

Consolidating sustainability efforts: The role of effective supply chain management in balancing economic growth, environmental stewardship, and social responsibility

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ABSTRACT

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This study explores the relationship between supply chain practices and sustainability efforts, with the understanding that logistics strategies can have profound impacts on economic growth, society, and environmental conservation. The primary objective of the research is to identify ways in which organizations can improve their supply chains to achieve more favorable sustainability outcomes by examining the relationship between the supply chain and sustainability performance. Data was collected through a questionnaire designed and distributed to 43 companies in the basic materials sector in the Kingdom of Saudi Arabia. The questionnaire data were analyzed using SPSS and Smartpls. The results indicate that supply chains in the basic materials sector in the Kingdom are operating effectively and positively, impacting the promotion of economic, social, and environmental sustainability. The insights from this study can help advance the understanding of how supply chains can drive sustainability improvements while developing a more robust economic framework for sustainability and resource management for stakeholders.

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1. Introduction

Sustainable supply chain management (SSCM) illustrates the critical interplay among economic advancement, environmental stewardship, and societal responsibility. It integrates these dimensions to create a paradigm that promotes sustainable development (Zailani et al., 2012; Gomes et al., 2022). The fundamental principles of SSCM highlight the urgent need for supply chains to evolve from traditional practices, which primarily emphasize cost minimization and operational efficiency, towards comprehensive and sustainability-focused methodologies (Charu, 2006). This advancement holds significant importance, as the interrelation of economic viability, environmental conservation, and social justice necessitates integrated approaches rather than disjointed initiatives (Mota et al., 2015). Effective SSCM improves organizational competitiveness through differentiation and innovation and establishes executives who follow companies to be responsible for their impact on society and the environment (Beske & Seuring, 2014). The literature suggests that organizations that integrate sustainability in their supply chain strategies often witness increased loyalty and perception, ultimately improving their positioning in the market (Rau et al., 2021; Bai et al., 2020). In this context, researchers like (Ageron et al., 2012; Rodríguez-Fernández et al., 2020) underline the role of the engagement of stakeholders in SCM, stating that transparent communication with customers, suppliers, and communities can produce significant benefits while simultaneously promoting long-term economic benefits.

Different phases of the supply chain present unique opportunities for implementing sustainable practices (Centobelli et al., 2023). The supply phase can adopt responsible sourcing strategies, prioritizing environmentally friendly materials and socially responsible suppliers (Chen, 2022). These strategies include the assessment of suppliers according to not only cost and delivery capacities but also their environmental impact and labor practices, so in cascade, the sustainability criteria throughout the channel (Lin, J. et al., 2016) supply. Likewise, companies can implement cleaner production techniques during the production phases to reduce resource consumption, waste, and emissions, aligning operational processes with sustainability objectives (Fang & Côté, 2005; Jabbour et al., 2013).

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In the research conducted by Wang, the supplementary effects of the economy may be enhanced through the optimization of transportation routes and the consolidation of shipments. The carbon emissions generated can yield advantages for both economic efficiency and environmental stewardship; if organizations embrace advanced technologies such as route optimization software and electric vehicles, they will augment the ecological sustainability of their logistics operations while simultaneously reducing costs (Wang, Y. & Shen, 2016).

According to Cope et al. (2019), it is essential to focus on the distribution and consumption stages, as these stages represent essential components in achieving sustainable outcomes, as implementing strategies such as reverse logistics facilitates enhanced recycling and reuse of products, thus contributing to waste reduction and promoting the circular economy (Ozola et al., 2019; Rogers & Rogers, 1998). Furthermore, providing consumers with knowledge regarding sustainable consumption frameworks can cultivate a more socially responsible demographic of consumers who support products and brands dedicated to sustainability (van Hoek et al., 2011).

The literature delimits that effective SSCM aligns with economic growth and intrinsically links the social and environmental dimensions that underpin sustainable development (Roy et al., 2018). Organizations can create systems that harmonize profitability with more imperatives of social equity and ecological integrity by using strategies through various phases of the supply chain, such as responsible supply, cleaner production, optimized logistics, and consumer engagement (Simão et al., 2016). The continuum of sustainability in supply chains is not simply a theoretical aspiration but a practical condition for modern companies aimed at prospering in an increasingly conscientious market (Thorlakson et al., 2018). Effective chain management strategies that improve economic growth while promoting sustainable practices are increasingly recognized as vital in the current panorama of the global market (Waked et al., 2023). Collaborating with suppliers is crucial, especially in emerging economies where resources can be limited, but the growth potential is significant. Ahmed et al. (2020) point out that the collaboration of suppliers improves operational efficiency and facilitates sharing of the best practices relating to environmental management and social responsibility. By meeting resources and knowledge, companies can reduce waste, optimize the use of materials, and reduce their carbon footprints (Chan, 2021). The collaborations that focus on long-term relationships create a synergistic environment where sustainable initiatives can thrive, ultimately improving economic performance (Mouzas, 2016).

Supply Chain Management (SCM) has conventionally prioritized reducing costs, enhancing operational efficiency, and effective responsiveness to market demands (Yang, 2024). Nevertheless, the growing recognition of environmental deterioration, the exhaustion of natural resources, and social inequity have instigated a substantial transformation in this paradigm (Galanton, 2024). A diverse array of stakeholders—consumers, investors, regulatory entities, and employees—progressively compel corporations to embrace responsible practices that yield positive outcomes for society and the environment (Price & Ross, 2014). Following this transformation requires a comprehensive approach to supply chain management that integrates economic performance with environmental sustainability and social responsibility (Luzzini et al., 2014), and thus, effective supply chain management extends beyond enhancing operational processes and logistics frameworks (Larson et al., 2007). It requires the strategic supervision of the comprehensive value chain, which includes all stages, from the extraction of raw materials to the management of end-of-life products, focusing on alleviating detrimental effects while augmenting positive contributions (Mangmeechai, 2020). This alteration in viewpoint calls for a review of established SCM methods and the embrace of progressive tactics that enhance clarity, cooperation, and responsibility throughout the supply chain (Li et al., 2023).

In today's complex world, the contemporary supply chain depends on efficiency and profitability and is inevitably linked to environmental health and societal well-being. This complex relationship will be explained in this paper, showing how economic, environmental, and social considerations are intertwined in the fabric of sustainable development. Through a literature review, the main problem of the study is identified as how to identify the relationship and impact between the supply chain in the basic materials sector in Saudi Arabia and economic growth, social responsibility, and environmental conservation. The study is divided into several sections; the second section deals with the interrelationship between the supply chain's economic, environmental, and social dimensions. The third section is devoted to 3. Literature Review: Section 4 deals with the development of hypotheses. Section 5 discusses the methodology. Section 6 reveals the results of the field study. Section 7 explains and discusses the results. Finally, Section 8 is dedicated to conclusion.

2. The interconnectedness of economic, environmental, and social dimensions in the supply chain

Achieving true sustainability requires a comprehensive vision integrating economic growth, environmental stewardship, and social responsibility. The triple bottom line (TBL) concept often summarizes this integrated approach, which emphasizes that sustainable practices must simultaneously address economic growth, environmental protection, and social well-being, inherently interconnected dimensions. Neglecting one dimension can lead to long-term unsustainability of the others (Bux et al., 2024; Amicarelli et al., 2024). To make real progress toward sustainability, organizations must actively manage their operations and supply chains with all three aspects of the triple bottom line in mind.

2.1 Economic Growth and Environmental Stewardship

Linear economic models based on "take-make-dispose" principles have historically driven economic growth at the expense of the environment (Dorsch & Kirkpatrick, 2021). By adopting circular economy principles within the supply chain, such as reducing waste, reusing materials, and remanufacturing products, businesses can decouple economic growth from resource consumption and environmental impact (De Angelis et al., 2018). Furthermore, investing in eco-friendly technologies and processes within the supply chain can create new markets, drive innovation, and enhance long-term competitiveness (Zheng & Li, 2023).

2.2 Economic Growth and Social Responsibility

The quest for economic advancement must never be pursued at the detriment of societal welfare (Potočan et al., 2021). Exploitative labor practices, hazardous working environments, and the refusal to provide equitable compensation, although potentially yielding immediate financial benefits, ultimately erode economic progress over time (Hunter, 2005). Such practices result in diminished productivity, elevated employee attrition rates, reputational harm, and possible legal consequences (Bengtsson & Stockhammer, 2021). Rather, enterprises should prioritize ethical procurement, adopt fair trade methodologies, and allocate resources toward their labor force's health, safety, and holistic well-being. These allocations cultivate a more stable, engaged, and efficient workforce, bolster brand reputation, establish consumer confidence, and alleviate the reputational hazards of unethical labor practices (Yousefian et al., 2023). Moreover, a dedication to social responsibility transcends the immediate workforce to include the wider community. Proactively assisting local communities through the generation of employment opportunities, the establishment of skills enhancement initiatives, and improvements in infrastructure while also fostering inclusive supply chain engagement by incorporating small and medium-sized enterprises (SMEs) from underrepresented communities can significantly contribute to broader economic progress and mitigate social disparities, and promote a more just and equitable society (Bux et al., 2024). In essence, social responsibility is not merely an act of philanthropy but rather a fundamental element of sustainable economic advancement.

2.3 Environmental Stewardship and Social Responsibility

Environmental degradation, including pollution, resource depletion, and climate change, disproportionately affects communities, and these communities often bear the brunt of environmental risks (Nguyen et al., 2023). By reducing pollution across all dimensions of their operations, conserving essential resources such as water and energy, and ensuring environmental justice within their supply chain, companies can significantly contribute to promoting a healthier, more sustainable, and more equitable society for all stakeholders involved (Fallah Shayan et al., 2022). This commitment mitigates harmful impacts and enhances corporate social license, building trust and stronger, more collaborative partnerships with local communities by demonstrating genuine support for their well-being and the environmental framework on which they depend (Amoako et al., 2021). As a result, this can lead to improved brand loyalty and a favorable public reputation. Implementing environmental management and social responsibility initiatives helps companies attract high-quality talent, as potential employees increasingly seek to align with organizations that reflect their ethical principles (Malik et al., 2021).

Further research is essential to develop relationships between economic performance, environmental health, and social equity in SCM. These frameworks should allow companies to adopt more holistic strategies that align with the United Nations sustainable development objectives (SDG) (Elansari et al., 2024).

3. literature Review

Growing evidence challenges the idea that economic success is intrinsically in contrast with environmental responsibility and social ethics (Garriga & Melé, 2004). The strategies of the supply chain that emphasize collaboration with suppliers and the implementation of social sustainability initiatives can not only guide economic growth but also strengthen a commitment to sustainable practices (Morais & Silvestre, 2018). This understanding of evolution promotes a more integrated approach to supply chain management that recognizes the intersections between economic, environmental, and social results, opening the way to a more sustainable future in various sectors (Yawar & Seuring, 2017). In the reign of the management of the sustainable supply chain (SSCM), environmental management acts as a critical pillar that assists organizations in aligning their operational activities with ecological conservation (Dubey et al., 2017). Effective SSCM strategies directly facilitate the reduction of an organization's ecological imprint. Yu et al. (2014) Underline the need to integrate the management practices of the green supply chain with operational performance metrics to create a harmonious balance between profitability and sustainable environmental practices. By implementing green initiatives, companies can improve their operational efficiency and minimize the consumption of waste and resources, leading to cost savings and improved corporate image. Longoni & Cagliano (2015) Also affirm that developing sustainable practices that align with organizational operations is fundamental for organizations that aim to improve their ecological performance. This integration is essential, as it creates a cohesive picture in which all the levels of the organization are working for a common goal of sustainability. If designed to reduce the environmental impact, operating practices can lead to innovation in processes and products, contributing to general sustainability.

Important study cases illustrate the tangible environmental benefits of effective SSCM practices. Esfahbodi et al. (2016) Provide convincing evidence by analyzing companies such as Unilever and Procter & Gamble. These companies have successfully adopted sustainable supply strategies that focus on reducing their dependence on non-renewable resources and promoting relationships with suppliers that prioritize environmental management. The result of implementing these strategies was not only a decrease in the consumption of resources but also significant market advantages since consumers increasingly favor brands that demonstrate a commitment to sustainability.

In addition, the application of the evaluation of the life cycle (LCA) is another strategy highlighted in the literature that can help companies minimize their ecological imprint. By evaluating the environmental impacts associated with all phases of a product's life, from the extraction of raw materials to production, distribution, use, and disposal, companies can identify critical areas for improvement (Zhu, Z. et al., 2018).

The existing literature corpus emphasizes the intertwined relationship between effective SSCM strategies and environmental administration; by integrating green practices into their operational paintings and promoting collaboration throughout the supply chain, organizations can significantly reduce their ecological imprint, improve their market positioning, and contribute to wider social objectives as regards sustainability (Chin et al., 2015; Al-Ghwayeen & Abdallah, 2018).

This alignment of economic growth with environmental management is essential and reflects an evolving organizational Ethos focused on sustainable development. Integrating social responsibility in sustainable supply chain management (SSCM) has drawn significant university attention, elucidating the mechanisms by which organizations can face social challenges while promoting economic growth. Yawar & Seuring, 2017 Claim that social problems - such as labor rights, health and safety standards, and community relations - play a central role in the supply chain performance. Companies that adopt proactive social responsibility strategies not only reduce risks such as disputes and reputation damage but also improve their competitive advantage; by aligning the practices of the supply chain with social values, organizations can obtain better operational and customer loyalty efficiency, which ultimately gives higher financial results (Heal, 2005).

In addition, the adoption of socially sustainable practices is increasingly recognized as a critical factor in the supply chain's resilience. Negri et al. (2021) Highlight the importance of working practices in maintaining a stable supply chain. Ethical work practices are not only a moral imperative; They directly impact productivity and quality. Research indicates that companies prioritizing equitable treatment undergo lower rotation rates and a higher commitment of employees, which culminates in an improvement in the supply chain performance (Gowen Iii & Tallon, 2003). While companies target greater operational efficiency, the negligence of labor practices can cause disruption, increased costs, and a target reputation, indicating the interdependence of social problems and supply chain efficiency (Seuring et al., 2008).

Community engagement is another essential strategy for achieving social sustainability in supply chains (Hutchins & Sutherland, 2008). This approach actively involves local communities in commercial processes, thus promoting mutual benefits; by investing in community development initiatives - such as education, improving infrastructure, and health care - companies can promote goodwill and create a favorable environment for their operations (Hall & Matos, 2010). Previous studies suggest that organizations that are effectively committed to communities improve their brand image and obtain information that can stimulate innovation in their supply chains (Kalkanci et al., 2019).

The literature identifies social responsibility as a fundamental component of effective chain management strategies. Companies committed to solving social problems through their supply chains can achieve measurable performance results, strengthening the idea that social sustainability is integral to resilient and effective supply chains (Mohammed et al., 2023). The construction of resilient supply chains requires a complete understanding of sustainability principles, which must be applied in all phases of the supply chain, supply, and production to distribute and manage products of life (Giannakis & Papadopoulos, 2016). This integration is beneficial and essential for companies to ensure continuity in the face of economic, environmental, and social challenges. Resilient supply chains that emphasize sustainable practices allow companies to reduce their vulnerability to the disruption of the supply chain, such as natural disasters, political disorders, or economic slowdowns, by promoting flexibility and adaptability (Christopher et al., 2004).

A study by Bastas and Liyanage (2018) suggests a direct relationship between sustainability and improved resilience. Firms prioritizing sustainable practices—such as reducing waste, improving resource use, and promoting ethical labor standards—are better equipped to deal with unexpected events (Lèbre et al., 2017). This is widely attributed to the proactive risk management strategies inherent in sustainable supply chain executives, who encourage companies to identify potential risks by promoting a culture of sustainability. Additionally, implementing sustainability strategies throughout the supply chain creates interdependence among suppliers, customers, and other stakeholders, enhancing resilience (Cao & Zhang, 2011).

Conversely, a lack of attention to sustainability can lead to increased vulnerability. Companies based solely on traditional practices can be poorly prepared for the consequences of societal pressures and regulatory changes requiring more sustainable approaches. The risks associated with reputation damage, regulatory fines, and customer loyalty loss can have disastrous implications, highlighting the need for organizations to integrate sustainability into their basic operational strategies (Kumar et al., 2021). Thus, the alignment of sustainability and resilience reduces not only the risks intrinsically linked to the

disturbances of the supply chain but also promotes the creation of long-term value by improving global organizational robustness (Blome et al., 2014).

The synthesis of these three-economic, environmental, social, and social dimensions is a multifaceted and strategic approach to sustainability, thus inaugurating the concept of management of the sustainable supply chain (SSCM) (David et al., 2024). Scholars such as Varsei et al. (2014) and Alzoubi & Ahmed, (2020) underline the need for a framework that intertwines these elements thoroughly; this underlines the idea that successful SCM practices cannot be isolated from their wider impacts and responsibilities since they operate within complex systems that connect various interested parties and interconnected processes.

The adoption of SSCM requires an understanding of the strategic practices that can be used in various stages of the supply chain to improve the results of sustainability Sweeney et al., (2018); Shad et al., (2019) Show that the integration of considerations on sustainability from contracts up to distribution improves not only operational efficiency but also the commitment of the interested parties and loyalty to the brand.

4. Hypotheses Development

4.1 Supply Chain Management and Economic Growth

Effective supply chain management (SCM) considerably influences the economic growth of contemporary economies, mainly by improving efficiency, reducing costs, promoting innovation, and taking advantage of globalization. While companies strive to maintain a competitive advantage, the SCM strategies that align with these dimensions are increasingly vital (Mahmood et al., 2024).

The main argument is that supply chain efficiency leads to increased productivity and economic prosperity. Effective supply chains allow companies to minimize waste and optimize resource allocation, which is crucial in a globalized economy where competition is fierce (Coyle et al., 2021); by integrating reduced management techniques and focusing on process improvements, companies can achieve better use of resources and operational efficiency, which contributes directly to economic growth (Mangan & Lalwani, 2016). In addition, incorporating Industry 4.0 technologies in the supply chain processes has improved operational performance considerably, thus stimulating economic growth (Ghadge et al., 2020).

Cost reduction is also a critical factor that illustrates the effectiveness of SCM in the influence of economic growth. Reducing production and logistics costs allows companies to offer competitive prices, attract customers, and increase market share (Esfahbodi et al., 2016). In addition, sustainable practices in supply chains, such as the management of the green supply chain, have shown potential in the balance of environmental performance and cost savings, leading to better Economic results (Khan et al., 2018). These environmentally friendly practices also open the way to innovation in products and services, improve organizational performance, and indirectly support economic development (Turker & Altuntas, 2014).

Innovation is another essential aspect of an effective SCM that stimulates economic growth. Effective supply chain strategies facilitate information sharing and collaborative networks that are crucial to promote innovation (Qrunfleh & Tarafdar, 2014); by encouraging partnerships and alliances, companies can take advantage of knowledge and resources, leading to the development of new technologies and practices which not only benefit the organization but also contribute to broader economic progress (Giannakis & Papadopoulos, 2016). In addition, the emphasis on innovation within supply chains helps organizations to adapt to a rapidly evolving market dynamic, thus ensuring long-term economic resilience (Govindan, 2018).

Globalization plays a central role in improving the impact of SCM on economic growth. Global supply chains allow companies to source materials, work more effectively, and expand their markets to a global audience (Stevens & Johnson, 2016). Operating internationally allows companies to achieve economies of scale, reduce costs, and improve profitability, which can considerably strengthen economic growth (Hines, 2014). In addition, globalization-based competition forces companies to innovate continuously, thus creating new products and services that improve consumers' well-being and stimulate economic activity (Govindan & Hasanagic, 2018). The interdependence of economies through global supply chains also facilitates knowledge transfer and technological progress through borders, promoting international economic growth (Khan et al., 2020).

In addition, integrating sustainable practices in global supply chains contributes positively to economic and environmental results (Sandra Marcelline et al., 2022). Companies have been shown that green practices are often rewarded not only by cost savings but also with better brand reputation and customer loyalty, which can improve their global economic contribution (Rajeev et al., 2017).

The obstacles to an effective SCM, especially in developing economies, indicate that although there is a potential for significant economic gains, there are also challenges that must be met to maximize the efficiency of SCM (Mangla et al., 2018). These obstacles could include a lack of infrastructure, inadequate technology, and insufficient training, which hinder the potential advantages of effective and sustainable supply chain practices (De Angelis et al., 2018).

In conclusion, the effective management of the supply chain is an essential engine of the economic growth of contemporary economies, influenced by factors such as efficiency, cost reduction, innovation, and globalization. While companies sail in the complexities of global supply chains, the positive economic impacts of strategic SCM practices highlight the importance of continuous investment and concentration in this area to ensure sustained economic progress in an increasingly interconnected world. This study presents the first hypothesis grounded in the theoretical interpretations discussed above:

Hypothesis 1: *A positive relationship exists between supply chain management and economic growth.*

4.2 Supply Chain Management and Environmental Stewardship

The effective practices of the supply chain (SCM) management play a crucial role in improving sustainability and environmental protection. By implementing innovative strategies, organizations can reduce their carbon footprints and minimize resource waste, thus contributing to global sustainability efforts. Green Supply Chain Management (GSCM), highlighted by Yildiz Çankaya and Sezen (2019), is essential to improve sustainability performance by integrating environmental considerations into the supply chain processes. This approach improves operational efficiency and promotes a competitive advantage in an increasingly ecological market.

Integrating Green Human Resource Management (GHRM) practices in the supply chain strategies further amplifies sustainability results. Zaid et al. (2018) found that when companies invest in hiring and training employees on sustainability practices, they experience significant gains in sustainable performance metrics. This indicates that human capital is fundamental in driving effective GSCM since expert employees can implement innovative solutions that substantially reduce environmental impact.

In addition, the dynamic skills of the supply chains are essential to support these practices over time. Hong et al. (2018) Stressed that companies with solid management capacity of the sustainable supply chain (SSCM) can better adapt to market changes and improve their corporate performance. This adaptability is essential to integrate green practices perfectly within the traditional processes of the supply chain, making environmental sustainability a central component of the corporate strategy.

Systematic reviews of the existing paintings must also support the transition to sustainable practices. Koberg & Longoni, (2019) Conducted a global review of the sustainable practices of the supply chain and noticed the importance of global collaborations in achieving optimal sustainability performance. By understanding the success models of various sectors, companies can adopt appropriate strategies that resonate with their specific operational contexts, thus improving their sustainability efforts.

Institutional pressures play a significant role in modeling GSCM practices. Khan et al. (2018) Have shown that economic growth is intertwined with effective GSCM since companies are forced to adhere to the environmental regulations and expectations of the company, thus reducing their carbon footprints. The alignment of the supply chain practices with eco-incident objectives has been shown to guide greater efficiency of resources (Khan & Qianli, 2017), which is essential to reducing overall waste.

Innovation in the practices of the supply chain is also fundamental. For example, the use of Big Data Analytics, as discussed by Bag et al. (2020), can provide insights that lead to a decision -improving the use of resources and the reduction of waste. The strategic distribution of these technologies not only translates into improved operations but also supports sustainability objectives.

In addition, involving customers and interested parties in green initiatives is essential. Zhu, Q. et al. (2017) discovered that the relational governance of customers contributes significantly to improving environmental and economic performance through GSCM. This collaborative approach promotes a culture of sustainability that permeates the entire supply chain, ultimately to shared environmental benefits. Knowledge management has emerged as a critical factor in improving the performance of the sustainable supply chain. Lim et al. (2017) stated that companies that exploit the mechanisms of sharing knowledge within their supply chains can better implement green practices, thus obtaining higher performance results. This reflects a holistic approach to sustainability, integrating insights from various functions within the organization. Environmental management systems must be distributed through the functions of the supply chain to encourage a unified approach to sustainability. Longoni et al. (2018) Indicated that the connection of Ghor with GSCM practices improves environmental results, suggesting that workforce involvement is essential to achieve wider sustainability objectives.

Collaboration in the supply chains is essential to advance sustainable practices, particularly in agriculture. (Thomson et al., 2017) They observed that science -based collaborations create opportunities to improve sustainability between supply chains in this sector. These partnerships allow the sharing of best practices and innovative solutions that improve environmental and operational metrics. This study presents the second hypothesis grounded in the theoretical interpretations discussed above:

Hypothesis 2: *There is a positive relationship between supply chain management and environmental stewardship.*

4.3 Supply Chain Management and Social Responsibility

Effective supply chain management practices (SCM) are increasingly recognized as fundamental to improve social responsibility within global commercial operations, mainly through sustainability, ethical supply, and the impact on the community. The supply chains are complex ecosystems that can significantly influence environmental and social results, thus requesting a strategic approach to the ism that aligns with companies' social responsibility (Mejías et al., 2016).

The research highlights the positive effects of the green supply chain (GSCM) management practices on sustainability performance. Yildiz Çankaya and Sezen (2019) Point out that incorporating green practices within the supply chain increases sustainability and improves financial services, thus creating a convincing business case for responsible SCM. These practices may include waste reduction initiatives, energy efficiency improvements, and supply of sustainable materials. By completing this perspective, Wan C. et al. (2020) Illustrate how GSCM can improve the social responsibility of companies, particularly if coupled with advanced data analysis features, thus promoting greater responsibility between supply chain operations.

Ethical supply remains a critical aspect of socially responsible supply chains. Khokhar et al. (2020) Underline the importance of evaluating suppliers' practices to ensure they align with social sustainability objectives. Ethical supply practices can strengthen a company's reputation and lead to customer loyalty, led by the demand for consumer responsibility and transparency in the supply chains (Brewer, 2019; Modica et al., 2020). The study of the relationship between suppliers' social performance and supply chain integration reveals that the share capital plays a fundamental role, suggesting that collaboration can improve the overall impact of CSR initiatives (Alghababsheh & Gallear, 2021).

In addition, the impact of effective SCM practices extends to the community's commitment. Integrating social responsibility initiatives in the supply chains can encourage the development and resilience of the community. Modak et al. (2019) Present a model in which company donations are integrated into the supply chain to raise social results, demonstrating a double advantage of contributing to the community's well-being while satisfying the company's ethical mandates. This alignment of the community's interests with commercial operations is taken up in the research that connects CSR practices to better green innovation, where dynamic skills facilitate adopting sustainable practices (Yuan & Cao, 2022). In particular, the circular economy framework is fundamental in promoting sustainable SCM. Kazancoglu et al. (2021) Propose a global political framework to improve company environmental management through the practices of the circular supply chain, highlighting the potential for the reduction of waste and the greater efficiency of resources. This frontier in SCM emphasizes transitioning from linear models to circular strategies that embrace sustainability in their nucleus. Despite the apparent benefits of sustainable SCM practices, the challenges remain in the implementation. Sajjad et al. (2020) Discuss managerial barriers that can hinder the integration of sustainable practices, particularly in various regional contexts. In addition, Gawusu et al. (2022) indicate the need to adapt GSCM practices to different specific challenges in the sector, particularly in the renewable energy sector.

In summary, effective supply chain management practices are crucial in improving social responsibility by promoting sustainability, promoting ethical supply, and positively influencing communities. Since companies increasingly recognize the interconnection of supply chain operations and social results, the demand for robust, responsible, and sustainable practices will guide innovation and transformation into global business strategies (Xu et al., 2022). The study presents the third hypothesis grounded in the theoretical interpretations discussed above:

Hypothesis 3: *There is a positive relationship between supply chain management and social responsibility.*

5. Methodology

To obtain the primary data, a questionnaire was created consisting of two sections, the first for demographic data and the second for questionnaire phrases. The questionnaire was distributed to 43 companies in the basic materials sector, listed on the Saudi Stock Exchange (Tadawul) (<https://www.saudiexchange.sa/>), which maintained an active trading status before 2020. 430 questionnaires were sent electronically and addressed to relevant individuals within these companies using their LinkedIn contact information. The research team initially collected 367 questionnaires; after a careful review process, 18 responses were excluded due to the identification of outliers that had the potential to distort the study's results. Consequently, the final dataset included 349 valid responses suitable for subsequent analysis. As a preliminary procedure, a random subsample of 60 responses was extracted before conducting statistical checks to assess the reliability and validity of the survey instrument, using Cronbach's alpha coefficient for each variable in the study, with the overall results shown in Table 1.

Table 1
Statistical Reliability and Validity Results

Variables	Coefficient Reliability	Validity Coefficient
Supply Chain Management	%07	84%
Economic Growth	%28	90%
Environmental Stewardship	%78	88%
Social Responsibility	83%	91%
For Questionnaire	%78	88%

6. Results and discussion

The Cronbach's alpha coefficient of 0.90 indicates a high level of internal consistency for the questionnaire, which is above the acceptable level of 0.60 for reliability, indicating that the items within the questionnaire measure the same underlying construct. The reliability and validity coefficients for each of the three study variables and the overall questionnaire are all above 0.60, as shown in Table 1. This provides strong evidence that the questionnaire has adequate reliability and validity. This makes it suitable for statistical analysis and allows for appropriate interpretations of the collected data.

Table 2

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.907
Bartlett's Test of Sphericity	Approx. Chi-Square	4915.02
	df	487
	Sig.	0.004

The Kaiser-Meyer-Olkin (KMO) measure indicates whether the sample size used in a study is sufficient and appropriate for conducting statistical analyses. The KMO value ranges from 0 to 1 (Thao et al., 2022), and a KMO value closer to 1 indicates a high degree of variability within the sample data, indicating its suitability for analysis. The KMO value was 0.907, which provides strong evidence that the sample data obtained can be used in statistical analysis. Complementing the KMO measure, the Bartlett test assesses the strength of the correlation matrix between variables. Revell (2016) Indicates that a Bartlett value greater than 50% indicates a strong correlation matrix, making the data suitable for latent factor analysis, and the closer the p-value is to zero, the more appropriate the relationships between variables are. For the results of Table 2, we note that the value of Bartlett's test reached 0.004, which indicates that the sample data is sufficient for the factorial analysis.

6.1 Measurement Validity, Reliability, and Discriminant Validity

According to Hair Jr et al. (2020), For PLS-SEM analysis, the first step involves assessing the reliability and validity of the measurement model, including discriminant validity. Reliability was assessed through the loading rates of questionnaire items on the latent variables and the average variance extracted (AVE). The results, as shown in Table 3 and Fig. 1, show that the loading rates are appropriate and exceed the recommended 0.60, and the AVE values are above 0.50, thus confirming strong reliability. Furthermore, the model's validity was assessed using Cronbach's alpha (CA) and composite reliability (CR), which exceeded the acceptable level of 0.70, as shown in Table 3. These CA and CR rates provide evidence supporting the high validity of the measurement model. Discriminant validity is a crucial aspect of assessing the construct validity of a measurement instrument. It ensures that a measure is not overly correlated with other measures that it theoretically should not be correlated with (Cheung et al., 2023). As noted by Sürücü & Maslakci (2020), a strong indicator of discriminant validity is when a variable's correlation with itself (typically assessed using a measure of internal consistency or by comparison to a related item within the same measure) is higher than its correlation with other variables. Table 4 provides evidence supporting the high discriminant validity of a model. The data presented clearly show that each variable correlates more strongly with itself than with other variables in the model, strengthening confidence that the measures have distinct constructs.

6.2 Structural Model Assessment

Researchers rely on the coefficient of determination (R^2) and effect size (f^2) to assess the strength of the model (Hair et al., 2019). The R^2 value, which ranges from 0 to 1, measures the proportion of variance in the dependent variable explained by the independent variable. Benchmarks indicate that an R^2 of 0.67 or higher indicates a strong relationship, values between 0.33 and 0.67 indicate a moderate relationship, and values between 0.19 and 0.33 indicate a weak relationship (Lin et al., 2020).

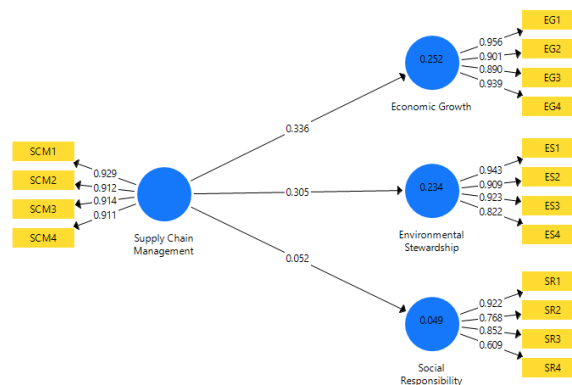


Fig. 1. Loading rate, R^2 and f^2

Examining the results in Table 5 and Fig. 1, the R^2 values reveal a weak explanation for Economic Growth at 0.252, a weak explanation for Environmental Stewardship at 0.234, and a weak explanation for Social Responsibility at 0.049. These results indicate that Supply Chain Management accounts for 25% of the observed variance in Economic Growth, 23% in Environmental Stewardship, and 4% in Social Responsibility, highlighting the relevance of the linear association in these relationships.

Table 3
Reliability, F Square, and R Square

Variables	Items	Loading	Cronbach's Alpha	Composite Reliability
Economic Growth	EG1	0.956	0.941	0.958
	EG2	0.901		
	EG3	0.890		
	EG4	0.939		
Environmental Stewardship	ES1	0.943	0.922	0.945
	ES2	0.909		
	ES3	0.923		
	ES4	0.822		
Social Responsibility	SR1	0.922	0.818	0.871
	SR2	0.768		
	SR3	0.852		
	SR4	0.609		
Supply Chain Management	SCM1	0.929	0.937	0.955
	SCM2	0.912		
	SCM3	0.914		
	SCM4	0.911		

Table 4
Discriminant Validity

Variables	Economic Growth	Environmental Stewardship	Social Responsibility	Supply Chain Management
Economic Growth	0.922			
Environmental Stewardship	0.252	0.900		
Social Responsibility	0.489	0.097	0.796	
Supply Chain Management	0.502	0.483	0.222	0.917

Effect size (F^2) determines the magnitude of the effect of the independent variables on the dependent variables (Selya et al., 2012). Effect sizes are classified as large if (≥ 0.35), medium if (0.35-0.15), small (0.15-0.02), or no effect if (≤ 0.02). Examination of the data in Table 5 and Fig. 1 reveals that the effect size of Supply Chain Management on Economic Growth is 0.336, indicating a large effect according to the specified criteria. More importantly, the effect size of Supply Chain Management on Environmental Stewardship is 0.305, indicating a medium effect and the effect size of Supply Chain Management on Social Responsibility is 0.052, indicating a small effect.

Table 5
F Square and R Square

F Square	Economic Growth	Environmental Stewardship	Social Responsibility
Supply Chain Management	0.336	0.305	0.052
R Square	0.252	0.234	0.049

6.3 Path Analysis

The final stage of the PLS-SEM analysis involved a path analysis based on linear regression to analyze the proposed model's relationships. This aimed to determine proposed hypothesized theories and identify direct and indirect contribution effects on the causal relationships between independent and dependent variables. As shown in Table 6 and Figure 2 below, the results indicate the proposed relationships as follows. Supply Chain Management has a positive direct effect on Economic Growth ($\beta = 0.502$, $t = 9.025$, $p = 0.000$); however, the result is not significant at the level of $p < 0.001$, indicating to reject the first hypothesis (H1). Supply Chain Management has a positive direct effect on Environmental Stewardship ($\beta = 0.483$, $t = 7.458$, $p = 0.000$); however, the result is significant at the level of $p < 0.001$, indicating to support the second hypothesis (H2). Supply Chain Management has a positive direct effect on Social Responsibility ($\beta = 0.222$, $t = 2.608$, $p = 0.008$); however, the result is significant at the level of $p < 0.01$, indicating support for the third hypothesis (H3).

Table 6. Path Analysis Results

Hypotheses	β	T Statistics	P Values	Decision
Supply Chain Management $\rightarrow$ Economic Growth	0.502	9.025	0.000	Supported
Supply Chain Management $\rightarrow$ Environmental Stewardship	0.483	7.458	0.000	Supported
Supply Chain Management $\rightarrow$ Social Responsibility	0.222	2.608	0.008	Supported

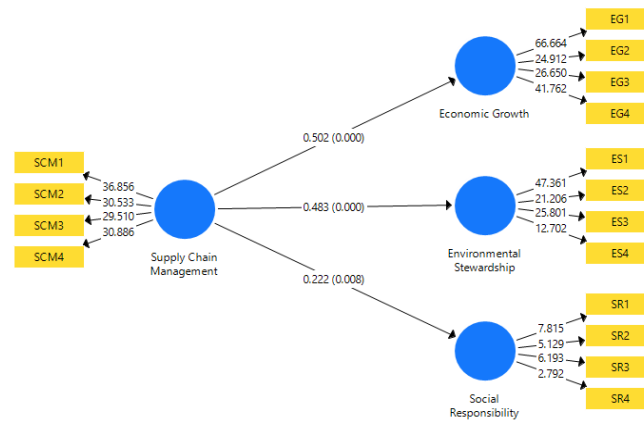


Fig. 2. Path Analysis

7. Discussion

The research explores the importance of supply chains to the efficient functioning of businesses in the basic materials industry and the important connections with economic development, social prosperity, and environmental protection in Saudi Arabia. The findings highlight how the fundamental asymmetries lie at the heart of generating and maintaining sustainable long-term value creation through the balanced alignment of these interconnected business elements. Through the strategic focus of converging sustainability experiences and practice with core business activities, opportunities to achieve enhanced financial functioning are enabled alongside contributing to meaningful social advancements. This dynamic relationship makes tangible increases possible to be realized in terms of internal organizational development, trusted relationships between business stakeholders, and value creation over the long term. This research study underscores the vital role of an efficient supply chain as a pillar of growth in Saudi Arabia's commodities market. Supply chains are more than just logistical processes; they are vital tools for achieving the country's broader goals of economic growth, social well-being, and environmental protection. By focusing on operational efficiency, market adaptability, and financial transparency, well-functioning supply chains enable smarter choices and unlock access to valuable economic benefits. The results also demonstrate that supply chain excellence in these areas can significantly contribute to social responsibility and environmental sustainability in the commodities sector. This research suggests several areas for further research, highlighting several fertile areas for study into innovative financial instruments and a broad range of policies that will work effectively to incentivize and promote sustainability throughout all aspects of supply chain activities. Hence, the study indicates that strategic and intentional design and management of the supply chain are vital components in meeting Saudi Arabia's ambitious and comprehensive development vision.

8. Conclusion

This study shows how supply chain effectiveness is key in aligning the conflicting objectives of economic growth, environmental sustainability, and social responsibility of basic materials companies listed on the Saudi stock market. Basic materials companies still struggle to balance profitability and sustainability, and the results suggest that strong supply chain practices give companies a competitive advantage that enables them to operate profitably and sustainably. Supply chain practices can be strategically improved by carefully assessing current practices and identifying areas for improvement. Supply chain management in the basic materials sector should expand policies supporting economic, social, and environmental sustainability. Strategic improvement of supply chains constitutes methods for sustainable best practices. Adopting sustainability and supply chains will align with Saudi Arabia's Vision 2030. Future research should focus on how effective supply chain management impacts sustainable practices in other operational contexts and industries and how these concepts can be implemented.

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