International Journal of Research - GRANTHAALAYAH
January 2026 14(1)
www.granthaalayah.com

Original Article

IMPACT OF CIRCULAR ECONOMY PRACTICES ON EXPORT PERFORMANCE

Sahar Hassan Khayat [1*]
[1] Associate Professor, Department of Economics, Faculty of Economics and Administration, King Abdulaziz University, P.O. Box 3024, Jeddah 21471, Kingdom of Saudi Arabia

ABSTRACT

This study aims to explore the impact of circular economy practices on export performance and environmental performance within the framework of a developing economy such as Jordan. Moreover, the mediating role of environmental performance on the nexus between circular economy practices and export performance. This study used a cross-sectional survey questionnaire from 279 managers of manufacturing firms in Jordan. To ensure diversity in the sample, this study included firms from different industry types. The structural equation modeling approach was performed with reliability and validity analysis to test the study hypothesis. The findings showed that circular economy practices significantly and positively influence environmental and export performance. Environmental performance also significantly and positively affects export performance. Moreover, it is also observed that environmental performance mediates the association between export performance and circular economy practices. This finding are intended to encourage the adoption of circular economy practices across the manufacturing firms of Jordan to reap economic gains by stimulating their exports through enhancement in environmental performance.

Keywords: Circular Economy Practices, Environment Performance, Export Performance

INTRODUCTION

The linear economic model centered on a growth-oriented approach of excessive consumption of natural resources is driving Earth's life-supporting systems beyond the safe threshold. Climatic instability, biodiversity crisis, and changes in land use patterns are all primary consequences of this system Barrie and Schröder (2022). Extraction, processing, and use of natural resources are among the driving catalysts of these effects, responsible for over 50% of global emissions and 90% of biodiversity loss on land Oberle et al. (2019). The circular economic model provides a solution, integrating economic advantages with the ecological conservation of natural resources, minimizing waste, and harnessing renewable energy sources Kirchherr et al. (2023). Different from the liner model, it produces a recirculating system where products and materials are reused, and waste is recycled into resources for future use. Deploying a circular economy in manufacturing sectors can minimize ecological consequences, and accelerate economic productivity and progress toward achieving sustainable development Shebanin et al. (2024). The manufacturing sector is fundamentally important for economic growth as it substantially contributes towards gross domestic product, generating employment opportunities, earning foreign exchange, and improving trade balances. Thus, the circular economy's potential in the manufacturing sector is enormous and could be dynamic for the sustainable development of a country.

The transition towards a closed-loop or circular economy is growingly identified as a model capturing the attention in global forums. Consequently, sustainable development goals aim to target the global optimization of resources in production and

*Corresponding Author:
Email address: Sahar Hassan Khayat (saharkayat@hotmail.com)

Received: 06 November 2025; **Accepted:** 23 January 2026; **Published** 10 February 2026
DOI: 10.29121/granthaalayah.v14.i1.2026.6611
Page Number: 89-100
Journal Title: International Journal of Research -GRANTHAALAYAH
Journal Abbreviation: Int. J. Res. Granthaalayah
Online ISSN: 2350-0530, **Print ISSN:** 2394-3629
Publisher: Granthaalayah Publications and Printers, India
Conflict of Interests: The authors declare that they have no competing interests.
Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.
Authors' Contributions: Each author made an equal contribution to the conception and design of the study. All authors have reviewed and approved the final version of the manuscript for publication.
Transparency: The authors affirm that this manuscript presents an honest, accurate, and transparent account of the study. All essential aspects have been included, and any deviations from the original study plan have been clearly explained. The writing process strictly adhered to established ethical standards.

consumption and pursue the decoupling of economic progress from ecological destruction. European Commission introduced a circular economy as a primary component in its economic strategy through launching a circular economy action plan (CEAP). During the last several years, myriad multinational coalitions have been made to stimulate the circular economy at regional and international levels such as the Platform for Accelerating the Circular Economy (PACE), Global Alliance for Resource Efficiency and Circular Economy (GARECE), and the African alliance of circular economy. At the national level, embracing a circular economy is also considered a strategy for accelerating economic competitiveness and minimizing reliance on unstable global supply chains.

The fundamental idea behind the adoption of a circular economy is to address the issue of scarcity of natural resources Pizzi et al. (2022). Thereby, circular economy practices have gained importance as an economic and business framework that offers firms an innovative approach to resource utilization. It emphasizes on significance of regenerating and recovering resources when products are no longer in use Cavicchi et al. (2022). Manufacturing firms prioritizing circular economy practices seek to employ reprocessed materials and closed-loop systems for their raw materials. They endeavor to reduce the utilization of natural resources, mitigate energy waste, and minimize emissions, and pollution. The studies of Shevchenko et al. (2023) and Le et al. (2024) have mentioned the above-stated objectives of circular economy practices. Companies have incorporated business models integrating circular economy practices such as recycling, resilience, maintenance, reuse, renovation, reshaping, decomposition, and capacity sharing. Chembessi et al. (2022) advocated that the target of circular economy practices is to maximize the usage of resources, promote efficiency and reduce waste. These circular economy activities exhibit the evolution of the 3R concept i.e., reduce, reuse, and recycle. Shevchenko et al. (2023) described the word “reduce” as evaluating strategies to modify the raw material composition, improve consumption and production processes, are modeling procedures. Similarly, the word “reuse” is defined by Schöggl et al. (2024) as the approach of utilizing products that have achieved their life cycle to reduce the reliance on raw materials and other resources in the production, development, and consumption of new products. Recycling becomes a favorable option when it’s not feasible to reduce and reuse waste. The "recycling" term demonstrates an efficient usage of scarce resources by transforming waste items into useful products Blinova et al. (2022).

It is important to mention that several empirical research has been carried out on the notion of circular economy practices in the field of general activities and operations of firms Mazzucchelli et al. (2022), Velasco-Muñoz et al. (2022). while, it is essential to recognize that above-mentioned studies predominantly follow the linear economic model and the conceptualization rooted in the principles of circular economy. Some studies have concentrated on the circular economy and its effects on the factors of corporate performance, particularly in the context of developed nations. However, the association between the circular economy practices and export performance still needs to be explored. Therefore, this study contributes to the literature by investigating the relationship between the circular economy practices and the environmental and export performance of the manufacturing firms of Jordan. Explicitly, this research also explores the mediating role of environmental performance in shaping the relationship between circular economy practices and export performance.

LITERATURE REVIEW

CIRCULAR ECONOMY PRACTICES

The circular economy is considered a constructive system in which emissions, resource waste, and the process of energy transmission are depleted through substances loops and closing energy Geissdoerfer et al. (2018). The circular economy is a sustainable development initiative that reduces the linear flow of energy and material in the societal consumption-production system by integrating renewable energy sources Korhonen et al. (2018). The concept of circular economy and its implementation in economic systems has developed to incorporate a wide range of ideas such as the cradle-to-cradle approach McDonough and Braungart (2010), Looped economy Stahel (2016), and ecology laws Commoner (2020), that are fundamentally important to form closed-loop framework. The circular economy is an economic model that organizations should implement by integrating activities that increase/diminish the use/reuse of resources while confirming they are recyclable Ahmadi et al. (2017). In a similar vein, Desing et al. (2020) stated that this concept has evolved to satisfy the growing needs while avoiding ecological degradation.

Geng et al. (2019) advocated that incentives and policies should be upgraded to propagate and deploy circular economy practices. Bag et al. (2021) presented a theoretical model to demonstrate the significance of technological advancement to facilitate circular economy practices. Primc et al. (2020) proposed measures of circular economy configuration and examined the impact of circular economy practices at different levels of firms’ growth. Nadeem et al. (2018) highlighted that circular economy practices reduce waste generation and use of recycled products thus, can minimize environmental pollution. Therefore, circular economy practices are required to conserve the environment and to promote sustainable manufacturing procedures Sfez et al. (2019).

EXPORT PERFORMANCE

Scholars have recognized the significance of exporting in the international economy as a critical measure of an organization’s capacity to optimize its materials and resources worldwide Azar and Ciabuschi (2017), Boehe and Jiménez (2016), Cadogan et al. (2016). Export performance is explained by Cavusgil and Zou (1994) as the level at which an organization accomplishes its strategic and economic targets related to exporting a commodity into the international market through effective formulation and

implementation of an export marketing strategy. It is considered a crucial performance that can contribute a role in supporting Jordan's economy. Jordan stands 94th internationally based on its export-reliant economy while its economic complexity ranks it 67th on the global scale (JIC, 2018). Brouthers et al. (2009) defined several indicators of export performance. Azar and Ciabuschi (2017) measured export performance by employing two dimensions such as strategic effectiveness and financial performance. Export performance may include exporting decisions, the range of accessible markets, the quantity of sold products, and the value of exported products Spanos (2016). However, Carneiro et al. (2016) and Katsikeas et al. (2000) have categorized the above measures into two major categories, including non-economic/non-financial and economic/financial (sales/profitability) measures. This research used export sales, international market access, growth of export market share, export targets, and profitability of exported goods as indicators of export performance as these indicators are extensively employed in literature and incorporate the two primary measures of export performance I.e., non-financial and financial measures.

ENVIRONMENTAL PERFORMANCE

In a period of awareness related to environmental issues, firms need to explore avenues to mitigate the ecological influences by incorporating organizations' environmental performance with activities, strategies, employee relationships, and the company's reputation to address environmental issues and regulations. Walls et al. (2012) described environmental performance as the consequences of an organization's strategic decisions in mitigating (or neglecting) its environmental influences.

The Environmental Performance Index Environmental Performance Index (2018) ranks 180 nations on 24 performance measures among 10 issues classification encompassing ecosystem validity and environmental health Environmental Performance Index (2018). Based on the country rank of Environmental Performance Index (2018), Jordan scores 62nd out of 180 and stands 6th in the Middle East and North Africa region. Concerning the issue classification, Jordan scores 26th in environmental health and 132th in ecosystem validity, especially scores 20th in air pollution and 107th in climate and energy Environmental Performance Index (2018).

Since no standardized measure of environmental performance exists, there are a variety of environmental performance indicators as environmental issues are often hard to quantify due to their intangible nature Banerjee (2002). However, variations in environmental performances persist within firms, among firms in the same industry, and across firms in different industries even different performance metrics are adopted Bocken et al. (2013). This research commonly used indicators of environmental performance, adopted from literature such as reduced liquid and solid waste, decreased atmospheric emission, minimal usage of resources, toxic and hazardous products, and environmental reputation of a firm Diab et al. (2015), Hasan (2013).

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

CIRCULAR ECONOMY PRACTICES AND ENVIRONMENTAL PERFORMANCE

Existing literature provided evidence of the relationship between circular economy practices and environmental performance. The studies of Marrucci et al. (2022) and Małys, (2022) have investigated the overall performance of an organization. The study conducted by Ncube et al. (2024) stated a positive association between drastic progress in the environmental performance of an organization and the adoption of a circular economy-based model. The stakeholders of firms took advantage of association between the ecological performance and circular economy practices Dvorský et al. (2023), Rahaman et al. (2023). However, Nishitani et al. (2022) argued that correlation between the environmental performance and the circular economy ultimately led to benefits for the organization. Moreover, the authors also mentioned that the adoption of technology and the promotion of innovative solutions can advance circular economy practices, eventually leading to a healthier ecosystem.

The earlier discussion has highlighted the influence of environmental performance, giving their relevance to sustainable practices and ecological practices Ogutu et al. (2023). There are increasing concerns among the stakeholders that organizations might focus on prioritizing ecological challenges, adjusting to the changing business landscape, and preserving resources, instead of solely focusing on profit-making because of strong market competition Tang et al. (2022). Meanwhile, circular economy practices can improve the efficiency of resource utilization, allowing the organization to fully recognize the benefits of adopting more sustainable approaches Jagoda et al. (2023). Thus, this study formulates the hypothesis as;

H1: There is a positive and significant association between environmental performance and circular economy practices.

CIRCULAR ECONOMY PRACTICES AND EXPORT PERFORMANCE

The direct influence of circular economy practices on export performance has not been explored in past research. Whereas, several studies have indirectly addressed this impact and shown a strong positive association Henrique et al. (2014), Villena and Souto (2016). Mitrović and Veselinov (2018) asserted that there is a nexus between global competitiveness and the level of circular economy development in the European Union. Furthermore, Rehman et al. (2023) showed that circular economy innovations have a significant and positive influence on market competitiveness. Đorđević et al. (2021) also argued that the notion of a circular

economy has a substantial contribution to improving competitiveness. Research by Nishitani (2011) found that the implementation of an environmental management system led to enhanced export performance in Japanese export-oriented companies.

The above discussion argued that implementing circular economy practices will support exporting products to various developing and developed countries that enforce rigid environmental legislations for imported products. Based on the above arguments, the hypothesis has been formulated as follows;

H2: There is a positive and significant association between export performance and circular economy practices.

ENVIRONMENTAL PERFORMANCE AND EXPORT PERFORMANCE

Limited studies focus on export performance and environmental performance, particularly in the context of developing nations. Firms that mitigate the adverse environmental impacts of their materials and practices and reusable materials from consumer waste are about to grow their markets Demirci (2014). Chen et al. (2006) highlighted that strengthening environmental performances throughout all stages of manufacturing processes including minimizing hazardous material and energy consumption, enhancing ecological reputation, optimizing waste processing, and reducing emissions. Consequently, these environmental upgrades contribute to increased marketing opportunities, improve the firm's reputation, and boost market share Zhu et al. (2013). Whereas, Ural (2009) believed that exporting is a component of an organization's marketing strategy. There might be additional costs involved such as the implementation of an environment management system, expenses of polluting air, and higher operational costs. These adverse impacts might be observed in the short-run, as in the long-run benefits including, reduced waste, energy savings, and improved operational efficiency can offset the cost. These improvements can boost the firm's reputation, and increase profits, leading to better performance in the market while meeting environmental standards. Concerning the above argument, the hypothesis is postulated as follows;

H3: There is a positive and significant association between export performance and environmental performance.

THE MEDIATING ROLE OF ENVIRONMENTAL PERFORMANCE ON THE NEXUS BETWEEN CIRCULAR ECONOMY PRACTICES AND EXPORT PERFORMANCE

Recovery, recycling, and reuse of activities that are used at the eco-design phase can reduce toxic materials and emissions, decrease energy consumption, and enhance waste management across the life cycle of a product. Thus, environmental performance can be achieved by eradicating waste and reducing resource usage Zhu et al. (2013). Implementing circular economy practices is prone to involve organizations in evaluating their environmental performance and enhancing it, thus integration of internal environmental strategies allows companies to reduce resource consumption and minimize waste. Conversely, the Arab Spring has driven Jordanian companies in the manufacturing sector to explore new markets, including those that impose ecological restrictions on exporting products. Thus, enhanced environmental performance could result in improved brand reputation and status, and fulfilling international environmental standards, which might be viewed as an opportunity to grow exports in existing markets and explore new foreign markets that would ultimately improve export performance. Based on the above discussion, the hypothesis is formulated as follows;

H4: The effect of circular economy practices on export performance is positively mediated by environmental performance.

The conceptual model of observed variables is presented in Figure 1.

Figure 1

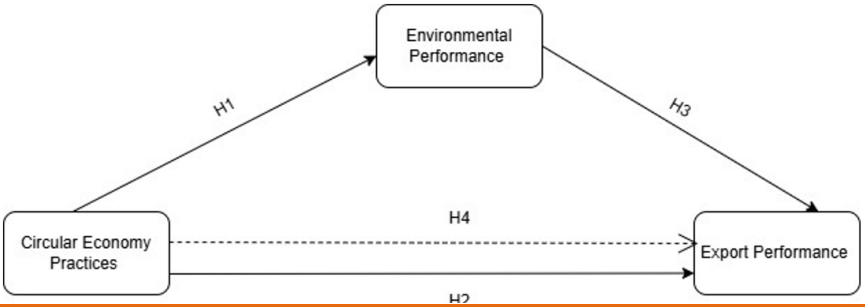

Figure 1 Conceptual Model of Research

MATERIALS AND METHODS

RESEARCH DESIGN AND SAMPLE

This study adopted a quantitative research design employing a cross-sectional survey questionnaire to gather data from the respondents. This research focused on the population of manufacturing firms in Jordan, which comprised 1,793. Sekaran and Bougie

(2016) mentioned that the adequate size of the sample for this population is 317. The researcher distributed 467 questionnaires online by utilizing e-mail addresses from the websites of selected manufacturing firms and also requested the respondents to participate in this research. A random sampling approach was used to select the study sample. Whereas, to ensure the diversity in the sample, different types of study such as, textile/garments, fertilizers/chemicals, pharmaceuticals, food/beverages, and plastic/rubber were involved in the study sample. This study targets the top, middle, and lower levels of management as they have the required information concerning the study questions. A cover letter was attached with the questionnaire highlighting the objective of the research, guiding completion, and ensuring that the collected data would be strictly used for research purposes. A total of 334 questionnaires were received with 55 having missing information. This may be happened because managers were hesitant to share internal policies as several firms have strict restrictions in sharing data related to their environmental practices. Thus, the final number of valid questionnaires was 279, reflecting a response rate of 59.7%. This response rate is close to other empirical research performed in Jordan employing the same methodology Al-Sa et al. (2017), Abdallah et al. (2017).

QUESTIONNAIRE DESIGN AND MEASURES

In pursuit of the research objective, this study used a questionnaire survey. The survey questions were adopted from past studies Kristoffersen et al. (2021), Amin et al. (2024), Chien (2014), Carneiro et al. (2016). Originally, the questionnaire was created in English and to convert it to Arabic, translation was required. This study used a back-translation approach which involves the translation of a questionnaire from one language to another and then translating back it into the original language to ensure the reliability of a questionnaire. Furthermore, the questionnaire was assessed by three professionals in operations to ensure that each construct was assessing what it was anticipated to assess. Additionally, this revision confirms the appropriateness and clarity of study constructs and translation accuracy. Adjustments were implemented as required such as filtering, revising removing some constructs. Moreover, five managers from manufacturing firms pre-tested the questionnaire, and adjustments were made in response to their feedback. The constructs of circular economy practices were evaluated on a 5-point Likert scale, ranging from strongly disagree to strongly agree. For the constructs of export and environmental performance, participants were requested to assess their firms' performance to that of their competitors over the three past years, also employing a five-point Likert scale (i.e., 1= strongly disagree to 5= strongly agree). The details of survey constructs with references were presented in the Appendix A.

RELIABILITY AND VALIDITY

Internal reliability was examined by employing composite reliability (CR) and Cronbach's alpha, following the suggestion of Hair et al. (2017). The minimum acceptance range of Cronbach alpha is 0.70 or above while the cutoff value for CR is 0.70. Discriminant and convergent validity were both evaluated Hair et al. (2014), Schijven and Jakimowicz (2003). Discriminant validity was assessed to confirm that each variable is distinct and captures a phenomenon not explained by other variables in the same measurement model Hair et al. (2014). The Fornell-Larcker criterion was used to test discriminant validity. The accepted criteria are values below 0.80 for discriminant Kline (2011). Moreover, Convergent validity was tested using Average Variance Extracted (AVE) and factor loadings Cheah et al. (2018), Hair et al. (2014). According to the criteria, AVE values should exceed 0.50, and factor loadings should be greater than 0.70.

DATA ANALYSIS

This study adopted the structural equation modeling (SEM) approach to evaluate the structural and measurement model. This analysis was conducted on STATA version 18. It is important to mention that there are two widely employed procedures to estimate the parameters of structural equation modeling (SEM); the variance-based approach (VB-SEM) and the covariance-based approach (CB-SEM). CB-SEM uses the maximum likelihood procedure to reduce the difference between the expected and observed covariance anticipated by the theoretical framework. Further, it requires a large sample size like 200 to 800 cases. However, this study used VB-SEM to examine the variables of the model via loading analysis and path values. In addition, this procedure reduces the overall adequacy of the covariance matrix of the observed measurements. The SEM approach is generally used when the researchers' objective is to explain and anticipate variation in significant target components by using multiple explanatory constructs Hair et al. (2014). Instead of focusing exclusively on the covariance that explains the link between items, the SEM approach prioritizes maximizing the variation explained in the dependent variable by the independent variable.

RESULTS

Table 1 summarizes the respondents and surveyed firms' profiles. It is observed that in the study sample males were predominant (75.98%) and a larger proportion of the sample were in middle-management roles (66.66%). Regarding industry type, the fertilizers and chemicals sector has the leading share (37.27%), followed by textiles and garments (26.88%), while the pharmaceuticals sector has the smallest group (10.39%). The majority of the participants work in small to medium-sized firms, with 40% of participants from firms with less than 50 employees and 24% from firms with 50-150 employees.

Table 1

Table 1 Demographic Profile of Participants and Surveyed Firms

Demographic Profile	Category	n (%)
Gender	Male	212 (75.98%)
	Female	67 (24.01%)
Designation	Top management	59 (21.14%)
	Middle management	186 (66.66%)
	Lower management	34 (12.18%)
Industry Type	Textile and garments	75 (26.88%)
	Food and beverages	40 (14.33%)
	Pharmaceuticals	29 (10.39%)
	Fertilizers and chemicals	104 (37.27%)
	Rubber/plastics	31 (11.11%)
Number of Employees	Less than 50	112 (40.14%)
	50-150	67 (24.01%)
	151-250	56 (20.07%)
	More than 250	44 (15.77%)

Table 2 demonstrates the reliability and validity measures of the study instruments. It is observed that the factor loadings for most items exceed 0.60, showing adequate reliability of items. Similarly, the Cronbach's Alpha values vary between 0.78 to 0.88, indicating good internal consistency. Furthermore, composite reliability (CR) ranges from 0.75–0.90, further supporting construct reliability. In addition, the average variance extracted (AVE) values (0.52–0.55) also satisfy the minimum threshold of 0.50, implying appropriate convergent validity. Overall, the study instruments indicate adequate reliability and validity of the questionnaire.

Table 2

Table 2 Reliability and Validity of Constructs

Constructs	Statements	Factor Loadings	Cronbach Alpha	CR	AVE
Circular economy practices	CEP1	0.69	0.87	0.80	0.55
	CEP2	0.80			
	CEP3	0.73			
	CEP4	0.66			
	CEP5	0.88			
	CEP6	0.65			
Environmental performance	ENPRF1	0.91	0.78	0.75	0.52
	ENPRF 2	0.84			
	ENPRF 3	0.77			
	ENPRF 4	0.71			
	ENPRF 5*	0.40			
	ENPRF 6*	0.44			
Export performance	EXP1	0.85	0.88	0.90	0.54
	EXP2	0.80			
	EXP3	0.67			
	EXP4	0.59			
	EXP5	0.74			

Note: * Deleted Items Due to Value Less than 0.50

Table 3 reports the assessment of discriminant validity using Fornell–Larcker criteria. The diagonal values indicate the square root of the AVE, exceeding the corresponding correlation coefficients, indicating acceptable discriminant validity. The VIF values less than 5, suggesting no severe multicollinearity problem across the constructs.

Table 3

Table 3 Discriminant Validity Assessment

Constructs	CEP	ENPRF	EXP	VIF
CEP	0.741	0.523	0.309	1.670
ENPRF	0.461	0.721	0.684	2.894
EXP	0.664	0.357	0.734	2.312

Note: Bolded Diagonal Terms Represent the Square Root of AVE.

Table 4 presents the results of hypothesis testing employing the SEM approach. It is observed that our results support the H1, highlighting a significant and positive impact of circular economy practices on environmental performance (β = 0.368, p-value = 0.000). In addition, circular economy practices have a significant and direct impact on export performance (β=0.299, p-value = 0.003), thus supporting H2. The effect of environment performance on export performance also showed positive and significant (β = 0.442, p-value = 0.000), consequently, H3 was also supported. The findings of the mediating effect of environment performance demonstrated that the impact of circular economy practices on export performance was also significant and positive (β = 0.193, p-value = 0.010) but it is less than as compared to the direct effect, thus H4 is also supported. Figure 2 also displays the direct and indirect effects of studied variables.

Table 4

Table 4 Results of Hypothesis Testing

Paths	Coefficient	t-value	p-value	95% Confidence Interval	Decision
CEP → ENPRF	0.368	6.238	0.000	[0.212;0.460]	Supported
CEP → EXP	0.299	4.855	0.003	[0.145;0.267]	Supported
ENPRF → EXP	0.442	6.019	0.000	[0.208; 0.522]	Supported
CEP → ENPRF→ EXP	0.193	4.652	0.010	[0.013; 0.167]	Supported

Figure 2

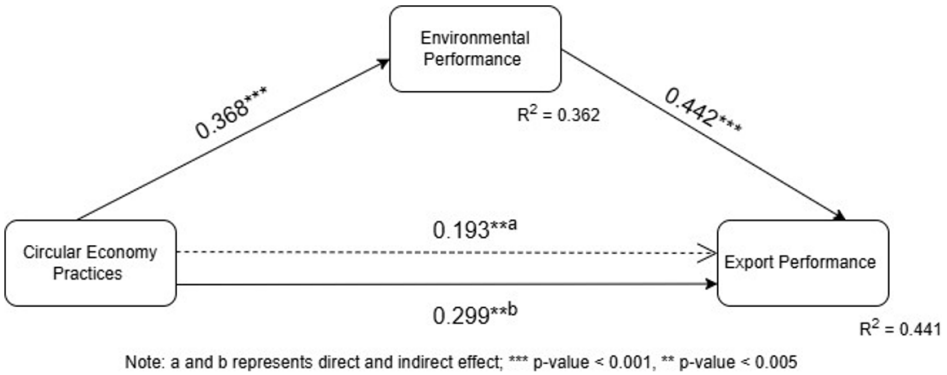

Figure 2 Path Analysis of Circular Economy Practices, Environmental Performance, and Export Performance

DISCUSSION

Based on empirical findings, it is revealed that circular economy practices have a direct positive impact on export performance. This suggests that effective implementation and integration of circular economy practices would improve the potential of manufacturing companies to boost their exports. Jordanian manufacturers that implement circular economy practices comply with global ecological standards, which enhance their export performance. This highlights that several foreign importers prioritize the performance of environmental-friendly products as acritical parameter when opting for possible exporters from developing nations. This finding is consistent with Đorđević et al. (2021), who argued that a circular economy has the potential to enhance

competitiveness in the international market. Moreover, Rehman et al. (2023) also found a significantly positive impact of circular economy innovations on market competitiveness.

This study also found that circular economy practices have a highly significant and positive influence on environmental performance. These results aligned with the findings of Nishitani et al. (2022), Jagoda et al. (2023), and Ncube et al. (2024). This shows that when the manufacturers of Jordan's economy adopt and integrate circular economy practices, the adverse impacts of their production operations and procedures on the environment will be reduced, therefore enhancing their environmental performance. These results highlight that manufacturing companies in Jordan appear to be increasingly aware of environmental issues and are supporting related legislation.

Furthermore, the impact of environmental performance on export performance is found to be significant and positive, demonstrating that by enhancing environmental performance, manufacturing firms of Jordan can improve their export performance. These results are supported by the research of Mitra and Datta (2014), asserting that most domestic Indian firms supply products to external firms, necessitating them to increase their environmental performance to secure their position as reliable suppliers in the long term. This finding may suggest that the majority of Jordanian manufacturing firms export their products to economies that place pronounced importance on ecological issues. In addition, by increasing environmental performance, firms can eliminate the costs associated with environmental performance like fines, sanctions, and penalties, ultimately favorably improving their environmental reputation lead to better export performance.

The significant and positive mediating influence of environmental performance demonstrates that circular economy practices significantly affect environmental performance which ultimately boosts export performance. These results highlight environmental performance as an efficient instrument for driving export performance. This might arise from viewing environmental performance as a vital factor in choosing suppliers. In contrast, Rao (2002) argued that the enhancement of environmental performance may not be reflected in better economic results.

THEORETICAL IMPLICATIONS

This research provides several theoretical contributions. First, it expands the existing literature by exploring how circular economy practices affect export and environmental performance. In addition, this research enriches the current body of knowledge by examining the mediating effects of environmental performance on the association between circular economy practices and export performance. This study strengthens the literature by attempting to establish a comprehensive understanding of circular economy practices and their effects on the performance of firms in a developing nation like Jordan.

MANAGERIAL IMPLICATIONS

This study found a clear influence of circular economy practices on export and environmental performance in Jordan. This study is intended to help managers in making decisions related to the adoption, adjustment, and enhancement of their present practices of circular economy. However, Jordanian manufacturing firms consider that circular economy practices facilitate generating new opportunities to vigorously enhance their foreign business performance through environmental performance. This requires investing more in the adoption of circular economy practices to retain their competitive status in a fast-evolving environment. Top management of Jordanian manufacturing firms must focus on meeting environmental standards to improve their environmental performance in promote their export performance. However, initiating circular economy practices and pursuing global environmental standards demands investment in the short-term and potentially in the medium-term but the long-term advantages will exceed these costs, leading to sustainable business outcomes in both domestic and international markets. In addition, based on the findings, managers should emphasize that integrating circular economy practices will not solely address the external pressure but also boost their firms' performance. Managers of manufacturing firms in other developing nations may reap advantages from the results of this research. Circular economy practices should be considered as a strategic competitive instrument that improves the appropriateness of export products to international markets through enhanced environmental performance.

LIMITATIONS AND FUTURE DIRECTIONS

This research has some limitations that must be acknowledged. First, this research used cross-sectional data at a single point. In the future, researchers adopt a longitudinal research design to explore the changes in firms' performance across time to gain a better understanding. In addition, mixed-method analysis can also be useful in integrating quantitative data with qualitative insights, resulting in a deeper understanding of the nexus between variables. Second, different industry types were used to collect data because limited number of firms associated with one industrial sector. Future studies can emphasize one industry type to deliver more precise outcomes and inferences Despite the outlined limitations, the study offers valuable support for the proposed framework and provides empirical evidence for future evaluations.

CONCLUSION

In conclusion, circular economy practices are a crucial driver of environmental performance in Jordanian manufacturing firms. In addition, findings indicate a substantial influence of circular economy practices on export performance. This study provides valuable insights related to the significance of improving environmental performance in facilitating Jordanian manufacturing firms to boost their export performance. Moreover, results revealed that environmental performance mediates the nexus between export performance and circular economy practices in a significant and positive manner. This study offers a deeper understanding of the effect of circular economy practices on two important performance factors (export and environmental performance) and offers meaningful practical and theoretical insights into circular economy practices in the manufacturing sector.

APPENDICES

Appendix A provides a structured questionnaire to gather demographic profiles and evaluate the implementation of circular economy practices like remanufacturing and waste reuse. It utilizes a five-point Likert scale to measure the impact of these practices on environmental performance and export success relative to competitors over a three-year period.

ACKNOWLEDGMENTS

The author is thankful to all the associated personnel who contributed to this study by any means.

REFERENCES

Abdallah, A. B., Abdullah, M. I., and Saleh, F. I. M. (2017). The Effect of Trust With Suppliers on Hospital Supply Chain Performance: The Mediating Role of Supplier Integration. Benchmarking: An International Journal, 24(3), 694–715. https://doi.org/10.1108/BIJ-05-2016-0062

Ahmadi, H. B., Kusi-Sarpong, S., and Rezaei, J. (2017). Assessing the Social Sustainability of Supply Chains Using Best Worst Method. Resources, Conservation and Recycling, 126, 99–106. https://doi.org/10.1016/j.resconrec.2017.07.020

Al-Sa'di, A. F., Abdallah, A. B., and Dahiyat, S. E. (2017). The Mediating Role of Product and Process Innovations on the Relationship Between Knowledge Management and Operational Performance in Manufacturing Companies in Jordan. Business Process Management Journal, 23(2), 349–376. https://doi.org/10.1108/BPMJ-03-2016-0047

Amin, M. B., Asaduzzaman, M., Debnath, G. C., Rahaman, M. A., and Oláh, J. (2024). Effects of Circular Economy Practices on Sustainable Firm Performance of Green Garments. Oeconomia Copernicana, 15(2), 637–682. https://doi.org/10.24136/oc.2795

Azar, G., and Ciabuschi, F. (2017). Organizational Innovation, Technological Innovation, and Export Performance: The Effects of Innovation Radicalness and Extensiveness. International Business Review, 26(2), 324–336. https://doi.org/10.1016/j.ibusrev.2016.09.002

Bag, S., Yadav, G., Dhamija, P., and Kataria, K. K. (2021). Key Resources for Industry 4.0 Adoption and Its Effect on Sustainable Production and Circular Economy: An Empirical Study. Journal of Cleaner Production, 281, 125233. https://doi.org/10.1016/j.jclepro.2020.125233

Banerjee, S. B. (2002). Corporate Environmentalism: The Construct and Its Measurement. Journal of Business Research, 55(3), 177–191. https://doi.org/10.1016/S0148-2963(00)00135-1

Barrie, J., and Schröder, P. (2022). Circular Economy and International Trade: A Systematic Literature Review. Circular Economy and Sustainability, 2(2), 447–471. https://doi.org/10.1007/s43615-021-00126-w

Blinova, E., Ponomarenko, T., and Knysh, V. (2022). Analyzing the Concept of Corporate Sustainability in the Context of Sustainable Business Development in the Mining Sector with Elements of Circular Economy. Sustainability, 14(13), 8163. https://doi.org/10.3390/su14138163

Bocken, N., Morgan, D., and Evans, S. (2013). Understanding Environmental Performance Variation in Manufacturing Companies. International Journal of Productivity and Performance Management, 62(8), 856–870. https://doi.org/10.1108/IJPPM-03-2013-0042

Boehe, D. M., and Jiménez, A. (2016). How Does the Geographic Export Diversification-Performance Relationship Vary at Different Levels of Export Intensity? International Business Review, 25(6), 1262–1272. https://doi.org/10.1016/j.ibusrev.2016.03.011

Brouthers, L. E., Nakos, G., Hadjimarcou, J., and Brouthers, K. D. (2009). Key Factors for Successful Export Performance for Small Firms. Journal of International Marketing, 17(3), 21–38. https://doi.org/10.1509/jimk.17.3.21

Cadogan, J. W., Boso, N., Story, V. M., and Adeola, O. (2016). Export Strategic Orientation-Performance Relationship: Examination of its Enabling and Disenabling Boundary Conditions. Journal of Business Research, 69(11), 5046–5052. https://doi.org/10.1016/j.jbusres.2016.04.078

Carneiro, J., Farias, I., da Rocha, A., and da Silva, J. F. (2016). How to Measure Export Performance? Scholars' vs. Practitioners' Answers. Journal of Business Research, 69(2), 410–417. https://doi.org/10.1016/j.jbusres.2015.06.046

Cavicchi, C., Oppi, C., and Vagnoni, E. (2022). Energy Management to Foster Circular Economy Business Model for Sustainable Development in an Agricultural SME. Journal of Cleaner Production, 368, 133188. https://doi.org/10.1016/j.jclepro.2022.133188

Cavusgil, S. T., and Zou, S. (1994). Marketing Strategy-Performance Relationship: An Investigation of the Empirical Link in Export Market Ventures. Journal of Marketing, 58(1), 1–21. https://doi.org/10.1177/002224299405800101

Cheah, J. H., Sarstedt, M., Ringle, C. M., Ramayah, T., and Ting, H. (2018). Convergent Validity Assessment of Formatively Measured Constructs in PLS-SEM: On Using Single-Item Versus Multi-Item Measures in Redundancy Analyses. International Journal of Contemporary Hospitality Management, 30(11), 3192–3210. https://doi.org/10.1108/IJCHM-10-2017-0649

Chembessi, C., Beaurain, C., and Cloutier, G. (2022). Analyzing Technical and Organizational Changes in the Circular Economy (CE) Implementation with a TOE Framework: Insights from a CE Project of Kamouraska (Quebec). Circular Economy and Sustainability, 2(3), 915–936. https://doi.org/10.1007/s43615-021-00140-y

Chen, Y. S., Lai, S. B., and Wen, C. T. (2006). The Influence of Green Innovation Performance on Corporate Advantage in Taiwan. Journal of Business Ethics, 67, 331–339. https://doi.org/10.1007/s10551-006-9025-5

Chien, M. K. (2014). Influences of Green Supply Chain Management Practices on Organizational Sustainable Performance. International Journal of Environmental Monitoring and Protection, 1(1), 12–23. https://doi.org/10.1115/1.860281_ch4

Commoner, B. (2020). The Closing Circle: Nature, Man, and Technology. Courier Dover Publications.

Demirci, U. (2014). Green Supply Chain Management Case: Turkish Automotive Industry by Practices, Pressures and Performance [Doctoral Dissertation].

Desing, H., Brunner, D., Takacs, F., Nahrath, S., Frankenberger, K., and Hischier, R. (2020). A Circular Economy Within the Planetary Boundaries: Towards a Resource-Based, Systemic Approach. Resources, Conservation and Recycling, 155, 104673. https://doi.org/10.1016/j.resconrec.2019.104673

Diab, S. M., Al-Bourini, F. A., and Abu-Rumman, A. H. (2015). The Impact of Green Supply Chain Management Practices on Organizational Performance: A Study of Jordanian Food Industries. Journal of Management and Sustainability, 5, 149. https://doi.org/10.5539/jms.v5n1p149

Đorđević, D., Bakator, M., Ćoćkalo, D., Đorđević, L., and Bogetić, S. (2021). Improving Competitiveness Through the Circular Economy Model. Engineering Management and Competitiveness (EMC 2021), 207.

Dvorský, J., Bednarz, J., and Blajer-Gołębiewska, A. (2023). The Impact of Corporate Reputation and Social Media Engagement on the Sustainability of SMEs: Perceptions of Top Managers and the Owners. Equilibrium. Quarterly Journal of Economics and Economic Policy, 18(3), 779–811. https://doi.org/10.24136/eq.2023.025

Environmental Performance Index. (2018). Environmental Performance Index. Yale University.

Geissdoerfer, M., Morioka, S. N., de Carvalho, M. M., and Evans, S. (2018). Business Models and Supply Chains for the Circular Economy. Journal of Cleaner Production, 190, 712–721. https://doi.org/10.1016/j.jclepro.2018.04.159

Geng, Y., Sarkis, J., and Bleischwitz, R. (2019). How to Globalize the Circular Economy. Nature, 565(7738), 153–155. https://doi.org/10.1038/d41586-019-00017-z

Hair, J. F., Black, W. C., Babin, B. J., and Anderson, R. E. (2014). Multivariate Data Analysis (7th ed.). Pearson Education Limited.

Hair, J., Hollingsworth, C. L., Randolph, A. B., and Chong, A. Y. L. (2017). An Updated and Expanded Assessment of PLS-SEM in Information Systems Research. Industrial Management and Data Systems, 117(3), 442–458. https://doi.org/10.1108/IMDS-04-2016-0130

Hasan, M. (2013). Sustainable Supply Chain Management Practices and Operational Performance [Master's thesis]. https://doi.org/10.4236/ajibm.2013.31006

Henrique da Rocha Vencato, C., Maffini Gomes, C., Luciane Scherer, F., Marques Kneipp, J., and Schoproni Bichueti, R. (2014). Strategic Sustainability Management and Export Performance. Management of Environmental Quality: An International Journal, 25(4), 431–445. https://doi.org/10.1108/MEQ-02-2013-0014

Jagoda, A., Kolakowski, T., Marcinkowski, J., Cheba, K., and Hajdas, M. (2023). E-Customer Preferences on Sustainable Last Mile Deliveries in the E-Commerce Market: A Cross-Generational Perspective. Equilibrium. Quarterly Journal of Economics and Economic Policy, 18(3), 853–882. https://doi.org/10.24136/eq.2023.027

Jordan Chamber of Industry. (2014). JoEconomy 2014.

Jordan Investment Commission. (2018). Jordan Investment Commission Portal.

Katsikeas, C. S., Leonidou, L. C., and Morgan, N. A. (2000). Firm-Level Export Performance Assessment: Review, Evaluation, and Development. Journal of the Academy of Marketing Science, 28(4), 493–511. https://doi.org/10.1177/0092070300284003

Kirchherr, J., Yang, N. H. N., Schulze-Spüntrup, F., Heerink, M. J., and Hartley, K. (2023). Conceptualizing the Circular Economy (Revisited): An Analysis of 221 Definitions. Resources, Conservation and Recycling, 194, 107001. https://doi.org/10.1016/j.resconrec.2023.107001

Kline, R. B. (2011). Convergence of Structural Equation Modeling and Multilevel Modeling. In The SAGE Handbook of Innovation in Social Research Methods (pp. 562–589). SAGE Publications. https://doi.org/10.4135/9781446268261.n31

Korhonen, J., Honkasalo, A., and Seppälä, J. (2018). Circular Economy: The Concept and Its Limitations. Ecological Economics, 143, 37–46. https://doi.org/10.1016/j.ecolecon.2017.06.041

Kristoffersen, E., Mikalef, P., Blomsma, F., and Li, J. (2021). The Effects of Business Analytics Capability on Circular Economy Implementation, Resource Orchestration Capability, and Firm Performance. International Journal of Production Economics, 239, 108205. https://doi.org/10.1016/j.ijpe.2021.108205

Kung, F. H., Huang, C. L., and Cheng, C. L. (2012). Assessing the Green Value Chain to Improve Environmental Performance: Evidence from Taiwan's Manufacturing Industry. International Journal of Development Issues, 11(2), 111–128. Https://Doi.Org/10.1108/14468951211241119

Le, T. T., Behl, A., and Pereira, V. (2024). Establishing Linkages Between Circular Economy Practices and Sustainable Performance: The Moderating Role of Circular Economy Entrepreneurship. Management Decision, 62(8), 2340–2363. https://doi.org/10.1108/MD-02-2022-0150

Marrucci, L., Daddi, T., and Iraldo, F. (2022). The Circular Economy, Environmental Performance, and Environmental Management Systems: The Role of Absorptive Capacity. Journal of Knowledge Management, 26(8), 2107–2132. https://doi.org/10.1108/JKM-06-2021-0437

Mazzucchelli, A., Chierici, R., Del Giudice, M., and Bua, I. (2022). Do Circular Economy Practices Affect Corporate Performance? Evidence from Italian Large-Sized Manufacturing Firms. Corporate Social Responsibility and Environmental Management, 29(6), 2016–2029. https://doi.org/10.1002/csr.2298

Małys, Ł. (2023). The Approach to Supply Chain Cooperation in the Implementation of Sustainable Development Initiatives and The Company's Economic Performance. Equilibrium. Quarterly Journal of Economics and Economic Policy, 18(1), 255–286. https://doi.org/10.24136/eq.2023.008

McDonough, W., and Braungart, M. (2010). Cradle to Cradle: Remaking the Way We Make Things. North Point Press.

Mitra, S., and Datta, P. P. (2014). Adoption of Green Supply Chain Management Practices and Their Impact on Performance: An Exploratory Study of Indian Manufacturing Firms. International Journal of Production Research, 52(7), 2085–2107. https://doi.org/10.1080/00207543.2013.849014

Mitrović, Đ., and Veselinov, M. (2018). Measuring a Country's Competitiveness in Circular Economy—Composite Index Approach. Quantitative Models in Economics, 417–436.

Nadeem, S. P., Garza-Reyes, J. A., and Glanville, D. (2018). The Challenges of the Circular Economy. In Contemporary Issues in Accounting: The Current Developments in Accounting Beyond the Numbers (pp. 37–60). Springer. https://doi.org/10.1007/978-3-319-91113-7_3

Ncube, A., Fiorentino, G., Panfilo, C., De Falco, M., and Ulgiati, S. (2024). Circular Economy Paths in The Olive Oil Industry: A Life Cycle Assessment Look Into Environmental Performance and Benefits. The International Journal of Life Cycle Assessment, 29(8), 1541–1561. https://doi.org/10.1007/s11367-022-02031-2

Nishitani, K. (2011). An Empirical Analysis of the Effects on Firms' Economic Performance of Implementing Environmental Management Systems. Environmental and Resource Economics, 48, 569–586. https://doi.org/10.1007/s10640-010-9404-3

Nishitani, K., Kokubu, K., Wu, Q., Kitada, H., Guenther, E., and Guenther, T. (2022). Material Flow Cost Accounting (MFCA) for the Circular Economy: An Empirical Study of the Triadic Relationship Between MFCA, Environmental Performance, and the Economic Performance of Japanese companies. Journal of Environmental Management, 303, 114219. https://doi.org/10.1016/j.jenvman.2021.114219

Oberle, B., Bringezu, S., Hatfield-Dodds, S., Hellweg, S., Schandl, H., and Clement, J. (2019). Global Resources Outlook: 2019. International Resource Panel, United Nations Environment Programme.

Ogutu, H., El Archi, Y., and Dénes Dávid, L. (2023). Current Trends in Sustainable Organization Management: A Bibliometric Analysis. Oeconomia Copernicana, 14(1), 11–45. https://doi.org/10.24136/oc.2023.001

Pizzi, S., Leopizzi, R., and Caputo, A. (2022). The Enablers in the Relationship Between Entrepreneurial Ecosystems and the Circular Economy: The Case of Circularity.Com. Management of Environmental Quality: An International Journal, 33(1), 26–43. https://doi.org/10.1108/MEQ-01-2021-0011

Primc, K., Kalar, B., Slabe-Erker, R., Dominko, M., and Ogorevc, M. (2020). Circular Economy Configuration Indicators in Organizational Life Cycle Theory. Ecological Indicators, 116, 106532. https://doi.org/10.1016/j.ecolind.2020.106532

Rahaman, M. A., Amin, M. B., Taru, R. D., Ahammed, M. R., and Rabbi, M. F. (2023). An Analysis of Renewable Energy Consumption in Visegrád Countries. Environmental Research Communications, 5(10), 105013. https://doi.org/10.1088/2515-7620/acff40

Rao, P. (2002). Greening the Supply Chain: A New Initiative in South East Asia. International Journal of Operations and Production Management, 22(6), 632–655. https://doi.org/10.1108/01443570210427668

Rehman, F. U., Gyamfi, S., Rasool, S. F., Akbar, F., Hussain, K., and Prokop, V. (2023). The Nexus Between Circular Economy Innovation, Market Competitiveness, and Triple Bottom Lines Efficiencies Among SMEs: Evidence from Emerging Economies. Environmental Science and Pollution Research, 30(58), 122274–122292. https://doi.org/10.1007/s11356-023-30956-0

Schijven, M., and Jakimowicz, J. (2003). Construct Validity. Surgical Endoscopy and Other Interventional Techniques, 17(5), 803–810. https://doi.org/10.1007/s00464-002-9151-9

Schöggl, J. P., Stumpf, L., and Baumgartner, R. J. (2024). The Role of Inter-Organizational Collaboration and Digital Technologies in the Implementation of Circular Economy Practices: Empirical Evidence from Manufacturing Firms. Business Strategy and the Environment, 33(3), 2225–2249. https://doi.org/10.1002/bse.3593

Sekaran, U., and Bougie, R. (2016). Research Methods for Business: A Skill Building Approach (7th ed.). John Wiley and Sons.

Sfez, S., De Meester, S., Vlaeminck, S. E., and Dewulf, J. (2019). Improving the Resource Footprint Evaluation of Products Recovered from Wastewater: A Discussion on Appropriate Allocation in the Context of the Circular Economy. Resources, Conservation and Recycling, 148, 132–144. https://doi.org/10.1016/j.resconrec.2019.03.029

Shebanin, V., Shebanina, E., Kormyshkin, Y., Drobitko, A., and Potryvaieva, N. (2024). Circular Economy of the Agricultural Sector: Strategies and Challenges in the Context of Globalization. Oeconomia Copernicana, 15(1). https://doi.org/10.48077/scihor9.2024.148

Shevchenko, T., Saidani, M., Ranjbari, M., Kronenberg, J., Danko, Y., and Laitala, K. (2023). Consumer Behavior in the Circular Economy: Developing a Product-Centric Framework. Journal of Cleaner Production, 384, 135568. https://doi.org/10.1016/j.jclepro.2022.135568

Spanos, G. (2016). Organization and Export Performance. Economics Letters, 146, 130–134. https://doi.org/10.1016/j.econlet.2016.07.031

Stahel, W. R. (2016). The Circular Economy. Nature, 531(7595), 435–438. https://doi.org/10.1038/531435a

Tang, Y. M., Chau, K. Y., Fatima, A., and Waqas, M. (2022). Industry 4.0 Technology and Circular Economy Practices: Business Management Strategies for Environmental Sustainability. Environmental Science and Pollution Research, 29(33). https://doi.org/10.1007/s11356-022-19081-6

Ural, T. (2009). The Effects of Relationship Quality on Export Performance: A Classification of Small and Medium-Sized Turkish Exporting Firms Operating in Single Export-Market Ventures. European Journal of Marketing, 43(1/2), 139–168. https://doi.org/10.1108/03090560910923274

Velasco-Muñoz, J. F., Aznar-Sánchez, J. A., López-Felices, B., and Román-Sánchez, I. M. (2022). Circular Economy in Agriculture: An Analysis of the State of Research Based on the Life Cycle. Sustainable Production and Consumption, 34, 257–270. https://doi.org/10.1016/j.spc.2022.09.017

Villena Manzanares, F., and Souto Pérez, J. E. (2016). Sustainability, Innovative Orientation and Export Performance of Manufacturing SMEs: An Empirical Analysis of the Mediating Role of Corporate Image. Business Strategy and the Environment, 25(7), 512–522. https://doi.org/10.3926/jiem.1532

Walls, J. L., Berrone, P., and Phan, P. H. (2012). Corporate Governance and Environmental Performance: Is there a Link? Strategic Management Journal, 33(8), 885–913. https://doi.org/10.1002/smj.1952

Zhu, Q., Sarkis, J., and Lai, K. H. (2013). Institutional-Based Antecedents and Performance Outcomes of Internal and External Green Supply Chain Management Practices. Journal of Purchasing and Supply Management, 19(2), 106–117. https://doi.org/10.1016/j.pursup.2012.12.001