



Linking Environmental Management Systems to Firm Performance: Empirical Evidence from an Emerging Economy

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Abstract: This study aims to determine how environmental performance and customer satisfaction affect the relationship between environmental management systems and company performance. For this purpose, we have collected and analyzed data from 243 textile companies in Pakistan, using partial least squares structural equation modelling. Our empirical results indicate that environmental management systems have a positive and significant impact on business success, customer satisfaction and environmental performance. The findings also show that environmental performance and customer satisfaction mediate the relationship between environmental management systems and business performance in a complementary manner. Our findings show that environmental performance and customer happiness are essential for textile companies to benefit from environmental management systems. The results suggest that Pakistani textile companies should make better use of environmental management systems as valuable tools for addressing stakeholders' concerns and for boosting financial profits.

Keywords: Environmental management systems, firm performance, customer satisfaction, environmental performance, PLS-SEM, Pakistan.

JEL Classification: L25, M14, M30, M31.

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Linking Environmental Management Systems to Firm Performance: Empirical Evidence from an Emerging Economy

1. Introduction

Until nearly ten years ago, the relationship between environmental management systems (EMSs) and firm performance had not been extensively researched (Ikram et al., 2019). Initially, concern about the environment was not only considered antithetical to a profitable firm strategy but also seen as a violation of the promises made to firm stakeholders (Azorin et al., 2015). According to the traditional view, engaging in environmental management increases costs and minimizes stakeholder profitability (Camilleri, 2022). However, Porter and Linde (1995) have challenged this approach and suggested that EMSs and firm performance are two sides of the same coin. This has helped change the mindset of manufacturers and encouraged them to become more environmentally sensitive and responsible (Melnyk et al., 2003).

With rising concerns about sustainability, companies are now focusing increasingly on EMSs, particularly for improving firm performance (Yang et al., 2011). Recently, manufacturing companies have adopted EMSs (Feng et al., 2016) to protect the natural environment and improve firm performance (Khan & Qianli, 2017). With growing global environmental concerns, manufacturing companies are now taking a more proactive stance to minimize their environmental impact and generally improve their performance (Epstein, 2018). According to Rehman et al. (2020), adopting EMSs is considered an effective method for achieving corporate objectives. Therefore, in today's dynamic environment, EMSs are pertinent tools for improving quality, achieving sustainable development and improving firm performance (Rino & Salvador, 2017).

In the last decade, EMSs have become necessary for most manufacturing industries due to pressure from stakeholders to practice environmental protection (Vachon & Klassen, 2008). The environment is considered an asset and must be protected (Ann et al., 2006). In addition to increasing pressure from the government and the public to protect the environment, the growing sensitivity of customers has led companies to adopt EMSs (Leonidou et al., 2013). Thus, it is expected that managers will exercise increased responsibility for protecting the environment and meeting other objectives. Customers are now more concerned about the

sustainability of products—more so for popular brands—and pay more attention to firms' responsibility for the environment. EMSs thus enable companies to realize their environmental concerns while reducing costs (Miroshnychenko et al., 2017).

With respect to environmentally sensitive customers and increasing demand for a sustainable environment, industries aim to achieve benefits related to environmental stewardship and sustainability (Çankaya & Sezen, 2018). EMSs help systematically improve firms' performance in the long run (Watson et al., 2004). The EMS is an internal system that can significantly reduce costs and build sustainability for the firm. Sustainable practices and product concerns for the future are much-needed practices (Miroshnychenko et al., 2017).

To decrease the adverse influence of firm activities on the environment, firms are under government pressure to maintain systems that ensure environmental safety (Durdyev et al., 2018). They adhere to EMSs to achieve a competitive advantage (Camilleri, 2022). EMSs help firms perform the required environmental assessments and plan and implement their activities accordingly (Zhao et al., 2014).

The motivation for firms' adoption of EMSs (Robinson, 2012; Campos et al., 2015), the improvement of environmental performance (Phan & Baird, 2015; Hartmann & Vachon, 2018; Otto et al., 2020), and the coordination between supply chain partners and the designated firm have all been examined in recent studies (Agan et al., 2016; Khan & Qianli, 2017; Camilleri, 2022). However, academics have observed that there is little research on the connection between EMSs and firm performance (Abisourour et al., 2021). This study bridges the gap by taking a comprehensive view of how EMSs affect firm performance through the mediation of environmental performance and customer satisfaction.

Adopting an EMS gives a firm better access to opportunities and the ability to manufacture innovative products that differ from those of its competitors (Pujari et al., 2013). Adhering to the EMS also helps companies maintain a competitive advantage by protecting the environment and natural resources (Haden et al., 2009). However, some disagreement exists on the relationship between the EMS and firm performance. According to several studies, an EMS enhances business success by lowering expenses, fostering a more humane perception of the organization, and enabling the sale of sustainable products (Ramanathan, 2018; Nasution et al., 2021).

However, other studies on this relationship are inconclusive (Abisourour et al., 2021). Therefore, further research is needed to resolve this ambiguity.

Zhao et al. (2014) state that there may not be a direct correlation between EMSs and firm performance. Researchers believe that the relationship may be affected by underlying factors that explain it better and suggest investigating customer attitudes and environmental performance as intervening factors. This study responds by exploring the role of customer satisfaction and environmental performance as mediating variables between EMSs and firm performance.

There are several reasons for this. First, very few studies have explored the connection between corporate strategies for environmental protection and business performance (Martín-de Castro et al. 2016). Second, previous research yields inconclusive results on the relationship between EMSs and firm performance. Third, given that the economy is under intense pressure from customers concerning environmental protection, the current situation in Pakistan is an interesting case study (Ikram et al., 2019). The GDP has experienced a consistent dip in Pakistan while other economic factors, such as currency, the tax-to-GDP ratio and current account deficit, are unsatisfactory (Ali & Rehman, 2015). Furthermore, the environmental conditions of Pakistan have continued to worsen. Although the Global Climate Index shows that Pakistan's own emissions are very small, the country remains subject to increasing environmental issues as economic development continues (Ikram et al., 2019).

As earlier studies have shown, there is a lack of evidence surrounding the intervening elements in the relationship between EMSs and firm performance (Zhao et al., 2014). The available research is mostly circumstantial and lacks any improvement framework (Watson et al., 2004). This dearth has meant that corporate-level strategists are less likely to adopt EMSs due to perceived costs. Therefore, this study presents and examines a conceptual framework to measure the impact of EMSs on firms' performance by considering the mediating behavior of customer satisfaction and environmental performance, which has not been investigated before (Li & Wu, 2017). Exogenous concepts such as customer attitudes/satisfaction and environmental performance have not received enough attention. However, significant research on the effects of customer satisfaction on firm performance, environmental performance on firm performance, and EMS performance is available (Hristov et al., 2021; Camilleri, 2022).

The discrepancies between the findings of earlier studies that explored the relationship between EMSs and firm performance may be due to the presence of an intervening factor (customer satisfaction and environmental performance). Closer consideration of such mediators is required to provide the missing links and give some consistency to the research in this area. Previous studies investigating EMSs and firm performance have focused on endogenous mechanisms, derived from resource-based view (RBV) theory (Tseng et al., 2021; Bresciani et al., 2022). The current study is based on RBV theory and institutional theory, where a firm's perspective is considered to address the concerns of stakeholders and consequently improve performance (Delmas & Toffel, 2004).

Several studies claim that the adoption of EMSs (Sadorsky & Henriques, 1996) is driven by customer demands (Christmann & Taylor, 2001). Therefore, it is important to focus on the social pressure that customers exert, which drives firms to adopt EMSs in textile industries. To address this, the current research hypothesizes a framework to study the intervening impact of customer satisfaction and environmental performance through which EMSs amplify firm performance. Furthermore, objective research investigating EMSs and firm performance in the textiles sector has not been given due attention. This study responds to a call by Lo et al. (2012) to fill this gap. Finally, from the perspective of the Pakistani textile industry, this research is the first of its kind and thus fills an important gap in the literature.

According to Muktiono and Soediantono (2022), implementing a proper EMS can significantly increase customer demand, market share and employee participation. It not only aids in significantly reducing carbon footprints but also raises customer satisfaction. Companies with an EMS orientation show high adaptability towards sustainability initiatives. This helps synchronize environmental resources and the appropriate use of management systems, ultimately mitigating risks and uncertainties and fulfilling financial and eco-friendly objectives (Asiaei et al., 2021). However, the literature has overlooked a distinct and practical theoretical gap between green management and its effects on environmental and overall firm performance (Asiaei et al., 2021; Makhoulfi et al., 2022). Therefore, this study has important implications for academics, policymakers and entrepreneurs.

The motivation for exploring this area is twofold. First, although extensive research has been carried out on environmental disclosure, little research has been conducted on how internal managerial processes, for

example, EMSs, can be employed by practitioners to meet their ecological objectives (Lisi, 2015). Second, from a theoretical perspective, the relationship between environmental practices and performance may have a positive or negative impact on value creation and investment costs depending on two competing theories—the stakeholder value creation view and the agency cost model (Freudenreich et al., 2020; Asiaei et al., 2021). To address this gap, it is crucial to investigate how EMSs plays a vital role in translating sustainable elements into conservational practice.

The study makes a range of contributions to theory and practice. The framework looks at the exogenous processes through which businesses might benefit from an EMS, particularly through customer satisfaction. By examining the positive impact of EMSs in addition to their internal advantages, this study overcomes the inconsistencies of RBV theory. Second, the study demonstrates that intervening factors, such as customer satisfaction and environmental performance, might affect the relationship between the EMS and firm performance. As a result, we expand on the EMS literature by highlighting the connections between external strategies and EMS adoption, both of which impact business performance. Third, this study fills the gap in relation to the dearth of studies on the textiles industry. Finally, we contribute to management practices by highlighting the enabling effect of the market environment and demonstrating how EMSs enhance the performance of enterprises in emerging countries.

The rest of the article is structured as follows. Section 2 provides a literature review and hypothesis development. Section 3 discusses the methodology used, while Section 4 provides the results. Finally, Section 5 provides a discussion and reviews the implications and study limitations.

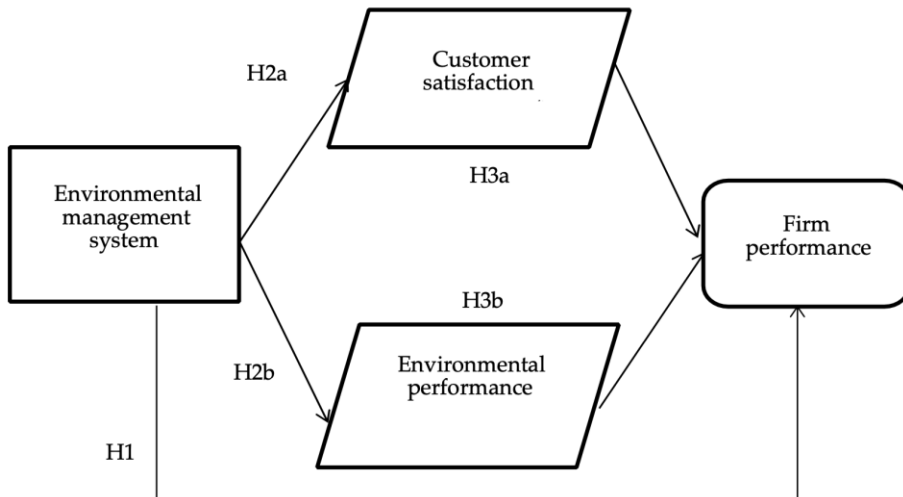
2. Literature Review and Hypothesis Development

2.1. Theoretical Background

This study adopts RBV theory and institutional theory. According to RBV theory, EMSs are strategic resources that aid firms in building sustainable abilities and giving them competitive advantages that are both attainable and sustainable (Vachon & Klassen, 2008). Such ecological advancements efficiently manage stakeholders' growing concerns and refine firms' operational abilities with the help of technological developments (Russo & Fouts, 1997; Chiou et al., 2011). Therefore, an EMS acts as a strategic asset for a company because it reduces waste, enhances the

required knowledge and skills, and increases cooperation (Darnall & Edwards, 2006). However, as industries work with external players and stakeholders, an institutional perspective also needs to be addressed so that a better understanding of the adoption of an EMS and its relationship with firm performance can be achieved (Zhao et al., 2014; Castro et al., 2015).

Figure 1: Theoretical Framework



Institutional theory addresses the impact of social and cultural pressures on business operations (Delmas & Toffel, 2004). It holds that the company acknowledges that performance and strategic targets are connected to external procedures such as stakeholder responses (Rebello et al., 2018). The first study to examine how organizations adhere to environmental management standards from an institutional theory perspective was conducted by Jennings and Zandbergen (1995). They concluded that firms adopted EMSs due to customer pressure as a driving force. A firm's performance depends on how well it can satisfy customers, which includes their behavior and attitudes. From a strategic analysis point of view, customers are the most crucial factor in a firm's strategic decisions (Agan et al., 2016). Customers change their perceptions of companies when they know that a company has adopted an EMS (Fernando & Saththasivam, 2017).

Figure 1 above depicts the mediating influence of customer satisfaction and environmental performance. Table 1 gives the definitions of the variables used.

Table 1: Constructs and Definitions

Variables	Definition	Literature
Environmental management systems	EMSs are internal management procedures related to assessing, planning, and implementing which can influence the company and its accord with the environment.	(Klassen & McLaughlin, 1996; Zhao et al., 2014; Ikram et al., 2019)
Customer satisfaction	Customer satisfaction is an emotional state, which describes the degree to which products and services supplied by a firm meet or surpass customers' expectations.	(Fornell, 1992; Kim et al., 2004)
Environmental performance	The degree to which an organization improves its performance in respect to its environmental responsibilities.	(Sroufe, 2003; Matos & Hall, 2007; Yang et al., 2011)
Firm performance	Firm performance indicates the market-based performance of the company.	(Selvarajan, et al., 2007)

2.2. Environmental Management Systems

In contrast to government interventions or regulatory authorities, EMSs focus on internal managerial procedures that impose specific conditions on manufacturing and operations. Darnall and Edwards (2006) define an EMS as a combination of internal activities that guide firms in planning, implementing, and assessing. EMSs assist in developing environmental policies that enable firms to analyze and evaluate the environmental impacts of their efforts by setting objectives, monitoring and assessing goal attainment, and making adjustments based on evaluation (Darnall & Edwards, 2006). EMSs ensure that managers acknowledge and that companies comply with regulations. It also ensures that firms are mindful of their operations, involve their employees by creating awareness of environmental regulations, and regularly monitor their progress. All these efforts ultimately help the company improve its internal operations and activities, increasing cost efficiency and effectiveness (Hart, 1995).

According to Klassen and McLaughlin (1996), companies need to consciously consider the environmental effects of environmental management initiatives and the manufacturing processes of products. Corporate-level strategy must have a clear environmental direction for the company. The literature strongly supports the idea that the adoption of

EMSs by manufacturing companies leads to improved environmental performance (Zhu & Sarkis, 2004; Daily et al., 2007; Hong & Modi, 2011; Lee et al., 2016; Ramanathan, 2018). According to Jorgensen et al. (2010), the adoption of EMSs is particularly advantageous in the textile sector. As a result, there is increasing pressure from stakeholders, especially customers, to adopt EMSs in the textile sectors, particularly in emerging economies.

EMSs encompass various internal mechanisms, such as environmental objectives, policies and guidelines, environmental impact analysis and evaluation, operations and processes, monitoring and compliance procedures, training and mentoring, and continual improvement. Therefore, the adoption of EMSs by manufacturing companies is crucial in minimizing adverse effects on the environment. It also helps build sustainable capabilities that are not easily imitated by competitors (Camilleri, 2022). Furthermore, the rising regulatory authority and public pressure to reduce resource wastage have increased awareness among the public, making it even more important for companies to adopt EMSs (Leonidou et al., 2013). As a result, managers are expected to have clear environmental objectives alongside other organizational objectives.

Today, customers who are more conscious and concerned about product sustainability, expect companies to be more environmentally responsible (Perry, 2018). Therefore, companies have a greater interest in gaining competitive advantages related to environmental sustainability and stewardship (Watson et al., 2004). The attitudes and behaviors of customers compel companies to improve their performance by adopting EMSs (Daddi et al., 2011). Similarly, Christmann and Taylor (2001) suggest that customers play a critical role in influencing companies to adopt environmental management programs. Therefore, this research focuses on the mediating role of environmental performance and customer satisfaction, through which EMSs lead to increased firm performance.

2.3. EMS and Firm Performance

Financial and social performance are widely recognized as the two most critical elements of firm performance (Rebelo et al., 2018). Social performance refers to issues related to the firm and the general and specific environment, while financial performance focuses on a firm's profitability resulting from its activities and operations. Although these performances are distinct, they are interrelated and have synergistic influences on a company's overall performance (Maas et al., 2018).

The literature presents conflicting views on the impact of EMSs on firm performance (Lo et al., 2012). For example, Boiral and Sala (1998) argue that implementing EMSs is a bureaucratic activity that requires extensive documentation and leads to higher costs. Thus, there is a negative relationship between EMSs and firm performance. In contrast, Delmas (2001) found that companies adopting EMSs can achieve better performance by enhancing product quality, achieving cost efficiencies, reducing lead time, and improving design and equipment selection (Melnik et al., 2003).

According to the natural-resource-based view, the effective implementation of an EMS requires organizations to balance their skill sets and resources to implement proactive environmental techniques and strategies (Martín-de Castro et al., 2016). EMSs have become more prevalent in organizational operations, procedures, policies, and programs. In particular, efforts to adopt EMSs can drive technological development in knowledge- and capital-intensive industries, leading to improved firm performance (Rehman et al., 2020).

Adopting EMSs can also enhance a company's corporate image, resulting in opportunities for cost reduction, increased revenue and stakeholder relationships (Ann et al., 2006). EMS adoption can minimize waste, improve recycling, and ultimately lead to lower costs and higher profits (Wong et al., 2012). Therefore, based on the above discussion, this study proposes the following hypothesis:

Hypothesis 1: EMSs have a significant impact on firm performance.

2.4. Mediating Role of Perceived Customer Satisfaction

Customer satisfaction is a central concept in marketing (Kassinis & Soteriou, 2003). It drives companies to design products that meet customer expectations (Fornell, 1992). Companies adopt EMSs not only to increase customer satisfaction but also to minimize negative environmental impacts (Endrikat et al., 2014). This, in turn, improves a firm's overall performance in terms of cost-effectiveness, revenues, demand, profit margins, and the adoption of eco-friendly measures (Yu et al., 2013; Rather et al., 2019).

Currently, there is a growing demand for eco-friendly products, which are perceived as high-quality products. Including green products in the supply chain can significantly enhance customer satisfaction (Banerjee et al., 2003). The adoption of EMSs leads to meeting customer needs while also

providing ecological protection (Chan et al., 2012). Therefore, branding the firm as a "responsible institution" creates a favorable and eco-friendly image in the eyes of customers (Zutshi & Sohal, 2004). This perception is crucial for attracting customers, investors, the social community, and other stakeholders who value environmental protection and sustainability (Delmas, 2001; Otto et al., 2020).

Minimizing the adverse effects on the environment will increase profits and turnovers by encouraging customers to make repeat purchases. When customers are aware of how environmentally conscious a company is in its manufacturing processes, they are more likely to buy more products from that company in the future (Zhao et al., 2014), resulting in improved profitability. Therefore, these practices lead to better long-term financial and economic performance. Based on the above discussion, the following hypotheses are proposed:

Hypothesis 2a: EMSs have a significant impact on customer satisfaction.

Hypothesis 3a: The relationship between EMSs and firm performance is mediated by customer satisfaction.

2.5. Mediating Role of Environmental Performance

Manufacturers should provide clear information about the progress and practices in their companies. They should ensure that their operations are environmentally safe and have a minimal carbon footprint (Sroufe, 2003). These activities should help minimize harmful effects and improve a company's environmental performance (Melnyk et al., 2003). Currently, manufacturers are increasingly concerned about customer satisfaction and the environmental impact of their operations. The reason for these concerns is the growing awareness among customers about how adopting EMSs can help companies reduce the negative impact of their operations on the environment (Sroufe, 2003; Yang et al., 2011; Miroshnychenko et al., 2017; Perry, 2018). EMSs enable companies to implement methods that reduce the harmful effects of their operations on the environment, leading to improved environmental performance (Matos & Hall, 2007; Yang et al., 2011).

According to Klassen and Mclaughlin (1996), these activities improve a company's overall performance by increasing profits, cost-effectiveness, and customer satisfaction. By implementing EMS, a company can reduce wastage of raw materials, recycle when necessary, significantly

save energy, and reduce toxic emissions (Lo et al., 2012). This approach helps companies monitor pollution and waste levels, enabling them to take necessary actions to enhance and optimize environmental performance (Yan & Zhang, 2021). Based on the above empirical evidence, the following hypotheses are proposed:

Hypothesis 2b: EMSs have a significant impact on environmental performance.

Hypothesis 3b: The relationship between EMSs and firm performance is mediated by environmental performance.

3. Methodology

This quantitative survey-based study utilized a cross-sectional research design. The structural and measurement models were evaluated using path analysis and confirmatory factor analysis (CFA). The theoretical path model of the study includes all the intervening, endogenous and exogenous factors, as illustrated in the framework shown in Figure 1. Mediation analysis was conducted following the guidelines of Zhao et al. (2014), and partial least squares structural equation modeling was used to assess the path coefficients.

For data collection, this study strictly followed the methodology used by Jawaad and Zafar (2019). Specifically, data was collected using three approaches: (i) web-based surveys, (ii) telephone surveys, and (iii) pick-and-drop-and-face-to-face methods (self-administered surveys). Details of each of the approaches are further given below.

3.1. Research Design and Sampling

A cross-sectional survey was conducted in two major cities of Pakistan: Faisalabad and Lahore. The data collected from this survey was then used to test the study hypotheses. Validated scales related to operations management, as established by previous studies, were employed to measure all the variables. Likert scales ranging from 1 to 7 were used to operationalize items for all dimensions, with 1 indicating 'strongly agree' and 7 indicating 'strongly disagree' (Brown, 2010). The scale used to evaluate EMSs was based on Zhao et al. (2014). Constructs from Daily et al. (2007) were utilized to measure environmental

performance, that is, a responsible company's efforts to improve performance and protect the environment (Yang et al., 2011).

According to Bozarth et al. (2009), customer satisfaction reflects the positive emotions experienced by customers regarding a company. The items used to measure this construct assess the company's ability to meet quality standards, customer expectations, and plant effectiveness. The scale was adapted from the research conducted by Bozarth et al. (2009). Furthermore, firm performance indicates a company's financial health and represents a favorable financial perspective (Selvarajan et al., 2007). The items selected to measure the construct of firm performance were adapted from Choi and Hwang (2015).

The appropriate statistical power and data collection requirements determine the sample size (Jawaad & Zafar, 2019). Some statisticians recommend using a sample size that is five to ten times the number of items on the scale (Hair et al., 2014). However, the rule of thumb for most studies to determine a feasible sample size, according to MacCallum et al. (1999), is between 30 and 500 units. Based on the above discussion, 243 complete and usable responses were considered sufficient.

3.2. Data Collection

Considering the challenge of finding knowledgeable and experienced respondents, snowball and convenience sampling were used as the sampling methods (Etikan et al., 2015). Textile companies with ISO certification were carefully selected in Lahore and Faisalabad. The list of textile manufacturers was taken as a sampling frame from the websites of the Lahore and Faisalabad Chambers of Commerce, the All Pakistan Textile Mills Association, the All Pakistan Textile Processing Mills Association and businesses that the respondents suggested (Jawaad & Zafar, 2019). Lahore and Faisalabad were specifically chosen because they are two of the world's most polluted cities (Dawn, 2019).

Additional evidence of the respondents' familiarity with and complete understanding of EMSs was obtained by confirming that they had worked for at least four years as employees in the textile industry (Abbasi, 2012; Çankaya & Sezen, 2018). Therefore, the managers who were considered the most suitable respondents were chosen based on these necessary characteristics. To ensure the quality of the information to be gathered, potential respondents such as supply chain managers, directors,

compliance managers, plant managers, general managers, and operation managers were selected (Khan & Qianli, 2017; Jawaad & Zafar, 2019).

A total of 1,341 textile firms involved in various textile manufacturing processes, including spinning, printing, bleaching, and composites, were initially selected. A response rate of 18.12 percent was achieved after receiving 243 completed survey questionnaires, which is satisfactory compared to previous studies where the response rate ranged between 15 and 25 percent (Nasution et al., 2021). The statistics related to the sampled firms are presented in Table 2. Overall, the final sample consisted of 30 percent composite firms, 51 percent spinning firms, 4 percent printing firms, and 15 percent bleaching/dyeing firms.

The methodology used to contact and collect the data was adapted from Li and Wu (2017). First, the questionnaire was developed using Google Forms and then emailed to the respondent firms in Faisalabad and Lahore. Second, a data-gathering firm was hired by the researchers to collect responses through a telephone survey. The interviewer followed a script using a software application to collect the responses.

Finally, a three-stage method was utilized to collect the data through a self-administered survey. In the first stage, the purpose of the meeting was briefly explained to the respondent firms to obtain their consent and schedule an appointment. In the second stage, the survey questionnaires were personally distributed to the respondents by contacting them. The third stage involved collecting the completed survey questionnaires, ensuring that they were fully filled out to minimize concerns about nonresponse. Additionally, to uphold ethical considerations, the respondents signed a consent letter indicating their voluntary participation in the survey, and their identities were kept anonymous. The respondents were also given an incentive as a token of appreciation for their time and effort (Jawaad & Zafar, 2019).

Table 2: Sample characteristics

	Total
Selected firms	1,341
Returned firms	243
Response rate (%)	18.12
Textile firm	Percentage (%)
Lahore	64
Faisalabad	36

	Total
Textile firm type	Percentage (%)
Spinning	51
Bleaching/dyeing	15
Printing	4
Composite	30
Firm operating since	Percentage (%)
5 to 10 years	16
11 to 15 years	42
16 to 20 years	31
21 and above	11
Job designation	Percentage (%)
Director	2
General manager/assistant	42
Compliance/quality assurance manager	48
Supply chain officer	8

N = 243.

3.3. Data Analysis

According to Hair et al. (2011), partial least structural equation modeling (PLS-SEM) is suitable for smaller samples and ignores outliers. Therefore, this study utilized the PLS-SEM approach, which consists of two steps: CFA and path analysis (Hair et al., 2011). CFA assesses the validity and reliability of the measurement model and overall model fit (Sroufe, 2003; Wang et al., 2012), while path analysis examines the direct and indirect relationships between the exogenous and endogenous constructs. SmartPLS 3 software was employed for SEM because it can handle outliers, smaller samples, nonnormal data and missing data. PLS-SEM yields more robust results and is considered a promising approach for researchers in the management field (Hair et al., 2011).

3.4. Pilot Test

Before conducting CFA and path analysis, a pilot test was conducted to enhance and validate the survey instrument. Forty respondent firms completed the questionnaire for the pilot test. Additionally, the questionnaire was translated into Urdu to improve comprehension. A twofold translation technique was utilized to create the Urdu version, ensuring that the questionnaire could be fully answered in Urdu. No significant differences were found between the two versions.

4. Results

4.1. Reliability and Validity Results

The study model demonstrated satisfactory convergent validity (criterion: > 0.7), composite reliability (criterion: > 0.7), and Cronbach's α value (criterion: > 0.9) statistics, indicating that all factor loadings met the acceptable criteria (Larcker & Fornell, 1981). The findings in Table 3 are sufficient to demonstrate appropriate reliability.

The content validity of each construct was also examined and the results were satisfactory (Zhao et al., 2014). The scales' discriminant and convergent validity were tested using Larcker and Fornell's (1981) technique. As shown in Table 3, all parameters for each item indicated significant and satisfactory convergent validity. The heterotrait-monotrait (HTMT) is the ratio of correlations of indicators across constructs to correlations of indicators within a construct. All ratio values are below the cutoff of 0.9, indicating that divergent validity holds for each pair of reflective constructs (Larcker & Fornell, 1981). In contrast to other constructs, the measurement items have a greater tendency to share common variance with their postulated components. Table 4 displays the HTMT ratios for all the constructs.

Furthermore, the average variance extracted (AVE) values were below the predetermined cutoff point (0.9), indicating convergent validity. AVE values indicate that the unexplained variance is less than the explained variance, which is a positive indication of the model. In addition, variance inflation factor values also indicate the absence of multicollinearity issues.

The standardized root mean square residual (SRMR) evaluates the discrepancy between the observed correlation matrix and the implied correlation matrix by the model. Since the SRMR is less than 0.08, the model fits the data well (Hu & Bentler, 1998). The NFI examines discrepancies between the chi-squared values of the null model and the hypothesis model. As all the model indices (SRMR = 0.07, CFI = 0.758, GFI = 0.832, AGFI = 0.543, $\chi^2 = 745.25$, NFI = 0.925) fall within the acceptable range, we can conclude that the model is a good fit.

Table 3: Construct Measures Validity and Reliability Analysis

Construct	Item	Standardized item loading (> 0.7)	Cronbach's alpha (> 0.7)	Composite reliability (> 0.7)	AVE (<0.9)
Customer satisfaction	CS1	0.929	0.819	0.917	0.846
	CS2	0.91			
Environmental management system	EMS1	0.877	0.961	0.968	0.812
	EMS2	0.911			
	EMS3	0.892			
	EMS4	0.881			
	EMS5	0.914			
	EMS6	0.904			
	EMS7	0.929			
Environmental performance	EP1	0.880	0.794	0.866	0.619
	EP2	0.813			
	EP3	0.727			
	EP4	0.714			
Firm performance	FP1	0.777	0.892	0.925	0.755
	FP2	0.887			
	FP3	0.894			
	FP4	0.910			

Note: CS = customer satisfaction, EMS = environmental management system, EP = environmental performance, FP = firm performance.

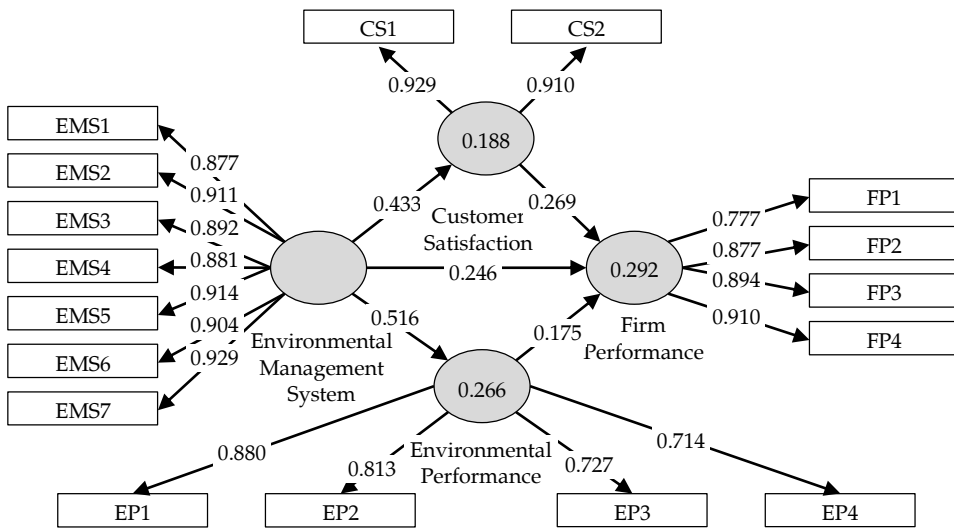
Table 4: Discriminant Validity: Heterotrait-Monotrait Ratio (HTMT) (< 0.9)

	Customer satisfaction	EMS	Environmental performance	Firm performance
Customer satisfaction	1.000	0.484	0.345	0.478
EMS	0.484	1.000	0.569	0.482
Environmental performance	0.345	0.569	1.000	0.427
Firm performance	0.478	0.482	0.427	1.000

4.2. CFA Results

All items with a factor loading of less than 0.5 were removed from the measurement model to improve the results of the path analysis. The final list of items included in the model after removing items with low loadings is presented in Table 3. Based on the factor loadings shown in Figure 2, we can infer that the model is sufficiently reliable for the specified construct and can be used for path analysis.

Figure 2: Final Model Loadings



4.3. Results of Structural Model (Path Analysis)

Table 5 shows the results of the path analysis in which all the hypotheses indicating direct relationships (H1, H2a, and H2b) were tested.

Table 5: Path Analysis

	Path coeff	SD	T stats	P-values	Hypothesis result
EMS → Firm performance (H1)	0.463	0.054	8.515	0.000***	Supported
EMS → Customer satisfaction (H2a)	0.466	0.074	6.319	0.000***	Supported
EMS → Environmental performance (H2b)	0.519	0.067	7.744	0.000***	Supported

Note: * indicates significance at the 0.1 level, ** indicates significance at the 0.05 level, *** indicates significance at the 0.01 level.

Table 5 demonstrates a positive and significant relationship between the adoption of an EMS by a firm and firm performance (H1), customer satisfaction (H2a), and environmental performance (H2b). EMS has the most significant effect on Customer satisfaction ($\beta = 0.466$, p-value = 0.000) and environmental performance ($\beta = 0.519$, p-value = 0.000). Hypotheses H1, H2a, and H2b indicate that firms that adopt EMSs not only prioritize environmental sustainability but also achieve enhanced performance levels while satisfying their customers ($\beta = 0.463$, p-value < 0.01). These results

indicate that adopting EMSs enables firms to accomplish more in an environmentally friendly manner. EMSs improve environmental performance by providing guidance for ongoing improvement in a company's environmental impact. These findings support previous research conducted by Fonseca (2015), Ramanathan (2018), and Ikram et al. (2019).

Table 6: Mediation Analysis

		β	STDEV	P values	Hypothesis result
Specific indirect effects	EMS → customer satisfaction → firm performance (H3a)	0.121	0.032	0.00***	Supported
Indirect effects	Customer satisfaction → firm performance	0.279	0.063	0.00***	
	EMS → customer satisfaction	0.434	0.051	0.00***	
	EMS → firm performance	0.336	0.064	0.00***	Complimentary mediation
Specific indirect effects	EMS → environmental performance → firm performance (H3b)	0.100	0.039	0.01**	Supported
Indirect effects	Environmental performance → firm performance	0.194	0.070	0.00***	
	EMS → environmental performance	0.516	0.070	0.00***	
	EMS → firm performance	0.454	0.055	0.00***	Complimentary mediation

Note: * indicates significance at the 0.1 level, ** indicates significance at the 0.05 level, *** indicates significance at the 0.01 level.

The findings of the mediation analysis are presented in Table 6. Zhao et al.'s (2010) typology was used to assess the mediation analysis regarding customer satisfaction (H3a) and environmental performance (H3b). The results indicate that both environmental performance ($\beta= 0.100$, p-value = 0.01) and customer satisfaction ($\beta= 0.121$, p-value = 0.00) serve as complementary mediators in the relationship between EMS and firm performance. This suggests that the chosen mediators in this study align with the theoretical model, although there may still be a missing mediator.

The results demonstrate that EMS is a valuable management tool and not just a bureaucratic exercise involving extensive documentation (Li &

Wu, 2017). In fact, it leads to improved firm performance through customer satisfaction and pro-environmental activities. This study aimed to explore whether the perceived satisfaction level of customers and environmental performance mediate the relationship between EMSs and firm performance, as suggested by previous researchers. The results presented in Table 6 show that both mediators act as complementary mediators. This finding supports the theoretical claim made by Feng et al. (2016).

5. Discussion

The current study aimed to test whether effective and compelling EMSs lead to higher firm performance. Specifically, the study investigated whether environmental performance and customer satisfaction mediate this relationship. To the best of our knowledge, this study is one of the first conducted on an emerging country's textile industry, providing significant validation for the importance of EMS adoption and its positive outcomes. The results are beneficial for both academics and practitioners.

The results show that implementing an EMS leads to a greener environment and greater customer satisfaction. As customers become more environmentally conscious, they are more likely to purchase products from firms engaged in ecologically friendly activities, resulting in higher returns. Therefore, all proposed hypotheses are accepted, affirming that EMS adoption is an effective tool for reinforcing green activities, enhancing customer satisfaction, and promoting financial gains.

In today's business environment, environmental responsibility is seen as a crucial aspect of value. Practitioners are expected to focus not only on operational efficiency and productivity but also on environmental concerns. Previous research has examined the impact of EMS on reducing the carbon footprint and its effects on the natural environment.

This study provides important insights into EMS and its implementation. First, this study contributes to the EMS literature by emphasizing the role of environmental performance and perceived customer satisfaction in improving firm performance. The results demonstrate that these mediators positively influence the relationship between EMS and firm performance. This highlights the increasing importance of EMS in improving environmental performance and customer satisfaction. These results support previous findings that successful environmental management leads to environmental performance.

Implementing an EMS involves significant modifications to manufacturing processes, resulting in a cleaner and safer environment.

Second, the results of this study support the RBV theory and institutional theory, which suggest that effective resources are crucial for better firm performance and the ability to gain and sustain competitive advantages. The results also provide evidence for the dynamic capabilities view, which indicates that firms need to adjust their resources and abilities to align with their business conditions to achieve competitive advantages. Therefore, EMSs can help firms redesign their distinct resources in line with sustainable goals and attract customers.

Third, the existing literature has differing views on the positive relationship between environmental systems and short-term returns. Few studies have examined this link and the previous literature has found diverse and inconsistent relationships (Feng et al., 2016). The results of our study show that a firm's environmental performance and customer satisfaction depend on effective EMSs. Adopting EMSs can be beneficial, particularly when satisfaction levels and environmental performance are high. Ultimately, perceived customer satisfaction and environmental performance contribute to improving a firm's conditions and enhancing its overall performance. From a strategic standpoint, the adoption of EMSs should align with market conditions shaped by customer attitudes to maximize gains.

Finally, the results of this study demonstrate that the coexistence of customer satisfaction and environmental performance leads to various types of interactions that affect the influence of EMSs on firm performance. Therefore, this study provides supporting evidence that perceived customer satisfaction and environmental performance mediate the influence of EMSs on firm performance.

Vachon and Klassen (2008) and Feng et al. (2016) have called for future researchers to investigate the relationship between EMSs and firm performance. This study responds to their call. The significant impact of strategic initiatives such as the EMS on firm performance, along with the complementary mediation of customer satisfaction and environmental performance, supports the findings of past researchers (Wang & Feng, 2016). Implementing an EMS increases a firm's reliability, resulting in happier and more satisfied customers. Buying from a firm that demonstrates responsible behavior towards sustainability enhances customer trust and positive

psychological behaviors, ultimately improving firm performance. Therefore, it can be concluded that textile firms adopting EMSs in Pakistan may experience incremental gains through revenues generated by environmentally conscious customers (Ikram et al., 2019).

Customers tend to prefer purchasing from firms that engage in eco-friendly activities. The results of our study indicate that the manufacturing sector of emerging economies is becoming more market-oriented, prioritizing customer satisfaction. Since the Pakistani textiles industry relies heavily on exports, it is crucial for firms to implement effective EMSs to satisfy foreign customers and maintain long-term relationships. Retaining both local and foreign customers is only possible when firms deliver quality products. Currently, customers prioritize production that aligns with sustainable goals (Jawaad & Zafar, 2019). Furthermore, proper EMS implementation ensures reduced hazardous emissions, effluent waste and overall carbon footprint, thereby enhancing environmental performance. This, in turn, contributes to improved firm performance (Rasoolimanesh et al., 2022).

5.1. Theoretical Implications

This study has utilized the RBV and institutional theory frameworks and has empirically tested an integrated EMS model. Based on previous investigations and findings, the model used proves to be a strong representation of the direct and mediated relationships that were tested. Therefore, an effective EMS can be one of the pathways through which firms can earn profits by satisfying customers and greening the environment (Hollebeek & Rather, 2019).

According to the RBV perspective, in a highly uncertain environment, firms actively seek out business opportunities that lead to sustainable competitive advantages and improved environmental performance (Hart, 1995; Rehman et al., 2020). Both institutional and resource-based views argue that a well-designed managerial framework should be implemented to leverage strategic resources and achieve a sustainable competitive advantage. According to RBV, resources that are valuable, unique, difficult to imitate, and cannot be easily substituted position a firm for long-term success (Hart, 1995; Makhoulfi et al., 2022). These strategic resources provide the foundation for developing business expertise, resulting in superior performance over time (Jawaad & Zafar, 2019; Kruesi & Bazelmans, 2023).

This study reinforces and confirms RBV theory by showing that the EMS is a deliberate resource embedded within the organizational culture and a flexible capability that enhances firms' abilities to sense and seize opportunities to sustain their environmental activities. Assets such as environmentally conscious staff members, the management of eco-friendly products, equipment with reduced hazardous emissions, and a focus on investment recovery and the practice of the 3Rs (recycling, reuse, reduction) are invaluable resources that can contribute to long-term profitability (Hart, 1995; Makhoulfi et al., 2022). Therefore, the more EMSs exploit environmentally friendly business opportunities, the greater their capacity for implementing green practices. This ultimately leads to improved environmental and firm performance (Sun et al., 2022).

5.2. Managerial Implications

The EMS is a framework that enables organizations to achieve and restore environmental rights and standards through consistent evaluation, implementation, and improvement (Yan & Zhang, 2021). By adopting the EMS, organizations can identify opportunities for improvement and growth while evaluating and restoring environmental regulations. Since EMSs are cost-effective, they prioritize meeting business requirements in the most efficient way possible (Otto et al., 2020). This is why implementing an EMS approach can be highly beneficial for organizational managers.

The EMS encompasses several key elements. One of the most important is the analysis of the environmental impacts of production processes and how to meet legal requirements. It also helps set environmental objectives aimed at reducing external interference through compliance (Hollebeek & Rather, 2019). Additionally, the EMS provides an effective framework for monitoring and measuring the performance and implementation of strategic environmental objectives set by the organization. Internally, the EMS promotes environmental awareness among staff members (Rehman et al., 2020).

Therefore, the cost and benefit advantages are reflected in both internal and external environments. Internally, the EMS requires staff and managers to allocate sufficient time to effectively represent the organization's extensive EMS resources. When analyzing the external environment, the EMS approach allows managers to enhance external environmental performance by seeking potential consultation or assistance from external parties, such as potential investors impressed by the business's

environmental objectives (Shin et al., 2017). Additionally, encouraging personnel training outside the workplace can improve environmental performance, enhance compliance, and prevent pollution.

As the EMS relies heavily on continuous evaluation of performance and implementation, one of its most evident advantages is that it provides marketers with an opportunity to promote a high-standard business reputation that strongly condemns the neglect of environmental objectives often overlooked by other organizations. Consumers in the market are increasingly inclined towards eco-friendly products, such as automobiles or small-scale products (Hollebeek & Rather, 2019). The adverse internal and external environmental impact of fast fashion production has led consumers to reject it as a trend.

Furthermore, this approach not only provides more convincing quality assurance for loyal consumers but also brings reputational gains. Its implementation is believed to contribute to integrated social and product-based performance, completing the sustainability chain while considering the financial costs associated with the organization's CSR objectives (Çankaya & Sezen, 2018). By helping firms establish a unique differentiation from their competitors, the EMS aims to promote promising profitability, customer loyalty, and a positive brand image in the market (Ramanathan, 2018).

Managers should prioritize customer requirements related to EMS adoption, as customer satisfaction serves as a bridge to achieving financial gains (Epstein, 2018). By placing more emphasis on ecological concerns, managers can assist their firms in minimizing waste, maximizing efficiency, and reducing costs, ultimately leading to improved performance levels. Managers and other administrative heads should actively participate in conducting environment-related workshops, seminars, and internal audits to encourage the adoption of EMSs and educate firms about the significance of environmental performance (Rather, 2018).

5.3. Limitations and Future Research Directions

This study has implications for future researchers. Firstly, the model could include other exogenous variables, such as competitive advantage. Secondly, besides customer satisfaction and environmental performance, there could be other mediators that link the EMS and firm performance (Camilleri, 2022). Thirdly, a comparative study could be conducted based on

the number of years since the firm started implementing the EMS. This kind of study would help managers and department heads understand the potential of various performance indicators in the long and short term. Finally, because this study was cross-sectional, it would be wise to compare the results before and after EMS adoption (Yan & Zhang, 2021).

This study also has limitations. For example, different findings may arise with a larger sample. Additionally, incorporating several economies may produce interesting results since the EMSs and performance of developing nations may differ significantly from those of developed countries in terms of customer attitude and environmental performance.

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