

Corporate social responsibility and sustainability practices: mediating effect of green innovation and moderating effect of knowledge management in the manufacturing sector

Corporate
social
responsibility

1369

Received 10 February 2023
Revised 18 July 2023
6 August 2023
Accepted 7 August 2023

Moza Saeed Alketbi

Management Department, College of Business, Abu Dhabi University, Abu Dhabi, United Arab Emirates, and

Syed Zamberi Ahmad

Dubai Business School, University of Dubai, Dubai, United Arab Emirates

Abstract

Purpose – This study aims to examine the roles of corporate social responsibility (CSR), green innovation (GI) and knowledge management (KM) in boosting sustainable practices (SPs). It also investigates the mediating effect of green innovation and the moderating effect of KM in the relationship between CSR and SPs.

Design/methodology/approach – Using measurement scales adapted from existing studies, a quantitative methodology with causal and deductive reasoning was used on data from an online survey with 322 respondents in manufacturing firms in the United Arab Emirates.

Findings – There was no direct significant positive relationship between CSR and SPs; the mediating role of GI was evident, whereas the moderating role of KM was not present.

Research limitations/implications – Only manufacturing enterprises are considered in this study, with a single geographical case study highlighting CSR efforts.

Practical implications – The findings reveal the positive influence of GI on CSR and SPs. This study contributes to the understanding of the influence of green processes and product innovation on applying social, environmental and sustainability practices to enhance the overall productivity, compliance, performance and well-being of the community.

Originality/value – This study collectively explores the causal relationships between these factors, besides offering new insights into the manufacturing industry in an emerging market.

Keywords Corporate social responsibility, Sustainable practices, Green innovation, Knowledge management, Manufacturing industry, United Arab Emirates

Paper type Research paper



1. Introduction

Social responsibility has gained significant attention because of increasing stakeholder expectations. Tien Thanh *et al.* (2023) and Padilla-Lozano and Collazzo (2021) argue that manufacturing firms should prioritise the implementation of socially responsible practices to achieve long-term success through enhanced brand image and reputation, improved

bottom line and profits, lower operating costs, increased customer and employee retention and higher compliance. Awareness of businesses' intentions to earn profits has increased, while social and environmental needs have been ignored. Thus, ensuring a balance across organisations' triple bottom lines is crucial for improving companies' commitment to developing a wide range of sustainable practices (SPs). It is important that such practices consider stakeholder interests and expectations (Tien Thanh *et al.*, 2023).

Global health emergencies, such as the COVID-19 pandemic, have drawn attention to the strong linkage between the environment and health and the importance of proactively addressing these connections (World Bank, 2022). The effects of the pandemic on human health are increasing due to air pollution, which is a risk factor. The Global Burden of Disease report (2019) estimated that air pollution cost the world \$8.1tn in 2019, which was 6.1% of the gross domestic product (GDP). In low- and middle-income countries, 95% of the deaths are attributed to air pollution. Addressing the negative impacts of pollution on human capital, health and GDP is critical. SPs offer solutions that can end poverty, increase shared wealth and meet the urgent needs of millions of people, thereby leading to healthier and more productive lives.

The implementation of socially responsible activities and their impact on the manufacturing sector have been extensively studied (Bux *et al.*, 2020; Erinos and Yurniwati, 2018). Various internal factors, such as green innovation (GI) and knowledge management (KM), have been noted to impact the implementation of corporate social responsibility (CSR) and sustainability, as evidenced by previous researchers (Asadi *et al.*, 2020; Dawar and Singh, 2023; Shahzad *et al.*, 2020; Ling, 2019; Martins *et al.*, 2019). However, research in the United Arab Emirates (UAE) is limited. Duthler and Dhanesh (2018) and Farouk and Jabeen (2018) confirm the importance of adopting socially responsible practices in manufacturing firms in the UAE. However, there are gaps in the existing body of knowledge because studies exploring these variables together are limited to the country's manufacturing sector. The compulsory *Estidama*, a sustainable development program in the UAE, was chosen to implement plans for sustainable cities. One aspect is the mandatory sustainable development program, which is a critical element of the country's vision for 2030 and offers the highest green standards for design, management, sustainable construction and community. It was one of the first Middle Eastern initiatives intended to achieve the sustainable development objectives outlined in the United Nations' Vision for 2030 (Krzymowski, 2020). This vision has emerged as a roadmap for success, implying that organisations' commitment to developing CSR initiatives is the key to their competitiveness and improved performance. The country has a solid agenda for sustainable development, with a focus on ensuring excellence in its implementation.

The manufacturing industry in the UAE was reported to contribute 10% of the GDP in the non-oil sector in 2020 (World Bank, 2022). This is expected to grow at a faster rate, owing to friendly policies and a favourable environment. Therefore, the manufacturing sector should actively work towards achieving sustainability through the effective implementation of CSR activities (Duthler and Dhanesh, 2018). This study was necessitated by the manufacturing sector's importance to the country's GDP and the country's desire to ascend the global value chain in support of achieving this long-term vision. However, rising industrial productivity frequently comes at the expense of environmental impact and social value (World Bank, 2022). This widespread trade-off appears to be challenging because of the emergence of ecologically minded entrepreneurs in the manufacturing industry in the UAE. This study attempts to bridge this gap by examining the influence of CSR on SPs in the manufacturing industry in a growing market setting by evaluating empirical evidence

from the UAE (Duthler and Dhanesh, 2018). Moreover, it investigates the mediating and moderating roles of GI and KM. The main question in this study is:

- Q1. What is the impact of CSR on SPs, and how does GI mediate and KM moderate this relationship?

The emphasis is on recognising the key contribution of sustainable development in the manufacturing context (Lin *et al.*, 2020). Little attention has been paid to the role of GI and KM in improving organisations' CSR orientations in the UAE. Therefore, this study addresses this gap and enriches literature on CSR practices by providing relevant information on the sustainable performance of UAE manufacturing companies.

This study contributes to the in-depth understanding of the moderating effect of KM and the mediating effect of GI on the correlation between CSR and SPs in emerging market manufacturing. Thus, researchers, policymakers and other key stakeholders in the UAE manufacturing sector will be adequately equipped with sufficient information to incorporate GI and KM and achieve specific CSR objectives. Moreover, the conclusions derived from this study provide a solid theoretical foundation for developing and using effective practical strategies to enhance the CSR profiles of different manufacturing companies in the UAE.

2. Literature review and hypotheses development

2.1 *Dynamic capabilities theory*

The dynamic capabilities (DC) theory argues that organisational capabilities should be maintained and updated according to environmental changes (Teece, 2014). As organisations address the environmental aspects, appropriate strategies should be formulated to build and reconfigure internal and external capabilities for continued success. The DC theory submits firms that adjust their resources according to changing requirements (Sabahi and Parast, 2020). Previous studies have proposed alternative perspectives regarding how the DC theory affects the internality and sufficiency of firms' resource use (Nayak *et al.*, 2020; Valdez-Juarez *et al.*, 2021). Knowledge, technology and workforce are viewed as unique as they are upgraded and improved with time and strategy (Shamim *et al.*, 2019). The study by Vu (2020) focuses on a thorough investigation of how the DC theory is applied to enhance stakeholders' innovation and entrepreneurial capabilities. Vu (2020) also proposes a promising conceptual model to establish relevant links between the variables identified in this study. The theory of Vu (2020) is applicable to this study because the roles of knowledge and innovation are imperative in implementing CSR and adopting sustainability, as required by government laws and regulations. However, previous studies exploring the practical implications of the DC theory place less emphasis on using a firm's capabilities in implementing appropriate CSR practices (Valdez-Juarez *et al.*, 2021). In this context, optimising the DC orientation of manufacturing organisations may be a relevant solution.

2.2 *Corporate social responsibility*

CSR generally refers to the activities performed by organisations that have a positive social impact (Barnett *et al.*, 2020; Lin *et al.*, 2020). Modern perspectives on profit-making also consider the varied roles of organisations, including the wider impact on society (Xia *et al.*, 2018). Moreover, stakeholder expectations are continuously increasing, requiring firms to become active in areas that were not previously considered important. CSR is accepted and acknowledged as a management concept by which organisations coordinate environmental and social concerns in their business activities and collaborate with interested parties (Fukuda and Ouchida, 2020). This concept has been discussed in terms of its visibility and

authenticity (Jose *et al.*, 2018). Companies implement CSR initiatives, including reducing carbon footprints, purchasing from Fair Trade suppliers and engaging in philanthropic work (Yadav and Mankavil Kovil Veetil, 2022) to create a strong social impact. Nevertheless, organisations primarily aim to enhance their corporate image and gain greater customer trust and loyalty (Xia *et al.*, 2018). From this perspective, it is essential to indicate that the advantages of the CSR concept extend not only to organisations but also to society.

Models and types of CSR differ depending on organisations' strategic objectives, mission and vision. CSR activities are broadly categorised into four categories, namely, environmental, philanthropic, ethical and economic responsibilities (Khuong *et al.*, 2021). Environmental CSR ensures that firms provide adequate environmental protection (Xia *et al.*, 2018), thereby emphasising environmental initiatives to decrease pollution and emissions (Fukuda and Ouchida, 2020). Ethical CSR implies that businesses uphold specific moral values and ethical beliefs when interacting with key stakeholders (Lin *et al.*, 2020); ethical issues, ranging from gender equality and high minimum wages to better work–life balance, are discussed in organisations. Philanthropic CSR reflects the specific causes that businesses pursue to have a strong impact on different communities (Lin *et al.*, 2020); for instance, helping refugees in a war-torn region or addressing poverty. Finally, economic-oriented CSR programs focus on the financial dimensions of the environmental, social and ethical initiatives pursued by organisations (Yadav and Mankavil Kovil Veetil, 2022). Along with achieving the financial objective of profitability, companies should emphasise the importance of adopting fair and transparent measures to benefit society and support the country's economy.

The CSR model is a self-regulating business model that enables organisations to become socially accountable to their stakeholders. This means that companies are conscious of the impact they have on the triple bottom line. As the application of the CSR concept is believed to emphasise the importance of GI in organisations, Padilla-Lozano and Collazzo (2021) recognise GI as a mediator in the link between CSR and competitiveness. Studies examining the implications of CSR and SP have recurred in the context of developed countries, particularly the United States and the United Kingdom. However, little research has been conducted for developing markets (Padilla-Lozano and Collazzo, 2021). Therefore, exploring the practical implications of CSR in an emerging economy such as the UAE provides substantial evidence of the universal dimensions of CSR concepts.

2.3 Sustainable practices

As organisations are inclined to over-use resources to achieve better returns, sustainability has gained attention as a way to meet existing needs while safeguarding the needs of future generations (Purvis *et al.*, 2019). Scarcity economics theory states that limited resources must be used responsibly to ensure that the needs of future generations are protected. Adoption of sustainability should focus on the three dimensions (i.e. social, economic and environmental) (Dhahri and Omri, 2018). The trade-offs among these dimensions may impact outcomes (Nagariya *et al.*, 2021; Kristensen and Mosgaard, 2020). For instance, efforts to achieve economic sustainability may negatively impact environmental sustainability because more resources are used but the risk of pollution is increased. SPs imply a high level of sustainability, prompting further progress in sustainable development (Nagariya *et al.*, 2021) and fulfilling their commitments to key stakeholders. Thus, the adoption of sustainability requires detailed analysis and an effective knowledge base to support all three dimensions.

2.3.1 Effect of corporate social responsibility on the development of sustainable practices. Sustainability involves reducing the harmful effects of business activities on society, the

economy and the environment to make resources available for future generations (Belas *et al.*, 2021). While CSR incorporates sustainability to establish wider relationships between firms and stakeholders, including society and the community (Christensen *et al.*, 2019), sustainability focuses on the complete value chain, from supply chain partners to customers. Both CSR and sustainability relate to compliance and long-term business needs; therefore, they support each other (Jain and Winner, 2016). When implemented consistently, CSR activities result in sustainability because CSR targets areas of overall improvement for society (Cowan and Guzman, 2020). Consequently, the following hypotheses were developed:

H1. CSR is positively correlated with the development of SPs in manufacturing organisations.

2.4 Green innovation

GI, an extension of innovation, involves creating new processes and using technologies that implement new and unique ideas to minimise negative environmental impacts, such as carbon footprint and pollution (Arici and Uysal, 2022; Sellitto, 2018). GI is directly linked to CSR and sustainability due to its aspect of environmental protection (Halder, 2019; Shahzad *et al.*, 2020; Wang, 2020). Environmental protection is a major requirement for CSR and sustainability, as business operations tend to negatively impact the environment and businesses are considered capable of reducing this impact through appropriate activities (Cheng, 2020). Various initiatives, such as wastewater treatment and recycling, can be adopted by organisations in unique and innovative ways to reduce negative environmental impacts.

2.4.1 *The mediating role of green innovation in the relationship between corporate social responsibility and sustainable practice.* CSR initiatives seek unique ways to reduce negative environmental impacts by using advanced technologies and innovative ideas to protect the environment in the long term, thus, promoting innovation culture in firms (Kraus *et al.*, 2020; Xie *et al.*, 2019). CSR activities also entail firms' environmental responsibilities through innovative activities that accomplish environmental sustainability goals (Satta *et al.*, 2019). The positive link between CSR and competitiveness, particularly in the manufacturing sector, necessitates the introduction of GI as a mediator of this relationship (Padilla-Lozano and Collazzo, 2021; Seman *et al.*, 2019; Wu *et al.*, 2018). Consequently, enhanced innovation leads to greater public visibility and corporate transparency. Moreover, evidence suggests that GI positively affects SP, implying that elements of environmental and organisational performance are part of SP (Shahzad *et al.*, 2021). As illustrated by Shahzad *et al.* (2021), developing optimal SPs is crucial for advancing GI across diverse organisational settings. Thus, the following hypotheses are proposed:

H2. CSR is positively linked with GI in manufacturing organisations.

H3. There is a significant positive relationship between GI and SPs.

H4. GI plays a strong mediating role in the relationship between CSR and SP.

2.5 Knowledge management

To meet their objectives, organisations require the creation, storage, exchange and utilisation of updated knowledge (Di Vaio *et al.*, 2021). Systematic processes including the timely availability of knowledge and knowledge sharing enable the workforce, management and leadership to benefit from this knowledge and perform their roles efficiently (Abdulmuhsin *et al.*, 2021; Farooq, 2018). As indicated by Schinzel (2018), responsible

leadership is directly associated with CSR activities, which, in turn, increase an organisation's KM capacity. As organisations exist in dynamic environments, with fierce competition, the role of KM cannot be undermined in enabling firms to achieve their goals (Abualoush *et al.*, 2018). The contribution of KM in implementing strategic initiatives is evidenced in literature through identification of environmental needs, comparison of these needs with organisational capabilities, enhancement of capabilities and working towards achieving goals (Zaim *et al.*, 2019). The three main dimensions of KM – accumulating, storing and sharing knowledge – should be incorporated in daily operations to improve sustainable performance (Schinzel, 2018) and competitiveness over time. Gonzalez-Ramos *et al.* (2023) notes that the interlinks between KM and CSR have been extensively explored considering the factor of innovation capability development. However, research on the utilisation of effective KM strategies is limited; therefore, the current study aims to undertake a more thorough exploration of the practical dimensions of KM as linked to CSR.

2.5.1 Knowledge management, corporate social responsibility and sustainable practices. CSR addresses various social, environmental and ethical aspects that require KM for efficient use of resources, enabling positive societal change (Espasandin-Bustelo *et al.*, 2020; Gangi *et al.*, 2018; Martins *et al.*, 2019). Moreover, CSR activities must be designed and implemented in accordance with innovative and creative ideas to achieve planned outcomes that require knowledge and information to succeed. According to Shafiee and Tabaeian (2021), KM has a strong moderating impact on organisations' CSR initiatives. Arguably, KM is crucial in ensuring that stakeholders have relevant access to knowledge that can be used to increase the competitiveness and sustainability of organisations (Liu *et al.*, 2022; Martins *et al.*, 2019). Thus, the study proposes the following hypothesis:

H5. KM plays a significant, moderating role in the relationship between CSR and SPs.

2.6 Conceptual framework

A review of the existing literature was conducted to create a conceptual framework for this study. The DC and KM theories underpin the frameworks that support the impact of capabilities, such as innovation and knowledge, on the achievement of organisational goals (i.e. CSR and sustainability). This study contributes to literature by empirically exploring the UAE's manufacturing industry and revealing key insights. This study also identifies the role of CSR in sustainability adoption, as underpinned by previous research. A comprehensive exploration of the CSR concept enhances the understanding of the moderating impacts of different variables such as GI and KM. This study also provides deeper insight into this area by exploring the mediating effect of GI and the moderating effect of KM on the relationship between CSR and sustainability adoption (see Figure 1).

3. Research methodology

This study used a quantitative methodology with causal and deductive reasoning. Quantitative methodology is appropriate as it allows for the statistical assessment of the relationships between CSR, SPs, GI and KM variables. Participants with management and administrative roles in manufacturing firms in the UAE were recruited for an online survey.

3.1 Variable measurement

Data normality, autocorrelation and heteroskedasticity tests were used to present statistically significant results. The data normality test ensured that the data set followed a normal distribution. The autocorrelation test presents specific measurements of the

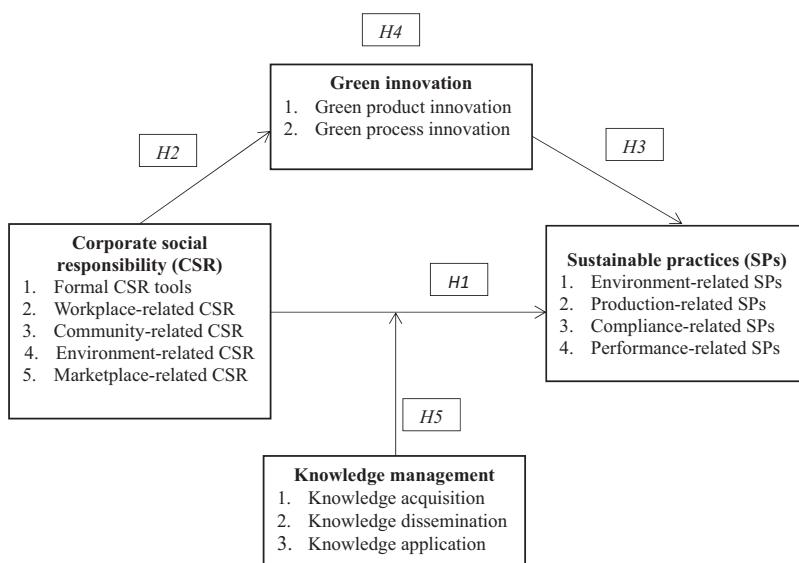


Figure 1.
Conceptual
framework

Source: Developed by Authors

observations made at various time points. Thus, relevant patterns or trends can be clearly identified. The heteroskedasticity test focuses on testing the variance in errors resulting from the regression analysis. Such errors may be related to the specific values of the independent variables used in this study. Measurement scales developed from existing scales were used because they allow for validated questions; a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) was used for each variable as follows:

- **CSR:** Following [Sang and Han \(2023\)](#), the scale is classified into five factors: formal CSR tools, environment-, community-, workplace- and marketplace-related CSR.
- **SPs:** The SPs scale was adapted from [Ibrahim *et al.* \(2020\)](#) and uses seven statements for factors related to the four dimensions: environment, production, compliance and performance.
- **GI:** The measurement scale for GI was adopted from [Chen \(2008\)](#). The scale is classified into two categories: green product innovation and green process innovation.
- **KM:** Following [Darroch \(2003\)](#), the KM measurement scale comprised 16 items classified into three factors: knowledge acquisition (six items), knowledge dissemination (five items) and knowledge application (five items).

[Table 1](#) lists the constructs, sources and measures for each construct.

3.2 Sample

Sample selection was conducted using purposive sampling by developing a selection criterion. Manufacturing companies in the UAE that adopted CSR were identified using directories and the Chamber of Commerce. The online survey was conducted using a survey

Table 1.
Construct
measurement
instrument

Construct	Source	Measures
Corporate social responsibility (CSR)	Sang and Han (2023)	CSR1. Does your organisation have an ISO 14001 certification? CSR2. Does your organisation have EMAS certification? CSR3. Does your organisation have ethics labels (SA8000 certification, OHSAS18001 certification, etc.)? CSR4. Is your organisation certified in other areas, like product certifications (Blauer Engel, Environmental Product Declaration, Ecolabel) or sectoral certifications (Oecotex)? CSR5. In the previous five years, have you prepared a social/sustainability annual report or an environmental annual report? CSR6. Does your organisation conduct internal environmental audits? CSR7. Does your organisation measure its impressions with environmental indicators? CSR8. Have you used raw materials that have a lower environmental impact? CSR9. In the last five years, have you created or adopted any codes of conduct or ethics? CSR10. Have you implemented employee benefits in the past five years (e.g. demands for part-time contracts, requests for individual work schedule flexibility, agreements with sporting and cultural institutions, partnerships with labour unions)? CSR11. Have you implemented sophisticated methods for employee assessment in the previous five years (e.g. processes for evaluating potential, balancing competencies)? CSR12. Have you participated in worldwide ethical and/or environmental efforts over the past five years (e.g. Accountability 1000, the Global Compact)? CSR13. Have you encouraged local community efforts during the past five years (e.g. funding for community projects, event sponsorship from associations or organisations in the area, opening doors)? CSR14. Have you established agreements and relationships with clients and vendors during the last five years to support ethical and/or environmentally friendly goods (e.g. joint marketing campaigns, manufacturing alliances)? CSR15. When selecting suppliers, do you consider the environmental compatibility of bought raw materials, auxiliary items or services? CSR16. When making purchasing decisions, do you consider if your suppliers hold ethical or environmental certifications (e.g. ISO14001, SA8000)? SP1. Energy saving is ensured in the manufacturing process SP2. Emissions are reduced in the manufacturing process SP3. Manufacturing and machine efficiency are increased SP4. Lean production processes are used SP5. Sustainable programs, standards or regulations are complied with SP6. Sustainable targets and objectives are developed SP7. Material flows or wastes are measured and inspected
Sustainable practices (SPs)	Ibrahim <i>et al.</i> (2020)	

(continued)

Construct	Source	Measures
Green innovation (GI)	Chen (2008)	GI1. The organisation conceives, designs, enhances and produces products using ecologically friendly materials GI2. For both new and old items, the organisation uses biodegradable packaging GI3. When designing new products and improving existing ones, the organisation considers how easily a certain product may be recycled, reused and degraded GI4. The organisation consumes fewer resources while creating, modifying and manufacturing products, and they use green product labelling GI5. The organisation uses fewer resources in the manufacturing process, such as water, electricity, coal and petroleum GI6. The organisation uses cleaner manufacturing technologies to conserve energy and stop the creation of pollutants GI7. The organisation can repurpose and recycle materials GI8. The organisation successfully cuts back on the release of hazardous materials and pollutants throughout the production process GI9. The organisation successfully cuts back on the consumption of raw materials during production
Knowledge management (KM)	Darroch (2003)	KM1. The organisation gives importance to employees' attitudes and opinions KM2. A well-developed financial reporting system exists KM3. Information regarding market developments is obtained KM4. The profile of science and technology human capital is maintained KM5. The organisation partners with international customers KM6. Market surveys are conducted by the firm KM7. Market information is made freely available KM8. On-the-job knowledge is provided KM9. Particular techniques are used to offer knowledge KM10. Technology is used for knowledge dissemination KM11. Written communication is preferred KM12. Customers respond using knowledge KM13. Marketing functions are supported by knowledge KM14. Technology is applied through knowledge KM15. Competitors are managed through knowledge KM16. Opportunities are leveraged and flexibility is ensured
Source: Developed by authors		

Table 1.

collection platform where the survey questionnaire was uploaded. The survey invitation and URL was sent to targeted industry professionals in the manufacturing industry through official emails, social media and professional online platforms such as LinkedIn from April to July 2022. This allowed participation of varied respondents, irrespective of their geographical location. Respondents who occupied management and administrative roles were selected because of their ability to offer insightful knowledge to their firms regarding CSR, SPs, GI and KM. From the data, 322 valid responses were identified, with a response rate of 91.21%. Majority of respondents were male (82.9%), with the most common age groups being 25–34 years (39.1%) and 35–44 years (34.5%). In terms of educational qualifications, 66.8% of the respondents ($N = 215$) indicated that they had a bachelor's degree. Most respondents reported being employed in the rubber and plastic (26.1%) and material recycling industries (18.3%). Those identified as working in the production department constituted 53.4% of the sample. Most respondents were from Sharjah (52.5%) (see [Table 2](#)).

3.3 Models

3.3.1 Measurement model. Principal component analysis was applied as part of the confirmatory factor analysis (CFA) to retain variables with a high correlation ([Yang et al., 2020](#)). The measurement model was developed using the pre-validated scales of CSR, SPs, GI and KM using the five-point Likert scale. To measure reliability, convergent validity was established through factor loadings, Cronbach's alpha scoring, a composite reliability of 0.6 and above ([Fornell and Larcker, 1981](#)) and the variables' average variance extracted (AVE) above 0.5 ([Clark and Watson, 2019](#); [Ab Hamid et al., 2017](#)). Discriminant validity, which measures the differentiation among variables, was established through the correlation coefficient strength among the variables and their AVE square root.

3.3.2 Structural model. A linear regression analysis using Hayes PROCESS macro v3.5 with Model 5 was applied to examine the indirect role of CSR on SPs through the mediator variable (i.e. GI). Both the direct and indirect effects of the mediator were measured ([Preacher and Hayes, 2008](#)).

4. Results

Statistical analysis was conducted on the survey data using IBM SPSS software version 25, with reliability testing using Cronbach's alpha. Model fit and construct validity were assessed using confirmatory factor analysis (CFA) and regression analysis with the Andrew Hayes plugin was used to examine the hypotheses.

4.1 Results for the measurement and structural models

As illustrated in [Table 3](#), the AVE for SPs was 0.441 before removing SP2, SP4, SP5 and SP7, with factor loadings of less than 0.7. This increased the AVE to 0.512. Similarly, the AVE for KM was 0.464, which led to the removal of KM4, KM5, KM6, KM11, KM12 and KM16, thereby increasing the AVE to 0.525.

The AVE square root of the variables was greater than the correlation strength of the constructs, indicating discriminant validity (see [Table 4](#)). The correlation between CSR and SPs was found to be positive and significant with moderate strength ($p < 0.01$; 0.542) and Cronbach's coefficients of 0.833 and 0.814 when higher than 0.7. Similarly, both CSR and GI and CSR and KM were significantly correlated ($p < 0.01$; 0.476 and 0.531, respectively), with Cronbach's coefficients of 0.893 for GI and 0.904 for KM.

There was an indirect effect of CSR on SPs through the mediator variable (i.e. GI). In addition, the moderator (i.e. KM) directly influenced the effect of CSR on SPs. [Table 5](#)

					Corporate social responsibility
Category	N	%	Mean	SD	
<i>Gender</i>					
Male	267	82.9	1.17	0.38	
Female	55	17.1			
<i>Age group</i>					
18–24	26	8.1	2.66	0.93	
25–34	126	39.1			
35–44	111	34.5			
45–54	51	15.8			
55 and above	8	2.5			
<i>Qualification</i>					
High school degree or equivalent	63	19.6	1.97	0.65	
Bachelor's degree	215	66.8			
Master's degree	38	11.8			
Doctorate degree	4	1.2			
Others	2	0.6			
<i>Working industry</i>					
Food, beverage and agricultural technology	25	7.7	2.59	0.52	
Pharmaceuticals	7	2.2			
Electrical equipment and electronics	21	6.5			
Petrochemicals and chemical products	8	2.5			
Rubber and plastics	84	26.1			
Machinery and equipment	41	12.7			
Materials recycling	59	18.3			
Medical technology	10	3.1			
Construction materials and refractories	13	4			
Paper and printing	19	5.9			
Renewable energy equipment	12	3.7			
Metal manufacturing	23	7.1			
Others	0	0			
<i>Current role</i>					
Investment department	10	3.1	2.25	0.71	
Production department	172	53.4			
Finance, sales and procurement	52	16.1			
Marketing department	15	4.6			
Customer service	40	12.4			
Technical department	25	7.7			
Human resources department	8	2.5			
Others	0	0			
<i>Emirate</i>					
Abu Dhabi	5	1.6	2.96	0.77	
Dubai	79	24.5			
Sharjah	169	52.5			
Ajman	65	20.2			
Ras Al Khaimah	3	0.9			
Fujairah	0	0			
Umm Al Quwain	1	0.3			

Source: Developed by authors

Table 2.
Demographic characteristics of respondents

Constructs	Item measurement	Loading	Composite reliability	Average variance extracted (AVE)	Square root of AVE	Cronbach's α
Corporate social responsibility (CSR)	CSR1	0.528	0.946	0.528	0.73	0.833
	CSR2	0.623				
	CSR3	0.807				
	CSR4	0.808				
	CSR5	0.601				
	CSR6	0.783				
	CSR7	0.832				
	CSR8	0.713				
	CSR9	0.738				
	CSR10	0.792				
	CSR11	0.668				
	CSR12	0.798				
	CSR13	0.743				
	CSR14	0.736				
	CSR15	0.69				
	CSR16	0.695				
Sustainable practices (SPs)	SP1	0.739	0.85	0.44 (0.512)	0.66	0.884 (0.814)
	SP2	0.645				
	SP3	0.703				
	SP4	0.629				
	SP5	0.684				
	SP6	0.703				
	SP7	0.525				
Green innovation (GI)	GI1	0.737	0.9	0.501	0.71	0.893
	GI2	0.791				
	GI3	0.694				
	GI4	0.651				
	GI5	0.753				
	GI6	0.726				
	GI7	0.69				
	GI8	0.607				
	GI9	0.706				
Knowledge management (KM)	KM1	0.72	0.932	0.464 (0.525)	0.68	0.934 (0.904)
	KM2	0.741				
	KM3	0.784				
	KM4	0.61				
	KM5	0.606				
	KM6	0.602				
	KM7	0.811				
	KM8	0.7				
	KM9	0.707				
	KM10	0.657				
	KM11	0.542				
	KM12	0.605				
	KM13	0.682				
	KM14	0.709				
	KM15	0.721				
	KM16	0.639				

Table 3.
Confirmatory factor
analysis

Source: Developed by authors

presents the results. Regression statistics revealed a positive yet insignificant effect of CSR on SPs ($\beta = 0.0808$, $p = 0.207$) (*H1*), whereas CSR had a positive and significant effect on GI ($\beta = 0.2567$, $p < 0.05$) (*H2*).

The direct impact of the mediator (i.e. GI) on SPs was positive and significant ($\beta = 0.1854$, $p < 0.05$), while the indirect effect of GI on the path of CSR to SPs was also positive and significant ($\beta = 0.0082$, $p < 0.05$) at the 95% confidence interval (*H3* and *H4*). This indicates that the inclusion of GI has a positive and significant effect on the relationship between CSR and SPs in manufacturing companies in the UAE. The direct effect caused by the moderator (i.e. KM) on SPs was shown to be positive and significant ($\beta = 0.1758$, $p = 0.042$); however, the indirect effect caused by KM on the relationship between CSR and SPs was negative and insignificant ($\beta = -0.0015$, $p = 0.29$) (*H5*). This indicates that KM had no significant moderating influence on the relationship between CSR and SPs.

5. Discussion

This study investigated the concept of CSR by examining the contributing linkages between CSR, SPs, GI and KM from the perspective of the UAE manufacturing industry. The findings on the relationship between CSR on SPs (*H1*) were consistent with previous literature that found a positive yet insignificant impact of CSR on SPs (Cowan and Guzman, 2020; Christensen *et al.*, 2019; Sang and Han, 2023). Sustainability is included in CSR; therefore, broader connections can be established between the company and its

	CSR	SPs	GI	KM	Average variance extracted (AVE)	AVE square root
Corporate social responsibility (CSR)	1				0.528	0.727
Sustainable practices (SPs)	0.542**	1			0.512	0.715
Green innovation (GI)	0.476**	0.744**	1		0.501	0.708
Knowledge management (KM)	0.531**	0.683**	0.638**	1	0.525	0.724

Note: ** Illustrates the precise level of the statistical significance of a regression coefficient

Source: Developed by authors

Table 4.
Discriminant validity
of the constructs

Hypothesis	Path	β	p -Value	Supported (yes/no)
<i>H1</i>	CSR $\rightarrow$ SP	0.0808	0.207	No
<i>H2</i>	CSR $\rightarrow$ GI	0.2567	<0.05	Yes
<i>H3</i>	GI $\rightarrow$ SP	0.1854	<0.05	Yes
<i>H4</i>	CSR $\rightarrow$ GI	0.2567	<0.05	Yes
Mediator	CSR (GI) $\rightarrow$ SP	0.0082	<0.05	
<i>H5</i>	KM $\rightarrow$ SP	0.1758	0.042	Yes
Moderator	CSR $\times$ KM $\rightarrow$ SP	-0.0015	0.29	No

Notes: CSR is corporate social responsibility; SP is sustainable practice; GI is green innovation; KM is knowledge management; P illustrates the precise level of the statistical significance of a regression coefficient

Source: Developed by authors

Table 5.
Hypothesis testing

stakeholders, such as society and the community. Long-term CSR initiatives lead to the acceptance of sustainability because they focus on societal improvement (Sang and Han, 2023). How manufacturing companies in the UAE incorporate the CSR concept to deliver optimal outcomes that will benefit key stakeholders in the industry is important (Yadav and Mankavil Kovil Veetil, 2022). A better symbiosis of theory and practice is needed to guide organisational leaders in developing and implementing fully optimised CSR practices.

The findings show a significant, positive coefficient on the relationship between CSR and GI ($H2$), which is supported by previous studies stating that CSR programs decrease negative environmental effects by leveraging innovative technology and fresh concepts, leading to long-term environment preservation. It has been observed that CSR has a positive effect on organisational performance simply because companies focus on maintaining the continuity of the process (Wu *et al.*, 2018). Thus, GI has a strong mediating effect on the link between CSR and organisational performance (Novitasari and Tarigan, 2022). CSR fosters a culture of innovation that supports the development of green products and processes. CSR programmes highlight businesses' commitment to environmental responsibility through innovative projects that help them achieve environmental sustainability goals (Satta *et al.*, 2019; Xie *et al.*, 2019). The direct link between CSR and GI established in this study is helpful for manufacturing firms in the UAE to undertake diverse, innovative actions that could instil CSR principles into corporate culture.

Furthermore, we investigated the relationship between GI and SPs ($H3$), which was found to be both directly and significantly positive. This finding is supported by previous studies confirming that because GI is an endeavour towards environmental preservation through the production and implementation of innovative ideas, it is closely related to CSR and sustainability (Shahzad *et al.*, 2020; Wang, 2020). activities often have a harmful impact on the environment and organisations are considered capable of minimising their damage through appropriate actions, environmental protection is a critical need for CSR and sustainability (Cheng, 2020). Recognising the link between GI and SPs has practical implications for manufacturing companies in the UAE (Duthler and Dhanesh, 2018). Key stakeholders in these companies can better understand how the incorporation of innovation and sustainability into the manufacturing sector can revamp the overall structure of the organisational culture.

The findings demonstrated the mediating role of GI in the relationship between CSR and SPs ($H4$), which is consistent with previous studies that argue that GI is strongly tied to CSR and sustainability because it aims to preserve the environment through the creation and use of innovative ideas for green processes and products (Cheng, 2020; Shahzad *et al.*, 2020; Wang, 2020). In addition, the moderating role of KM in the relationship between CSR and SPs ($H5$) was negative. This is inconsistent with previous research by Ling (2019), who revealed that effective knowledge use enables implementation of strategic projects, such as CSR. Similarly, Gangi *et al.* (2018) noted that CSR covers a broad variety of topics, including environmental, social and ethical concerns, which require effective use of resources to effect societal change. KM enables development of CSR and the efficient use of resources (Espasandin-Bustelo *et al.*, 2020; Martins *et al.*, 2019). As emphasised by Hossain *et al.* (2022), KM is used as a mediating variable to understand the link between CSR and SP. Conclusively, the development of optimal CSR practices through corporate structure and culture depends on the introduction of a distinctive KM model in dynamic organisational settings (Hossain *et al.*, 2022).

6. Conclusion

In conclusion, CSR and SPs do not have a significantly positive relationship; thus, CSR has no direct impact on SPs in UAE manufacturing firms. This contradicts previous research

conducted in a non-UAE context, which confirmed the positive impact of CSR on SPs (Gangi *et al.*, 2018). However, the study confirms the mediating role of GI in CSR and SPs, revealing the positive role of GI in UAE manufacturing firms. The moderating role of KM was not confirmed in this study, unlike in previous studies. The pharmaceuticals, petrochemicals and chemical products sectors have been found to contribute less to sustainability because of low investments in GI and SPs (Ling, 2019). They need to increase their awareness of SPs to boost the productivity and profitability of businesses and reduce emissions, thereby benefiting the whole community (Hossain *et al.*, 2022). This study provides direction for manufacturing firms in the UAE on investing time, effort, energy and finances in CSR and SP initiatives.

7. Implications of this study

7.1 Practical and theoretical implications

Manufacturing organisations should encourage GI to enhance their CSR and SP outcomes. Businesses should focus on all elements of innovation for green products and processes, including waste management, energy conservation, pollution control and environmental management (Duthler and Dhanesh, 2018), while considering the development of various advanced technologies. Moreover, these organisations should be proactive in introducing various innovative projects to reduce negative impact on the environment (Jose *et al.*, 2018), thereby creating a competitive edge and additional value for key stakeholders. Sufficient research and development activities for identifying critical areas of improvement enhance the UAE manufacturing companies' specific CSR and SP objectives. Improving the CSR profile of these organisations is a long process involving efficient resource utilisation, collaboration between key stakeholders and coordination of policy objectives and CSR practices. Organisational leaders should focus on understanding the practical implications of CSR to bridge the gap between theory and practice. This means that key stakeholders in the manufacturing industry are expected to approach the concept of CSR more holistically by recognising the impact of different aspects, such as GI and KM (Lin *et al.*, 2020). In addition, it is important to adopt multiple perspectives to explain the link between GI and KM in the context of CSR. Surprisingly, KM was not found to moderate the relationship between CSR and SPs as opposed to findings in previous studies. This would guide manufacturing firms to avoid spending their capabilities on enhancing their KM to improve CSR and SPs (Liu *et al.*, 2022). This study provides evidence for the more efficient use of environmentally friendly resources, clean manufacturing technologies, increased operational efficiency, energy savings, emissions reduction and increased profitability. Furthermore, this study contributes to the understanding of the influence of green processes and product innovation on practices related to production, compliance, performance and the environment (Dawar and Singh, 2023). Through social, environmental and sustainability practices, CSR helps to establish an advanced culture that can produce new business models, goods and services, and improve the productivity of supply chains and organisations, ultimately enhancing the overall productivity and well-being of the community. However, a strong CSR culture requires substantial effort and resources to coordinate stakeholder activities across manufacturing organisations. These stakeholders should follow a well-developed strategic plan to achieve the initially discussed organisational objectives.

7.2 Limitations of the study

The survey focused on manufacturing companies in the UAE. Therefore, these results are not generalizable to the entire Gulf Cooperation Council, Middle East or developing world, presenting future research opportunities in other regions or markets. Moreover, the study

was required to evaluate GI as a mediator rather than as a general innovation strategy for mediating impact. Although it has been studied in rich economies, expanding the mediator function between CSR and SPs to a broader definition of innovation might provide pertinent potential for future studies in emerging markets. Similar studies should be conducted in other industries (e.g. banking and healthcare) in the UAE to obtain more robust results. Green supply chain management is another concept that might be included as it relates to business practices that aim to enhance interaction and collaboration with suppliers, stakeholders and customers, since CSR and GI are likely to result in implications and SPs when carried throughout the entire supply chain. Supplier selection, which aims to achieve more consistent environmental performance, and the implementation of joint improvement initiatives are among these approaches.

References

- Ab Hamid, M.R., Sami, W. and Sidek, M.M. (2017), "Discriminant validity assessment: use of Fornell and Larcker criterion versus HTMT criterion", *Journal of Physics: Conference Series*, Vol. 890 No. 1, p. 12163, doi: [10.1088/1742-6596/890/1/012163](https://doi.org/10.1088/1742-6596/890/1/012163).
- Abdulmuhsin, A.A., Zaker, R.A. and Asad, M.M. (2021), "How exploitative leadership influences on knowledge management processes: the moderating role of organizational citizenship behaviour", *International Journal of Organizational Analysis*, Vol. 29 No. 3, pp. 529-561, doi: [10.1108/IJOA-09-2020-2424](https://doi.org/10.1108/IJOA-09-2020-2424).
- Abualoush, S., Batatineh, K. and Alrowwad, A.A. (2018), "The role of knowledge management process and intellectual capital as intermediary variables between knowledge management infrastructure and organization performance", *Interdisciplinary Journal of Information, Knowledge, and Management*, Vol. 13, p. 279, doi: [10.28945/4088](https://doi.org/10.28945/4088).
- Arici, H.E. and Uysal, M. (2022), "Leadership, green innovation, and green creativity: a systematic review", *The Service Industries Journal*, Vol. 42 Nos 5/6, pp. 280-320, doi: [10.1080/02642069.2021.1964482](https://doi.org/10.1080/02642069.2021.1964482).
- Asadi, S., Pourhashemi, S.O., Nilashi, M., Abdullah, R., Samad, S., Yadegaridehkordi, E., Aljojo, N. and Razali, N.S. (2020), "Investigating influence of green innovation on sustainability performance: a case on Malaysian hotel industry", *Journal of Cleaner Production*, Vol. 258, p. 120860, doi: [10.1016/j.jclepro.2020.120860](https://doi.org/10.1016/j.jclepro.2020.120860).
- Barnett, M.L., Henriques, I. and Husted, B.W. (2020), "Beyond good intentions: designing CSR initiatives for greater social impact", *Journal of Management*, Vol. 46 No. 6, pp. 937-964, doi: [10.1177/0149206319900539](https://doi.org/10.1177/0149206319900539).
- Belas, J., Čera, G., Dvorský, J. and Čepel, M. (2021), "Corporate social responsibility and sustainability issues of small-and medium-sized enterprises", *Corporate Social Responsibility and Environmental Management*, Vol. 28 No. 2, pp. 721-730, doi: [10.1002/csr.2083](https://doi.org/10.1002/csr.2083).
- Bux, H., Zhang, Z. and Ahmad, N. (2020), "Promoting sustainability through corporate social responsibility implementation in the manufacturing industry: an empirical analysis of barriers using the ISM-MICMAC approach", *Corporate Social Responsibility and Environmental Management*, Vol. 27 No. 4, pp. 1729-1748, doi: [10.1002/csr.1920](https://doi.org/10.1002/csr.1920).
- Chen, Y. (2008), "The driver of green innovation and green image – green core competence", *Journal of Business Ethics*, Vol. 81 No. 3, pp. 531-543, doi: [10.1007/s10551-007-9522-1](https://doi.org/10.1007/s10551-007-9522-1).
- Cheng, C.C. (2020), "Sustainability orientation, green supplier involvement, and green innovation performance: evidence from diversifying green entrants", *Journal of Business Ethics*, Vol. 161 No. 2, pp. 393-414, doi: [10.1007/s10551-018-3946-7](https://doi.org/10.1007/s10551-018-3946-7).
- Christensen, H.B., Hail, L. and Leuz, C. (2019), "Adoption of CSR and sustainability reporting standards: economic analysis and review", *National Bureau of Economic Research*, Vol. 623, pp. 1-121.

- Clark, L.A. and Watson, D. (2019), "Constructing validity: new developments in creating objective measuring instruments", *Psychological Assessment*, Vol. 31 No. 12, p. 1412, doi: [10.1037/pas0000626](https://doi.org/10.1037/pas0000626).
- Cowan, K. and Guzman, F. (2020), "How CSR reputation, sustainability signals, and country-of-origin sustainability reputation contribute to corporate brand performance: an exploratory study", *Journal of Business Research*, Vol. 117, pp. 683-693, doi: [10.1016/j.jbusres.2018.11.017](https://doi.org/10.1016/j.jbusres.2018.11.017).
- Darroch, J. (2003), "Developing a measure of knowledge management behaviours and practices", *Journal of Knowledge Management*, Vol. 7 No. 5, pp. 41-54, doi: [10.1108/13673270310505377](https://doi.org/10.1108/13673270310505377).
- Dawar, G. and Singh, S. (2023), "Barriers to corporate social responsibility implementation in the medium size manufacturing sector: an interpretive structure modelling approach", *Journal of Entrepreneurship in Emerging Economies*, Vol. 15 No. 2, pp. 447-479, doi: [10.1108/JEEE-12-2020-0451](https://doi.org/10.1108/JEEE-12-2020-0451).
- Dhahri, S. and Omri, A. (2018), "Entrepreneurship contribution to the three pillars of sustainable development: what does the evidence really say?", *World Development*, Vol. 106, pp. 64-77, doi: [10.1016/j.worlddev.2018.01.008](https://doi.org/10.1016/j.worlddev.2018.01.008).
- Di Vaio, A., Palladino, R., Pezzi, A. and Kalisz, D.E. (2021), "The role of digital innovation in knowledge management systems: a systematic literature review", *Journal of Business Research*, Vol. 123, pp. 220-231, doi: [10.1016/j.jbusres.2020.09.042](https://doi.org/10.1016/j.jbusres.2020.09.042).
- Duthler, G. and Dhanesh, G.S. (2018), "The role of corporate social responsibility (CSR) and internal CSR communication in predicting employee engagement: perspectives from the United Arab Emirates (UAE)", *Public Relations Review*, Vol. 44 No. 4, pp. 453-462, doi: [10.1016/j.pubrev.2018.04.001](https://doi.org/10.1016/j.pubrev.2018.04.001).
- Erinos, N.R. and Yurniwati, Y. (2018), "Green intellectual capital and financial performance of manufacturing companies in Indonesia", *First Padang International Conference on Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA). 2018*, Atlantis Press, Vol. 57, pp. 613-618, doi: [10.2991/piceeba-18.2018.79](https://doi.org/10.2991/piceeba-18.2018.79).
- Espasandin-Bustelo, F., Palacios-Florencio, B. and Garcia, J.S.R. (2020), "CSR intellectual structure in management and tourism", *The TQM Journal*, Vol. 32 No. 3, pp. 521-541, doi: [10.1108/TQM-06-2019-0173](https://doi.org/10.1108/TQM-06-2019-0173).
- Farooq, R. (2018), "Developing a conceptual framework of knowledge management", *International Journal of Innovation Science*, Vol. 11 No. 1, pp. 139-160, doi: [10.1108/IJIS-07-2018-0068](https://doi.org/10.1108/IJIS-07-2018-0068).
- Farouk, S. and Jabeen, F. (2018), "Ethical climate, corporate social responsibility and organizational performance: evidence from the UAE public sector", *Social Responsibility Journal*, Vol. 14 No. 4, pp. 737-752, doi: [10.1108/SRJ-01-2017-0002](https://doi.org/10.1108/SRJ-01-2017-0002).
- Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50, doi: [10.2307/3151312](https://doi.org/10.2307/3151312).
- Fukuda, K. and Ouchida, Y. (2020), "Corporate social responsibility (CSR) and the environment: Does CSR increase emissions?", *Energy Economics*, Vol. 92, p. 104933, doi: [10.1016/j.eneco.2020.104933](https://doi.org/10.1016/j.eneco.2020.104933).
- Gangi, F., Mustilli, M. and Varrone, N. (2018), "The impact of corporate social responsibility (CSR) knowledge on corporate financial performance: evidence from the European banking industry", *Journal of Knowledge Management*, Vol. 23 No. 1, pp. 110-134, doi: [10.1108/JKM-04-2018-0267](https://doi.org/10.1108/JKM-04-2018-0267).
- Gonzalez-Ramos, M.I., Donate, M.J. and Guadamillas, F. (2023), "The interplay between corporate social responsibility and knowledge management strategies for innovation capability development in dynamic environments", *Journal of Knowledge Management*, Vol. 27 No. 11, pp. 59-81, doi: [10.1108/JKM-08-2022-0637](https://doi.org/10.1108/JKM-08-2022-0637).
- Haldar, S. (2019), "Towards a conceptual understanding of sustainability-driven entrepreneurship", *Corporate Social Responsibility and Environmental Management*, Vol. 26 No. 6, pp. 1157-1170, doi: [10.1002/csr.1763](https://doi.org/10.1002/csr.1763).
- Hossain, M.B., Nassar, S., Rahman, M.U., Dunay, A. and Illes, C.B. (2022), "Exploring the mediating role of knowledge management practices to corporate sustainability", *Journal of Cleaner Production*, Vol. 374, p. 133869, doi: [10.1016/j.jclepro.2022.133869](https://doi.org/10.1016/j.jclepro.2022.133869).

- Ibrahim, Y.M., Hami, N. and Abdulameer, S.S. (2020), "A scale for measuring sustainable manufacturing practices and sustainability performance: validity and reliability", *Quality Innovation Prosperity*, Vol. 24 No. 2, pp. 59-74, doi: [10.12776/QIP.V24I2.1385](https://doi.org/10.12776/QIP.V24I2.1385).
- Jain, R. and Winner, L.H. (2016), "CSR and sustainability reporting practices of top companies in India", *Corporate Communications: An International Journal*, Vol. 21 No. 1, pp. 36-55, doi: [10.1108/SRJ-03-2018-0078](https://doi.org/10.1108/SRJ-03-2018-0078).
- Jose, S., Khare, N. and Buchanan, F.R. (2018), "Customer perceptions of CSR authenticity", *International Journal of Organizational Analysis*, Vol. 26 No. 4, pp. 614-629, doi: [10.1108/IJOA-08-2017-1213](https://doi.org/10.1108/IJOA-08-2017-1213).
- Khuong, M.N., Truong An, N.K. and Thanh Hang, T.T. (2021), "Stakeholders and corporate social responsibility (CSR) Programme as key sustainable development strategies to promote corporate reputation-evidence from Vietnam", *Cogent Business and Management*, Vol. 8 No. 1, p. 1917333, doi: [10.1080/23311975.2021.1917333](https://doi.org/10.1080/23311975.2021.1917333).
- Kraus, S., Rehman, S.U. and García, F.J.S. (2020), "Corporate social responsibility and environmental performance: the mediating role of environmental strategy and green innovation", *Technological Forecasting and Social Change*, Vol. 160, p. 120262, doi: [10.1016/j.techfore.2020.120262](https://doi.org/10.1016/j.techfore.2020.120262).
- Kristensen, H.S. and Mosgaard, M.A. (2020), "A review of micro level indicators for a circular economy—moving away from the three dimensions of sustainability?", *Journal of Cleaner Production*, Vol. 243, p. 118531, doi: [10.1016/j.jclepro.2019.118531](https://doi.org/10.1016/j.jclepro.2019.118531).
- Krzyszowski, A. (2020), "Sustainable development goals in Arab region—United Arab Emirates' case study", *Problemy Ekorozwoju*, Vol. 15 No. 1, pp. 211-220.
- Lin, W.L., Ho, J.A., Chin, L. and Ng, S.I. (2020), "Impact of positive and negative corporate social responsibility on automotive firms' financial performance: a market-based asset perspective", *Corporate Social Responsibility and Environmental Management*, Vol. 27 No. 4, pp. 1761-1773, doi: [10.1002/csr.1923](https://doi.org/10.1002/csr.1923).
- Ling, Y.H. (2019), "Influence of corporate social responsibility on organizational performance: Knowledge management as moderator", *VINE Journal of Information and Knowledge Management Systems*, Vol. 49 No. 3, pp. 327-352, doi: [10.1108/VJIKMS-11-2018-0096](https://doi.org/10.1108/VJIKMS-11-2018-0096).
- Liu, J., Zhu, Y. and Yan, J. (2022), "Exploring the role of Guanxi in CSR performance and knowledge management of a stakeholder network: a case of iStone, China", *Psychology Research and Behavior Management*, Vol. 15, pp. 1665-1687, doi: [10.2147/PRBMS.368892](https://doi.org/10.2147/PRBMS.368892).
- Martins, V.W.B., Rampasso, I.S., Anholon, R., Quelhas, O.L.G. and Leal Filho, W. (2019), "Knowledge management in the context of sustainability: literature review and opportunities for future research", *Journal of Cleaner Production*, Vol. 229, pp. 489-500, doi: [10.1016/j.jclepro.2019.04.354](https://doi.org/10.1016/j.jclepro.2019.04.354).
- Nagariya, R., Kumar, D. and Kumar, I. (2021), "Enablers to implement sustainable practices in the service only supply chain: a case of an Indian hospital", *Business Process Management Journal*, Vol. 27 No. 5, pp. 1463-1495, doi: [10.1108/BPMJ-10-2020-0469](https://doi.org/10.1108/BPMJ-10-2020-0469).
- Nayak, A., Chia, R. and Canales, J.I. (2020), "Noncognitive microfoundations: understanding dynamic capabilities as idiosyncratically refined sensitivities and predispositions", *Academy of Management Review*, Vol. 45 No. 2, pp. 280-303, doi: [10.5465/amr.2016.0253](https://doi.org/10.5465/amr.2016.0253).
- Novitasari, M. and Tarigan, Z.J. (2022), "The role of green innovation in the effect of corporate social responsibility on firm performance", *Economies*, Vol. 10 No. 5, p. 117, doi: [10.3390/economies10050117](https://doi.org/10.3390/economies10050117).
- Padilla-Lozano, C.P. and Collazzo, P. (2021), "Corporate social responsibility, green innovation and competitiveness—causality in manufacturing", *Competitiveness Review: An International Business Journal*, Vol. 32 No. 7, pp. 21-39, doi: [10.1108/CR-12-2020-0160](https://doi.org/10.1108/CR-12-2020-0160).
- Preacher, K.J. and Hayes, A.F. (2008), "Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models", *Behavior Research Methods*, Vol. 40 No. 3, pp. 879-891, doi: [10.3758/BRM.40.3.879](https://doi.org/10.3758/BRM.40.3.879).
- Purvis, B., Mao, Y. and Robinson, D. (2019), "Three pillars of sustainability: in search of conceptual origins", *Sustainability Science*, Vol. 14 No. 3, pp. 681-695, doi: [10.1007/s11625-018-0627-5](https://doi.org/10.1007/s11625-018-0627-5).

-
- Sabahi, S. and Parast, M.M. (2020), "Firm innovation and supply chain resilience: a dynamic capability perspective", *International Journal of Logistics Research and Applications*, Vol. 23 No. 3, pp. 254-269, doi: [10.1080/13675567.2019.1683522](https://doi.org/10.1080/13675567.2019.1683522).
- Sang, Y. and Han, E. (2023), "A win-win way for corporate and stakeholders to achieve sustainable development: corporate social responsibility value co-creation scale development and validation", *Corporate Social Responsibility and Environmental Management*, Vol. 30 No. 3, pp. 1177-1190, doi: [10.1002/csr.2412](https://doi.org/10.1002/csr.2412).
- Satta, G., Spinelli, R. and Parola, F. (2019), "Is tourism going green? A literature review on green innovation for sustainable tourism", *Tourism Analysis*, Vol. 24 No. 3, pp. 265-280, doi: [10.3727/108354219X15511864843803](https://doi.org/10.3727/108354219X15511864843803).
- Schinzl, U. (2018), "Responsible leadership and corporate social responsibility (CSR) in Luxembourg", *International Journal of Organizational Analysis*, Vol. 26 No. 3, pp. 415-431, doi: [10.1108/IJOA-09-2017-1241](https://doi.org/10.1108/IJOA-09-2017-1241).
- Sellitto, M.A. (2018), "Assessment of the effectiveness of green practices in the management of two supply chains", *Business Process Management Journal*, Vol. 24 No. 1, pp. 23-48, doi: [10.1108/BPMJ-03-2016-0067](https://doi.org/10.1108/BPMJ-03-2016-0067).
- Seman, N.A., Govindan, K., Mardani, A., Zakuan, N., Saman, M.Z., Hooker, R.E. and Ozkul, S. (2019), "The mediating effect of green innovation on the relationship between green supply chain management and environmental performance", *Journal of Cleaner Production*, Vol. 229, pp. 115-127, doi: [10.1016/j.jclepro.2019.03.211](https://doi.org/10.1016/j.jclepro.2019.03.211).
- Shafiee, M.M. and Tabaeian, R.A. (2021), "Integrating knowledge-responsibility-performance via supplier relationship management", *International Journal of Integrated Supply Management*, Vol. 14 No. 4, pp. 445-466, doi: [10.1504/IJISM.2021.118566](https://doi.org/10.1504/IJISM.2021.118566).
- Shahzad, M., Qu, Y., Javed, S.A., Zafar, A.U. and Rehman, S.U. (2020), "Relation of environment sustainability to CSR and green innovation: a case of Pakistani manufacturing industry", *Journal of Cleaner Production*, Vol. 253, p. 119938, doi: [10.1016/j.jclepro.2019.119938](https://doi.org/10.1016/j.jclepro.2019.119938).
- Shahzad, M., Qu, Y., Zafar, A.U. and Appolloni, A. (2021), "Does the interaction between the knowledge management process and sustainable development practices boost corporate green innovation?", *Business Strategy and the Environment*, Vol. 30 No. 8, pp. 4206-4222, doi: [10.1002/bse.2865](https://doi.org/10.1002/bse.2865).
- Shamim, S., Zeng, J., Shariq, S.M. and Khan, Z. (2019), "Role of big data management in enhancing big data decision-making capability and quality among Chinese firms: a dynamic capabilities view", *Information and Management*, Vol. 56 No. 6, p. 103135, doi: [10.1016/j.im.2018.12.003](https://doi.org/10.1016/j.im.2018.12.003).
- Teece, D.J. (2014), "A dynamic capabilities-based entrepreneurial theory of the multinational enterprise", *Journal of International Business Studies*, Vol. 45 No. 1, pp. 8-37, doi: [10.1057/jibs.2013.54](https://doi.org/10.1057/jibs.2013.54).
- Tien Thanh, P., Thu Ha, N., Thi Hong Ngoc, P. and Thuy Ha, L.T. (2023), "Corporate social responsibility, corporate reputation and intention to apply for a job: evidence from students in an emerging economy", *International Journal of Organizational Analysis*, doi: [10.1108/IJOA-11-2022-3484](https://doi.org/10.1108/IJOA-11-2022-3484).
- Valdez-Juarez, L.E., Gallardo-Vazquez, D. and Ramos-Escobar, E.A. (2021), "Entrepreneurial orientation and CSR: a dynamic capability in the corporate performance of Mexican SMEs", *Entrepreneurship and Sustainability Issues*, Vol. 8 No. 3, pp. 654-680, doi: [10.9770/jesi.2021.8.3\(41\)](https://doi.org/10.9770/jesi.2021.8.3(41)).
- Vu, H.M. (2020), "A review of dynamic capabilities, innovation capabilities, entrepreneurial capabilities and their consequences", *The Journal of Asian Finance, Economics and Business*, Vol. 7 No. 8, pp. 485-494, doi: [10.13106/jafeb.2020.vol7.no8.485](https://doi.org/10.13106/jafeb.2020.vol7.no8.485).
- Wang, C.H. (2020), "An environmental perspective extends market orientation: green innovation sustainability", *Business Strategy and the Environment*, Vol. 29 No. 8, pp. 3123-3134, doi: [10.1002/bse.2561](https://doi.org/10.1002/bse.2561).

- World Bank (2022), "Manufacturing sector in UAE", available at: <https://data.worldbank.org/indicator/NV.IND.MANF.ZS?locations=AE> (accessed 12 April 2022).
- Wu, W., Liu, Y., Chin, T. and Zhu, W. (2018), "Will green CSR enhance innovation? A perspective of public visibility and firm transparency", *International Journal of Environmental Research and Public Health*, Vol. 15 No. 2, p. 268, doi: [10.3390/ijerph15020268](https://doi.org/10.3390/ijerph15020268).
- Xia, B., Olanipekun, A., Chen, Q., Xie, L. and Liu, Y. (2018), "Conceptualizing the state of the art of corporate social responsibility (CSR) in the construction industry and its nexus to sustainable development", *Journal of Cleaner Production*, Vol. 195, pp. 340-353, doi: [10.1016/j.jclepro.2018.05.157](https://doi.org/10.1016/j.jclepro.2018.05.157).
- Xie, X., Huo, J. and Zou, H. (2019), "Green process innovation, green product innovation, and corporate financial performance: a content analysis method", *Journal of Business Research*, Vol. 101, pp. 697-706, doi: [10.1016/j.jbusres.2019.01.010](https://doi.org/10.1016/j.jbusres.2019.01.010).
- Yadav, N. and Mankavil Kovil Veetil, N. (2022), "Developing a comprehensive business case for sustainability: an inductive study", *International Journal of Organizational Analysis*, Vol. 30 No. 6, pp. 1335-1358, doi: [10.1108/IJOA-04-2020-2146](https://doi.org/10.1108/IJOA-04-2020-2146).
- Yang, W., Zhao, Y., Wang, D., Wu, H., Lin, A. and He, L. (2020), "Using principal components analysis and IDW interpolation to determine spatial and temporal changes of surface water quality of Xin'anjiang river in Huangshan, China", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 8, p. 2942, doi: [10.3390/ijerph17082942](https://doi.org/10.3390/ijerph17082942).
- Zaim, H., Muhammed, S. and Tarim, M. (2019), "Relationship between knowledge management processes and performance: critical role of knowledge utilization in organizations", *Knowledge Management Research and Practice*, Vol. 17 No. 1, pp. 24-38, doi: [10.1080/14778238.2018.1538669](https://doi.org/10.1080/14778238.2018.1538669).

Further reading

- World Bank (2023), "Pollution", available at: www.worldbank.org/en/topic/pollution#:~:text=Air%20pollution%20is%20the%20leading,%2D%20and%20middle%2D%20income%20countries (accessed 15 April 2022).

Corresponding author

Syed Zamberi Ahmad can be contacted at: drszamberi@yahoo.com