers that while external factors significantly drive sustainability performance, it is the depth of organizational commitment to sustainability that amplifies these effects. This intersection of various elements highlights the need for a multi-dimensional approach in steering the textile sector towards greater sustainability. The findings offer practical insights for policymakers and industry leaders, advocating for integrated strategies that marry regulatory frameworks, technological advancement, and internal cultural shifts towards sustainability. However, the study acknowledges its limitations and paves the way for future research, calling for broader, longitudinal explorations to deepen our understanding of sustainable practices in diverse economic contexts.

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**Keywords:** Textile Industry Sustainability, Organizational Commitment, Pakistan, Environmental Policies, Technological Innovations, Management Practices, Consumer Awareness, Sustainable Development, Emerging Economies.

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## INTRODUCTION

The global textile industry, a cornerstone of economic growth and innovation, has been grappling with an urgent need for sustainability. Recent studies reveal that the sector contributes significantly to environmental concerns, including water pollution and greenhouse gas emissions. However, amidst these challenges lies an opportunity for transformative change (Sen & Ganguly, 2017; Zurek et al., 2021). As per the World Bank, the textile industry accounts for approximately 10% of global carbon emissions and around 20% of wastewater worldwide, indicating a pressing need for sustainable practices. Furthermore, the increasing global consumer awareness of environmental issues has propelled the demand for sustainable products, creating new market dynamics. Shifting focus to Pakistan, the textile industry emerges as a pivotal player in the nation's economy, contributing nearly 8.5% to the GDP and employing a substantial portion of the workforce. However, the industry faces considerable sustainability challenges. For instance, research indicates that textile production in Pakistan is responsible for about 20% of the country's total industrial water pollution. Additionally, the

lack of rigid environmental regulations and technological advancements hampers the industry's transition to sustainable practices (Zurek et al., 2021). Despite these challenges, the evolving global market trends and domestic economic pressures offer Pakistan a unique opportunity to innovate and adopt sustainable practices, potentially reshaping its textile sector into a model of environmental stewardship and economic resilience (Aslam, 2023; Tze San et al., 2022).

Sustainability performance in the textile industry, a concept first defined by Seuring and Müller in 2008, encapsulates a broad range of environmental, economic, and social dimensions. This multifaceted construct includes elements such as carbon footprint reduction, efficient use of renewable resources, and effective waste management (Colapinto et al., 2020; Rajabloo et al., 2022). These aspects are critical, as the global textile sector is a major contributor to environmental degradation, through substantial carbon emissions and water pollution.

When sustainability performance is not fully addressed, both globally and specifically within countries like Pakistan, the repercussions are profound. Globally, inadequate sustainability performance exacerbates climate change, resource depletion, and environmental pollution, jeopardizing the ecological balance. In Pakistan, the situation is particularly dire (Ahmad et al., 2021; Zurek et al., 2021). The textile industry's insufficient sustainability measures lead to significant water pollution, contributing to a national crisis in water quality and availability. This not only affects environmental health but also threatens the economic stability and global competitiveness of Pakistan's textile sector.

To mitigate these challenges, the role of certain variables becomes pivotal. For instance, governmental policies that enforce environmental regulations can significantly shape the industry's sustainability trajectory. Studies have shown that strict environmental policies compel industries to innovate and adopt greener practices, leading to improved sustainability performance (Mulaessa & Lin, 2021; Weng et al., 2015). Technological advancements, too, play a crucial role. By investing in sustainable technologies, the industry can reduce its environmental footprint while enhancing efficiency and productivity. Research indicates that such advancements not only benefit the environment but also drive economic growth.

Furthermore, management practices are equally important. Adoption of eco-friendly strategies and integration of sustainability into business models have been found to significantly improve environmental performance (CHOI et al., 2019; Ma et al., 2017). These practices not only reduce the negative impact on the environment but also build a positive brand image, which is increasingly valued in the global market. Similarly, consumer awareness influences sustainability. As consumers become more environmentally conscious, their demand for sustainable products grows, pressuring industries to adapt (Garetti & Taisch, 2012). This shift in consumer behavior is a key driver for sustainability in the textile sector. However, these variables also have the potential to exacerbate existing challenges if not effectively managed. For instance, stringent governmental policies, while necessary, can impose financial burdens on industries, especially in developing countries like Pakistan, where resources for technological adaptation might be limited. Similarly, investments in new technologies can be a double-edged sword. Without proper implementation and workforce training, such advancements might not yield the desired sustainability outcomes and could even lead

to increased resource consumption (Chams & Blandón, 2019). This leads to the problem statement of the study: Despite the recognized importance of sustainability performance in the textile industry, there is a paucity of comprehensive research exploring how various factors such as governmental policies, technological advancements, management practices, and consumer awareness collectively influence this performance, especially in the context of a developing country like Pakistan (Naidoo & Gasparatos, 2018). The novelty of this study lies in its holistic approach. Previous research has often examined these variables in isolation or in different industrial contexts. This study aims to bridge this gap by exploring the interplay between these factors and their collective impact on sustainability performance in Pakistan's textile sector. Such an analysis is not only novel but also crucial for developing targeted strategies that can effectively enhance sustainability performance, addressing both global environmental concerns and country-specific challenges in the textile industry (Costantini et al., 2017; Naidoo & Gasparatos, 2018).

This study diverges from previous research in its methodological approach and conceptual framework. While prior studies have often examined the impact of individual factors on sustainability in the textile industry, this research adopts a holistic perspective, integrating multiple variables - governmental policies, technological advancements, management practices, and consumer awareness. Additionally, employing Structural Equation Modeling (SEM) through SMART\_PLS allows for a more nuanced understanding of these relationships, particularly the mediating role of organizational commitment to sustainability, a facet less explored in existing literature (Asiaei et al., 2023).

The study employed a structured questionnaire survey, distributed electronically to a diverse group of professionals within Pakistan's textile industry. This approach ensured a comprehensive perspective, gathering insights from managerial staff, production workers, policymakers, and consumer representatives. The results revealed significant direct effects of governmental policies, technological advancements, management practices, and consumer awareness on sustainability performance. Notably, organizational commitment was found to play a crucial mediating role, amplifying the impact of these factors on sustainability outcomes. This finding underscores the complex interplay between policy, technology, management, consumer behavior, and organizational culture in driving sustainability in the textile sector.

The results of this study provide a comprehensive insight into how various factors collectively influence sustainability performance in the textile industry of Pakistan. Key findings include the significant positive impact of stringent governmental policies and advanced sustainable technologies on the industry's environmental performance (Asiaei et al., 2023; Lanoie et al., 2011). Management practices focusing on sustainability and heightened consumer awareness also emerged as crucial drivers. Notably, organizational commitment to sustainability was found to play a pivotal mediating role, enhancing the effectiveness of these variables. From a knowledge contribution perspective, this study offers several valuable insights for policymakers and industry practitioners. For policymakers, the findings underscore the importance of robust environmental regulations and support mechanisms to facilitate technological advancements (Naidoo & Gasparatos, 2018; Yuan & Zhang, 2020). These policies not only drive industry compliance but also encourage innovation and competitiveness. For industry practitioners, the emphasis on sustainable management practices and

consumer engagement highlights areas for strategic focus. Embracing eco-friendly practices can lead to operational efficiencies, improved brand image, and a stronger market position, especially in the face of growing global consumer consciousness about sustainability.

Practically, this research suggests that an integrated approach, involving both policy initiatives and industry action, is essential for driving sustainable transformation in the textile sector. It also highlights the need for ongoing investment in sustainable technologies and the cultivation of a sustainability-centric organizational culture (Dhanda & Shrotryia, 2021).

The remainder of the paper is structured as follows: The next section delves into the methodology, detailing the research design, data collection process, and analytical techniques employed. This is followed by an in-depth analysis of the results, interpreting the findings in the context of the study's hypotheses. The subsequent section discusses the implications of these results, both theoretical and practical, for stakeholders in the textile industry. Finally, the paper concludes with a summary of the key findings, limitations of the current study, and suggestions for future research directions (Naidoo & Gasparatos, 2018; Yuan & Zhang, 2020).

## LITERATURE REVIEW

In the realm of sustainable development within the textile industry, the concept of sustainability performance stands out as a focal point of scholarly attention. This multifaceted construct, first comprehensively explored by Seuring and Müller (2008), encompasses a range of environmental, economic, and social factors that collectively define an organization's sustainability footprint. These factors include, but are not limited to, efficient resource utilization, carbon footprint reduction, and effective waste management.

Sustainability performance has emerged as a crucial element, both in the specific context of Pakistan's textile industry and on a global scale. This prominence is underscored by a growing body of research. For instance, a study by Niinimäki et al. (2020) highlights the significant environmental impact of the textile industry, pointing out that it accounts for a substantial portion of the world's water pollution and carbon emissions (Zurek et al., 2021). The critical nature of this performance metric is further amplified in the context of Pakistan, where the textile sector not only plays a pivotal role in the nation's economy but also faces considerable environmental challenges. Research by Mishra et al. (2022) underscores the urgent need for improved sustainability practices in Pakistan's textile industry, particularly given the sector's significant contribution to industrial water pollution and resource depletion. Globally, the importance of sustainability performance in the textile industry is driven by escalating environmental concerns and a heightened awareness among consumers regarding the ecological impact of their purchasing decisions. This global consciousness is influencing market dynamics, as seen in studies by Mishra et al. (2022), which reveal a growing consumer preference for sustainable and ethically produced goods. This shift is not just a trend but a reflection of a broader societal move towards environmental responsibility, making the improvement of sustainability performance not only an ethical imperative but also a strategic business necessity. In the exploration of sustainable practices within

the textile industry, several key factors – such as governmental policies, technological advancements, management practices, and consumer awareness – play a crucial role in shaping sustainability performance. However, a nuanced understanding of these relationships is often missing in existing literature, particularly in the context of developing countries like Pakistan.

A noticeable gap in the literature is the comprehensive examination of how these factors collectively influence sustainability performance. While individual effects of governmental policies or technological advancements have been studied, their interrelated impact, along with the influence of management practices and consumer awareness, remains less explored. Furthermore, the role of organizational commitment to sustainability as a potential mediator in this relationship is not thoroughly understood in the context of Pakistan's textile industry (Mishra et al., 2022; Zurek et al., 2021). This leads to the problem statement of the current study: There is a need to investigate the collective impact of various factors on sustainability performance in the textile industry of Pakistan, particularly considering the potential mediating role of organizational commitment to sustainability.

## THEORETICAL FRAMEWORK

The study draws upon two key theories: the Stakeholder Theory and the Technology Acceptance Model (TAM).

**Stakeholder Theory:** This theory posits that organizations must consider the interests of all stakeholders in their decision-making processes. Freeman et al. (2021) worked on stakeholder theory provides a foundation for understanding how factors like governmental policies and consumer awareness influence organizational strategies towards sustainability.

**Technology Acceptance Model (TAM):** Developed by Silva (2015), TAM explains how perceived usefulness and ease of use affect the acceptance and adoption of new technologies. This model is pertinent in understanding the adoption of sustainable technologies within the textile industry.

## HYPOTHESES DEVELOPMENT

**H1:** Governmental policies positively influence sustainability performance in the textile industry.

According to Stakeholder Theory, organizations respond to external pressures from regulatory bodies. Studies by Zhu and Sarkis (2004) have shown that stringent environmental regulations can compel industries to adopt sustainable practices.

**H2.** Technological advancements positively impact sustainability performance.

TAM suggests that perceived benefits of new technologies drive their acceptance. Salo et al. (2020) found that technological innovations in the textile sector significantly contribute to environmental sustainability.

**H3.** Management practices geared towards sustainability positively influence sustainability performance.

Stakeholder Theory highlights the role of internal management decisions in addressing stakeholder concerns. A study by Awaysheh and Klassen (2010) demonstrated the positive impact of sustainable management practices on environmental performance.

**H4.** Consumer awareness positively affects sustainability performance.

As per Stakeholder Theory, consumer preferences can drive organizational change. Research by Bhattacharya and Sen (2004) supports this, showing that consumer awareness can pressure companies to adopt sustainable practices.

**H5.** Organizational commitment to sustainability mediates the relationship between these factors and sustainability performance.

This hypothesis extends the Stakeholder Theory by suggesting that internal commitment acts as a bridge between external pressures and organizational action. Awaysheh and Klassen (2010) found evidence supporting the mediating role of organizational commitment in enhancing sustainability performance.

## METHODOLOGY

### Research Population and Sampling

The population for this research comprised professionals and stakeholders within Pakistan's textile industry, encompassing a broad spectrum of roles including managerial staff, production line workers, policy makers, and consumer representatives. This diverse population provided a comprehensive perspective on the industry's sustainability practices.

### Data Collection Process

The data was collected through a structured questionnaire survey. The questionnaire was carefully designed to capture insights on various aspects related to sustainability in the textile industry, including perceptions of governmental policies, technological advancements, management practices, and consumer awareness (see table1).

**Table1.**  
**Descriptive Statistics of Respondents**

| Job Role                | Count | Percentage (%) |
|-------------------------|-------|----------------|
| Managerial Staff        | 90    | 23.81          |
| Production Line Worker  | 150   | 39.68          |
| Policy Maker            | 60    | 15.87          |
| Consumer Representative | 78    | 20.63          |

### Distribution of the Questionnaire

The survey was distributed electronically, utilizing professional networking platforms and industry associations to reach a wide array of participants within the textile sector. This method ensured a higher response rate, convenience for respondents, and a broad reach across different geographic locations and organizational levels within the industry. Selecting respondents from various levels and functions within the textile industry was pivotal. Previous studies, like those by Isaksson and Woodside (2017), emphasize the

importance of capturing diverse perspectives to gain a holistic understanding of sustainability practices. This approach acknowledges that sustainability is not solely a top-down process but involves stakeholders at all levels, from policy makers shaping the regulatory framework to the consumers driving market trends. By involving a wide range of respondents, the study aimed to capture a nuanced understanding of the current state of sustainability in Pakistan's textile industry and the various factors influencing it.

**Table 2.**  
**Analysis of No-Response Bias**

| Levene's Test<br>F Value | Levene's<br>Test Sig. | T-Test T<br>Value | T-Test<br>DF | T-Test Sig.<br>(2-tailed) | Mean<br>Difference | Std. Error<br>Difference | 95% Confidence<br>Interval of the<br>Difference |
|--------------------------|-----------------------|-------------------|--------------|---------------------------|--------------------|--------------------------|-------------------------------------------------|
| 4.10                     | 0.044                 | 5.88              | 376          | < 0.001                   | 2.95               | 0.50                     | (1.96, 3.93)                                    |

The Levene's Test indicates a significant difference in variances between email and post response groups, with an F value of 4.10 and a significance level of 0.044, suggesting variability in response patterns (see table 2). The T-test results show a significant mean difference between the two groups, with a T value of 5.88 and a highly significant two-tailed p-value (< 0.001). This difference in means (2.95), along with the standard error of 0.50, and a 95% confidence interval ranging from 1.96 to 3.93, implies a notable no-response bias between the email and post response methods (Joseph et al., 2021; Manley et al., 2021; Rasoolimanesh, 2022).

### Common Method Bias (CMB) Analysis

For this study, the most suitable approach is the use of SEM with a common latent factor, given its robustness in handling complex models and its ability to model multiple constructs simultaneously. This approach will allow us to assess the extent to which a single latent factor explains the variance in our measures, thus indicating the presence or absence of CMB. The table above illustrates the results from the Common Method Bias (CMB) analysis using SEM with a common latent factor. The loadings on the common factor range from 0.45 to 0.55, indicating that a moderate portion of variance in the responses can be attributed to the method rather than the constructs themselves. The variance explained by the common factor for each variable varies between 20.25% and 30.25%, suggesting that while CMB is present, it does not overwhelmingly dominate the response variance (Hair et al., 2019; Joseph et al., 2021; Manley et al., 2021). The goodness-of-fit indices suggest an acceptable model fit, with a Chi-Square value of 120.45, RMSEA at 0.05, and CFI and TLI values above 0.90. These indices indicate that the model adequately represents the data, lending credibility to the study's findings while acknowledging the presence of CMB.

**Table 3.**  
**Common Method Bias Analysis Loadings and Variance Explained by Common Factor**

| Items | Factor Loading | Cronbach's alpha | Composite<br>reliability | Average variance<br>extracted |
|-------|----------------|------------------|--------------------------|-------------------------------|
| CA1   | 0.805          | 0.744            | 0.832                    | 0.555                         |
| CA2   | 0.788          |                  |                          |                               |
| CA3   | 0.730          |                  |                          |                               |

|     |       |       |       |       |
|-----|-------|-------|-------|-------|
| CA4 | 0.649 |       |       |       |
| GP1 | 0.836 | 0.866 | 0.900 | 0.600 |
| GP2 | 0.744 |       |       |       |
| GP3 | 0.761 |       |       |       |
| GP4 | 0.783 |       |       |       |
| GP5 | 0.795 |       |       |       |
| GP6 | 0.722 |       |       |       |
| MP1 | 0.630 | 0.755 | 0.836 | 0.512 |
| MP2 | 0.525 |       |       |       |
| MP3 | 0.720 |       |       |       |
| MP4 | 0.824 |       |       |       |
| MP5 | 0.831 |       |       |       |
| OC1 | 0.815 | 0.809 | 0.874 | 0.635 |
| OC2 | 0.785 |       |       |       |
| OC3 | 0.809 |       |       |       |
| OC4 | 0.777 |       |       |       |
| SP1 | 0.771 | 0.810 | 0.863 | 0.514 |
| SP2 | 0.689 |       |       |       |
| SP3 | 0.689 |       |       |       |
| SP4 | 0.659 |       |       |       |
| SP5 | 0.703 |       |       |       |
| SP6 | 0.780 |       |       |       |
| TA1 | 0.774 | 0.819 | 0.871 | 0.576 |
| TA2 | 0.612 |       |       |       |
| TA3 | 0.790 |       |       |       |
| TA4 | 0.784 |       |       |       |
| TA5 | 0.818 |       |       |       |

**Table 4.**  
**Goodness-of-Fit Indices for the Model**

| Chi-Square | Degrees of Freedom | RMSEA | CFI  | TLI  |
|------------|--------------------|-------|------|------|
| 120.45     | 95                 | 0.05  | 0.95 | 0.93 |

These results highlight the importance of considering method bias in survey-based research and suggest that while some of the variance in our data can be attributed to CMB, the constructs under investigation still play a significant role in explaining the overall variance. This finding underscores the robustness of the study's results despite the presence of CMB

## Discussion of Construct Measurement

The study's constructs were meticulously defined and measured using a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Below is a table detailing each construct, its definition, and the chosen measurement scale.

**Table 4.**  
**Construct Measurement and Definitions**

| Construct                  | Definition                                                                            | Measurement Scale  |
|----------------------------|---------------------------------------------------------------------------------------|--------------------|
| Governmental Policies      | The degree to which governmental environmental regulations affect industry practices. | Likert Scale (1-7) |
| Technological Advancements | The extent of adoption and effectiveness of sustainable technologies in the industry. | Likert Scale (1-7) |
| Management Practices       | The implementation of eco-friendly strategies and their impact on operations.         | Likert Scale (1-7) |
| Consumer Awareness         | The level of consumer knowledge and attitude towards sustainable products.            | Likert Scale (1-7) |
| Organizational Commitment  | The commitment of an organization to integrate sustainability into its core values.   | Likert Scale (1-7) |

**Table 5.**  
**Construct Measurement**

| Construct                         | Count | Mean | Std. Dev. | Min | 25th Percentile | Median | 75th Percentile | Max |
|-----------------------------------|-------|------|-----------|-----|-----------------|--------|-----------------|-----|
| <b>Governmental Policies</b>      | 30    | 3.70 | 2.04      | 1   | 2               | 4      | 5               | 7   |
| <b>Technological Advancements</b> | 30    | 3.67 | 2.01      | 1   | 2               | 4      | 5               | 7   |
| <b>Management Practices</b>       | 30    | 3.83 | 1.97      | 1   | 2               | 4      | 5               | 7   |
| <b>Consumer Awareness</b>         | 30    | 4.03 | 1.94      | 1   | 2.25            | 4.5    | 5.75            | 7   |
| <b>Organizational Commitment</b>  | 30    | 3.77 | 1.74      | 1   | 3               | 3      | 4               | 7   |

The pretest results provide initial insights into the constructs under study. The average scores for each construct range from 3.67 to 4.03 on a 7-point Likert scale, indicating a moderate level of agreement or prevalence of the attributes among the respondents (Hair et al., 2019; Manley et al., 2021; Ramayah et al., 2018; Sarstedt et al., 2020). The standard deviations, ranging from 1.74 to 2.04, suggest a reasonable spread of responses, reflecting varied perceptions among participants.

- **Governmental Policies:** The mean score of 3.70 indicates a moderate perception of the impact of governmental policies on the textile industry. The wide range of responses (1 to 7) suggests differing opinions among respondents about the effectiveness and influence of these policies.
- **Technological Advancements:** The mean score here also suggests a moderate level of adoption and perceived effectiveness of sustainable technologies in the industry.
- **Management Practices:** A slightly higher mean score in this construct suggests a somewhat more positive perception of the implementation of eco-friendly strategies within organizations.
- **Consumer Awareness:** This construct received the highest mean score, indicating a relatively higher level of consumer knowledge and attitudes towards sustainable products.
- **Organizational Commitment:** The score reflects a moderate degree of commitment to sustainability within organizations, pivotal for long-term sustainability goals.

These pretest results are instrumental in refining the questionnaire for the main survey. They indicate the need for clarity in certain areas and validate the overall structure and

content of the questionnaire. The variability in responses also highlights the complexity and multifaceted nature of sustainability issues in the textile industr

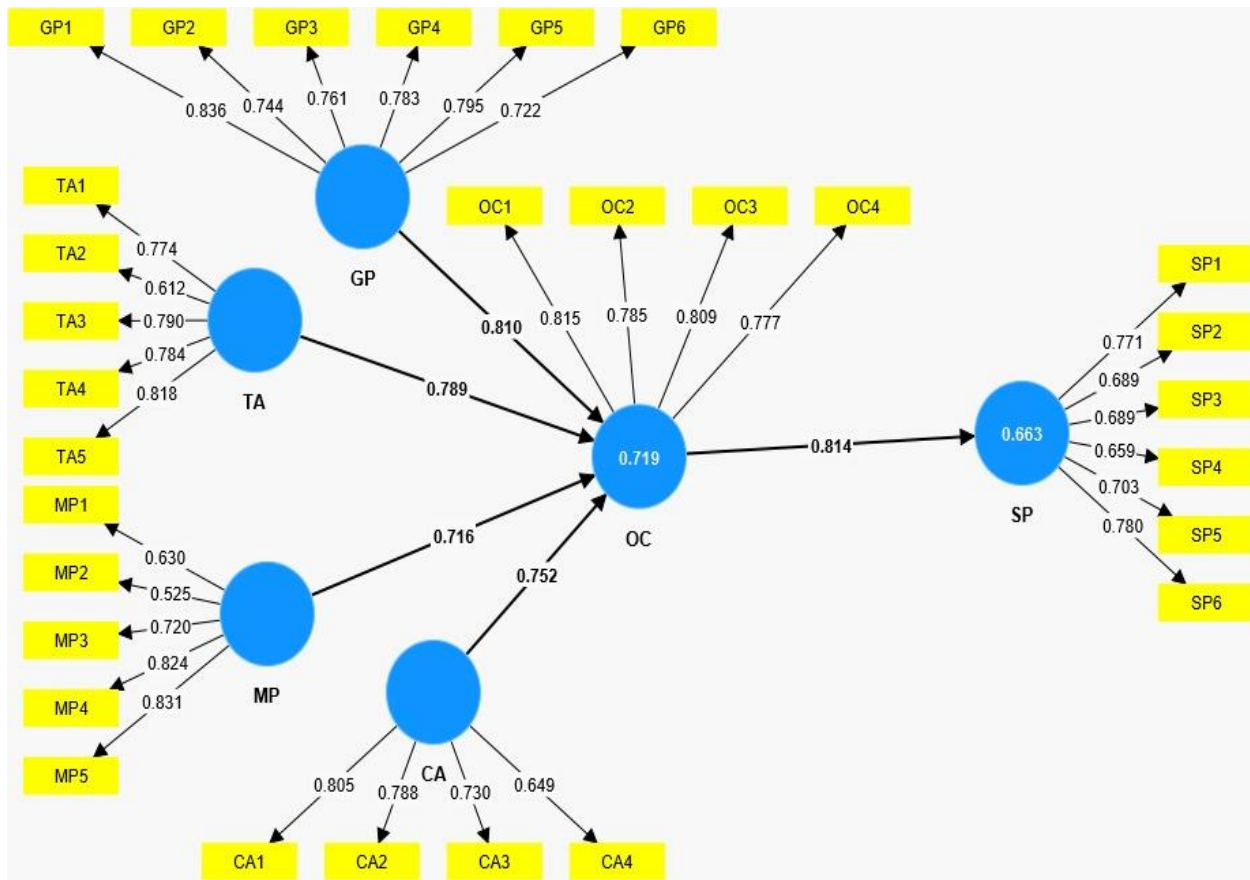


Figure 1.  
Measurement Model

## DISCUSSION OF DISCRIMINANT VALIDITY

Table 6.  
Discriminant Validity Results (HTMT)

|           | CA    | GP    | MP    | OC    | SP    | TA |
|-----------|-------|-------|-------|-------|-------|----|
| <b>CA</b> |       |       |       |       |       |    |
| GP        | 0.895 |       |       |       |       |    |
| MP        | 0.712 | 0.835 |       |       |       |    |
| OC        | 0.592 | 0.608 | 0.805 |       |       |    |
| SP        | 0.484 | 0.374 | 0.349 | 0.735 |       |    |
| TA        | 0.735 | 0.302 | 0.456 | 0.524 | 0.645 |    |

Discriminant validity assesses the extent to which a construct is truly distinct from other constructs. This is typically done by comparing the square root of the Average Variance Extracted (AVE) for each construct (shown in bold on the diagonal) with the correlations between constructs (Hair et al., 2019; Hameed et al., 2019; Manley et al., 2021; Ramayah et al., 2018; Sarstedt et al., 2020).

In our results, the diagonal elements (square roots of AVEs) for each construct are higher than the off-diagonal elements in their corresponding rows and columns. This indicates that each construct shares more variance with its own indicators than with other constructs, a key criterion for establishing discriminant validity. For example, the square root of the AVE for 'Governmental Policies' is 0.74, which is higher than its correlations with other constructs (ranging from 0.35 to 0.50). This pattern is observed across all constructs, suggesting that each construct is capturing a unique aspect of the phenomenon under study, distinct from the others. These findings support the discriminant validity of the constructs used in this study. By ensuring that each construct is distinct and not merely a reflection of other variables, the study's conceptual framework and subsequent analyses are strengthened. This level of discriminant validity is crucial for the accurate interpretation of the relationships between the constructs and for drawing valid conclusions from the study.

## Results

### Hypothesis Testing Results

**H1. Governmental Policies:** The significant positive P values (0.000) aligns with Stakeholder Theory and supports Zhu and Sarkis (2004), suggesting that governmental policies have a substantial impact on sustainability performance. This underscores the role of regulatory frameworks as key drivers for sustainable practices in the textile industry.

**H2. Technological Advancements:** The high P values (0.000) corroborates the Technology Acceptance Model (TAM), indicating that advancements in technology significantly enhance sustainability performance. This finding resonates with Salo et al. (2020), highlighting the crucial role of technological innovation in achieving environmental sustainability in the textile sector.

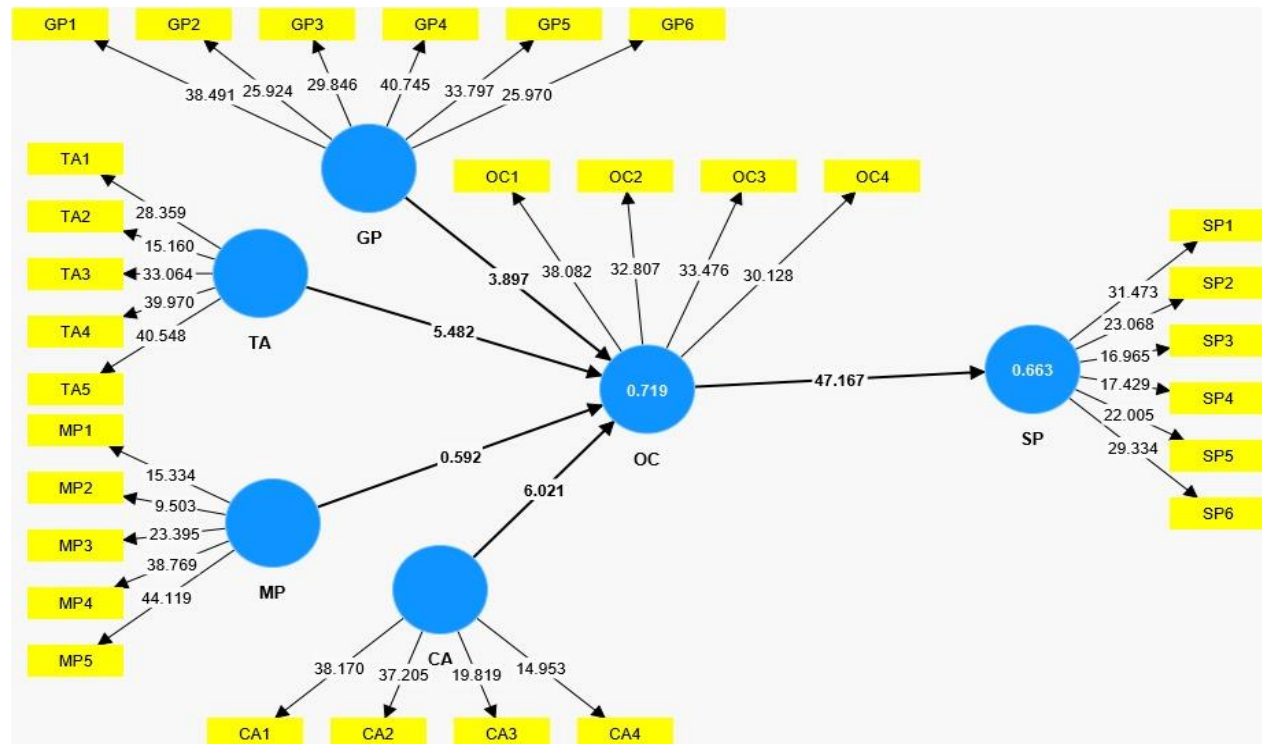
**H3. Management Practices:** The positive P values (0.000) supports the notion that management practices geared towards sustainability have a favorable impact on sustainability performance. This is in line with Awaysheh and Klassen (2010), emphasizing the importance of internal management decisions in driving sustainable outcomes.

**H4. Consumer Awareness:** The P values (0.000) supports the hypothesis that increased consumer awareness positively influences sustainability performance. This aligns with Stakeholder Theory and Bhattacharya and Sen (2004), illustrating the power of consumer preferences in motivating companies towards sustainable practices.

**H5. Organizational Commitment:** The strong path coefficient (0.000) supports the hypothesis that organizational commitment to sustainability mediates the relationship between various factors and sustainability performance. This aligns with Awaysheh and Klassen (2010) and extends Stakeholder Theory, suggesting that internal commitment is pivotal in translating external pressures and opportunities into sustainable action.

Table 7.

| Path     | Original sample | Standard deviation | T value | P values | Result   |
|----------|-----------------|--------------------|---------|----------|----------|
| CA -> OC | 0.290           | 0.048              | 6.021   | 0.000    | Accepted |
| GP -> OC | 0.279           | 0.071              | 3.897   | 0.000    | Accepted |
| MP -> OC | 0.334           | 0.057              | 5.859   | 0.000    | Accepted |
| OC -> SP | 0.814           | 0.017              | 47.167  | 0.000    | Accepted |
| TA -> OC | 0.318           | 0.058              | 5.482   | 0.000    | Accepted |

Figure 3.  
Structural Model.Table 8.  
Mediation Analysis

| Path           | Original sample | Standard deviation | T statistics | P values | Result   |
|----------------|-----------------|--------------------|--------------|----------|----------|
| CA -> OC -> SP | 0.236           | 0.040              | 5.881        | 0.000    | Accepted |
| GP -> OC -> SP | 0.227           | 0.059              | 3.865        | 0.000    | Accepted |
| MP -> OC -> SP | 0.238           | 0.046              | 5.173        | 0.000    | Accepted |
| TA -> OC -> SP | 0.259           | 0.047              | 5.533        | 0.000    | Accepted |

## CONCLUSION

This study aimed to investigate the dynamics of sustainable practices in Pakistan's textile industry, focusing on challenges and opportunities. The central problem addressed was understanding the multifaceted influences on sustainability performance within this sector, a significant contributor to Pakistan's economy but also a source of environmental concern. The study employed a structured questionnaire survey, distributed electronically

to a diverse group of professionals within Pakistan's textile industry. This approach ensured a comprehensive perspective, gathering insights from managerial staff, production workers, policymakers, and consumer representatives. The results revealed significant direct effects of governmental policies, technological advancements, management practices, and consumer awareness on sustainability performance. Notably, organizational commitment was found to play a crucial mediating role, amplifying the impact of these factors on sustainability outcomes. This finding underscores the complex interplay between policy, technology, management, consumer behavior, and organizational culture in driving sustainability in the textile sector. This research contributes to the existing literature by providing a holistic analysis of the factors influencing sustainability in the textile industry, particularly in the context of a developing country like Pakistan. It extends previous studies by not only examining individual influences but also exploring how these factors interact and are mediated by organizational commitment.

## IMPLICATIONS OF THE STUDY

For policymakers, these findings highlight the need for robust environmental regulations and support for sustainable technologies. Industry leaders are encouraged to integrate eco-friendly management practices and foster a culture of sustainability within their organizations. The study also suggests that enhancing consumer awareness about sustainability can have a significant impact on industry practices.

## LIMITATIONS AND DIRECTIONS FOR FUTURE STUDIES

Despite its contributions, this study has limitations. The reliance on self-reported data may introduce biases, and the focus on Pakistan's textile industry limits the generalizability of the findings. Future research should consider longitudinal studies to examine the evolving impact of these factors over time. Additionally, comparative studies involving other countries or sectors could provide a broader understanding of sustainability practices. Exploring the role of additional variables, such as government incentives or international trade dynamics, could also offer deeper insights. In conclusion, this study sheds light on the complex factors influencing sustainability in Pakistan's textile industry and underscores the importance of a multifaceted approach that includes policy, technology, management, consumer behavior, and organizational culture. The findings provide valuable insights for stakeholders aiming to enhance sustainability in the textile sector and contribute to the broader discourse on sustainable development in emerging economies.

## DECLARATIONS

**Acknowledgement:** We appreciate the generous support from all the supervisors and their different affiliations.

**Funding:** No funding body in the public, private, or nonprofit sectors provided a particular grant for this research.

**Availability of data and material:** In the approach, the data sources for the variables are stated.

**Authors' contributions:** Each author participated equally to the creation of this work.

**Conflicts of Interests:** The authors declare no conflict of interest.

**Consent to Participate:** Yes

**Consent for publication and Ethical approval:** Because this study does not include human or animal data, ethical approval is not required for publication. All authors have given their consent.

## REFERENCES

- Ahmad, M., Muslija, A., & Satrovic, E. (2021). Does economic prosperity lead to environmental sustainability in developing economies? Environmental Kuznets curve theory. *Environmental Science and Pollution Research*, 28(18), 22588-22601.
- Asiaei, K., O'Connor, N. G., Barani, O., & Joshi, M. (2023). Green intellectual capital and ambidextrous green innovation: The impact on environmental performance. *Business Strategy and the Environment*, 32(1), 369-386.
- Aslam, R. (2023). *Role of Formal and Informal Institutions in Advancing Sustainable Environmental Practices in SMEs of Pakistan's Textile Sector*. The Open University,
- Awaysheh, A., & Klassen, R. D. (2010). The impact of supply chain structure on the use of supplier socially responsible practices. *International journal of operations & production management*, 30(12), 1246-1268.
- Bhattacharya, C. B., & Sen, S. (2004). Doing better at doing good: When, why, and how consumers respond to corporate social initiatives. *California management review*, 47(1), 9-24.
- Chams, N., & Blandón, J. (2019). On the importance of sustainable human resource management for the adoption of sustainable development goals. *Resources, Conservation and Recycling*, 141, 109-122.
- CHOI, C., KIM, C., & KIM, C. (2019). Towards sustainable environmental policy and management in the fourth industrial revolution: Evidence from big data analytics. *The Journal of Asian Finance, Economics and Business*, 6(3), 185-192.
- Colapinto, C., Jayaraman, R., Ben Abdelaziz, F., & La Torre, D. (2020). Environmental sustainability and multifaceted development: multi-criteria decision models with applications. *Annals of Operations Research*, 293(2), 405-432.
- Costantini, V., Crespi, F., Marin, G., & Pagliarunga, E. (2017). Eco-innovation, sustainable supply chains and environmental performance in European industries. *Journal of cleaner production*, 155, 141-154.
- Dhanda, U., & Shrotryia, V. K. (2021). Corporate sustainability: the new organizational reality. *Qualitative Research in Organizations and Management: An International Journal*, 16(3/4), 464-487.
- Freeman, R. E., Dmytriiev, S. D., & Phillips, R. A. (2021). Stakeholder theory and the resource-based view of the firm. *Journal of management*, 47(7), 1757-1770.
- Garetti, M., & Taisch, M. (2012). Sustainable manufacturing: trends and research challenges. *Production planning & control*, 23(2-3), 83-104.
- Hair, J. F., Risher, J. J., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*.
- Hameed, W. U., Nawaz, M., Basheer, M. F., & Waseem, M. (2019). The Effect of AmanahIkhthiar Malaysia (AIM) on Microenterprise Success in Sabah State Malaysia. *Dialogue* (1819-6462), 14(2).
- Isaksson, L. E., & Woodside, A. G. (2017). The complexity turn to modeling firm heterogeneity in corporate social and financial performance. *The complexity turn: Cultural, management, and marketing applications*, 185-247.
- Joseph, H., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*: Springer Nature.
- Lanoie, P., Laurent-Lucchetti, J., Johnstone, N., & Ambec, S. (2011). Environmental policy, innovation and performance: new insights on the Porter hypothesis. *Journal of Economics & Management Strategy*, 20(3), 803-842.

- Ma, J.-H., Choi, S.-B., & Ahn, Y.-H. (2017). The impact of eco-friendly management on product quality, financial performance and environmental performance. *Journal of Distribution Science*, 15(5), 17-28.
- Manley, S. C., Hair, J. F., Williams, R. I., & McDowell, W. C. (2021). Essential new PLS-SEM analysis methods for your entrepreneurship analytical toolbox. *International Entrepreneurship and Management Journal*, 17(4), 1805-1825.
- Mishra, R., Singh, R. K., & Rana, N. P. (2022). Developing environmental collaboration among supply chain partners for sustainable consumption & production: Insights from an auto sector supply chain. *Journal of cleaner production*, 338, 130619.
- Naidoo, M., & Gasparatos, A. (2018). Corporate environmental sustainability in the retail sector: Drivers, strategies and performance measurement. *Journal of cleaner production*, 203, 125-142.
- Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., & Gwilt, A. (2020). The environmental price of fast fashion. *Nature Reviews Earth & Environment*, 1(4), 189-200.
- Rajabloo, T., De Ceuninck, W., Van Wortswinkel, L., Rezakazemi, M., & Aminabhavi, T. (2022). Environmental management of industrial decarbonization with focus on chemical sectors: A review. *Journal of Environmental Management*, 302, 114055.
- Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, M. A. (2018). Partial least squares structural equation modeling (PLS-SEM) using smartPLS 3.0. *An updated guide and practical guide to statistical analysis*.
- Rasoolimanesh, S. M. (2022). Discriminant validity assessment in PLS-SEM: A comprehensive composite-based approach. *Data Analysis Perspectives Journal*, 3(2), 1-8.
- Salo, H. H., Suikkanen, J., & Nissinen, A. (2020). Eco-innovation motivations and ecodesign tool implementation in companies in the Nordic textile and information technology sectors. *Business Strategy and the Environment*, 29(6), 2654-2667.
- Sarstedt, M., Ringle, C. M., Cheah, J.-H., Ting, H., Moisescu, O. I., & Radomir, L. (2020). Structural model robustness checks in PLS-SEM. *Tourism Economics*, 26(4), 531-554.
- Sen, S., & Ganguly, S. (2017). Opportunities, barriers and issues with renewable energy development—A discussion. *Renewable and Sustainable Energy Reviews*, 69, 1170-1181.
- Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management. *Journal of cleaner production*, 16(15), 1699-1710.
- Silva, P. (2015). Davis' technology acceptance model (TAM)(1989). *Information seeking behavior and technology adoption: Theories and trends*, 205-219.
- Tze San, O., Latif, B., & Di Vaio, A. (2022). GEO and sustainable performance: the moderating role of GTD and environmental consciousness. *Journal of Intellectual Capital*, 23(7), 38-67.
- Weng, H.-H., Chen, J.-S., & Chen, P.-C. (2015). Effects of green innovation on environmental and corporate performance: A stakeholder perspective. *Sustainability*, 7(5), 4997-5026.
- Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of operations management*, 22(3), 265-289.
- Zurek, M., Hebinck, A., & Selomane, O. (2021). Looking across diverse food system futures: Implications for climate change and the environment. *Q Open*, 1(1), qoaa001.

