

## RESEARCH ARTICLE

# Relational capital, environmental knowledge integration, and environmental performance of small and medium enterprises in emerging markets

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## Abstract

Although several prior studies have examined associations between firm social capital and environmental sustainability, the links between relational resources (i.e., relational capital and ties strength), environmental knowledge integration, and environmental performance have yet to be well established at the micro-level. This study, therefore, aims to determine (1) how environmental knowledge integration serves as a mediating mechanism for the relationship between relational capital and environmental performance and (2) how this impact differs at different levels of ties strength. A quantitative approach has been adopted to examine the main hypotheses using a structural equation model (SEM) technique. Two groups of actors were surveyed, including chief executive officers (CEOs) and financial officers of small and medium-sized enterprises (SMEs) operating in Dubai, United Arab Emirates. In total, 216 survey responses were gathered, suggesting a response rate of 73.22%. Our findings suggest that environmental knowledge integration is a vital mediating mechanism for the relationship between relational capital and SMEs' environmental performance. Also, we find that ties strength moderates the indirect effect of relational capital on SMEs' environmental performance via environmental knowledge integration. Our empirical evidence provides recommendations for SMEs' managers and policymakers to promote environmental sustainability in the emerging market context.

## KEYWORDS

environmental knowledge integration, environmental performance, relational capital, SMEs, ties strength, UAE

## 1 | INTRODUCTION

Given the decline in global climate conditions, growing stakeholder demands, and stricter regulations and laws at both national and international scales, firms have realized the importance of integrating various environmental issues into their strategic orientations in order to

enhance their financial and non-financial performances (Liao, 2018a; Yang et al., 2020; Zhang, Pan, et al., 2020). As a result, the environmental performance has become a key issue of interest among practitioners and academics (Gerged, 2021; Haque & Ntim, 2018; Singh et al., 2019), including a considerable amount of studies published in *Business Strategy and the Environment* (e.g., Gerged, Beddewela, & Cowton, 2021;

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Gerged et al., 2018; Jiang et al., 2020; Lin & Niu, 2018; Song et al., 2020; Zhang, Liang, et al., 2020). Extant literature on environmental performance focuses on large firms (Gerged, Matthews, & Elheddad, 2021; Gölgeci et al., 2019; Obara & Peattie, 2018; Tashman et al., 2019), as compared to small and medium-sized enterprises (SMEs) that generate increased environmental impacts due to their engagement in commercial activities (Singh et al., 2020). However, increased institutional and stakeholders' pressure has forced SMEs across different industries and geographies to pursue environmental management initiatives (Wang et al., 2018; Yu & Ramanathan, 2015). It calls upon SMEs to look for factors that address the complexity of environmental issues and respond to pressures from various stakeholders (Cherrafi et al., 2017; Shashi et al., 2019). As such, this study is motivated to understand the determinants of environmental performance in the context of SMEs.

Extant literature has examined the factors influencing SMEs' environmental performance from varied perspectives, including resources (Arend, 2014; Shashi et al., 2019; Worthington & Patton, 2005), stakeholder pressure (Adomako & Nguyen, 2020a; Tang & Tang, 2012, 2018), environmental regulations and laws (Graafland & Smid, 2017; Pimenova & van der Vorst, 2004), among other factors. A small and growing number of studies suggest that resource-constrained SMEs can achieve environmental performance by leveraging strategic alliances with which they engage (Hofman et al., 2020; Lewis et al., 2015; Nakano & Hirao, 2011). Strategic alliances with customers, suppliers and/or competitors help an SME to access resources and knowledge that can allow the development of solutions for social and environmental issues (Adams et al., 2016; Calza et al., 2021; Palmieri et al., 2019; Stekelorum et al., 2020; Yen, 2018). However, strategic alliance is a risky activity and may fail due to differences in the expectations of partners (Chakravarty et al., 2020; Tukamuhabwa et al., 2017). Previous scholarship, therefore, suggests that relational capital is a critical driving value from alliance relationships (Liao, 2018c; Yoo et al., 2016; Zahoor & Al-Tabbaa, 2020). Relational capital refers to the extent of mutual trust, close interaction, and reciprocal information exchange among strategic alliance partners (Yoo et al., 2016). As an intangible resource, relational capital can create value due to the development of trust and recognition (Catanzaro et al., 2019), better access to financial resources (Cucculelli et al., 2019), and effective management of environmental issues (Gold et al., 2020; Yu & Huo, 2019).

Although researchers have recognized relational capital as an integral element of alliance relationships (Yoo et al., 2016; Zhang, Pan, et al., 2020), the majority of the scholarly efforts are dedicated to understanding the impact of relational capital on alliance learning (Barão et al., 2017; Kohtamäki et al., 2012; Yoo et al., 2016), internationalization (Yayla et al., 2018; Zahoor & Al-Tabbaa, 2020), and financial performance (Byun et al., 2018; Carmeli & Azeroual, 2009; Yu & Huo, 2019). However, to date, research remained scant on how relational capital can influence SMEs' environmental performance (Gold et al., 2020). Since relational capital ascertains the ability of SMEs to gain resources from alliance partners (Sambasivan et al., 2013), it can be deemed as a vital resource to promote environmental performance

(Liao, 2018c). Specifically, relational capital is proven useful for facilitating information exchange (Lefebvre et al., 2016), which has the potential to promote environmental knowledge integration for environmental performance (Hasan et al., 2020; Miković et al., 2020; Westman et al., 2019). Indeed, relational capital helps SMEs understand and exploit relevant knowledge on trends and events prevalent in the external environments and promotes environmental initiatives (Liao, 2018c), which might influence environmental performance (Gerged, 2021). However, scholars suggest that sharing information with alliance partners requires ties strength—referring to the frequency of interaction between alliance partners (Ali et al., 2020; Tzabbar & Vestal, 2015). The stronger ties with alliance partners are important in terms of building trust and deriving greater knowledge about environmental issues that can enhance SMEs' environmental performance. Despite the benefits of stronger ties in acquiring new knowledge, previous studies neglected the role of ties strength in the context of SMEs to improve their environmental performance from relational capital in the strategic alliances (Guo et al., 2020; Peterman et al., 2020).

This study attempts to address the aforementioned gaps by building on the resource-based view (RBV) (Barney, 1991; Wernerfelt, 1984) and social capital literature (Nahapiet & Ghoshal, 1998). Specifically, we argue that relational capital is an important resource that fosters mutual trust among alliance partners and results in superior access to resources held by others and enhances environmental knowledge integration (Abu Seman et al., 2019; Onofrei et al., 2020). In turn, environmental knowledge integration promotes sustainable and environmental-friendly initiatives resulting in enhancing the environmental performance of SMEs (Gölgeci et al., 2019; Singh et al., 2019). Stating differently, we posit that environmental knowledge integration mediates the effect of relational capital on SMEs' environmental performance. Furthermore, we examine the moderating role of ties strength because it can allow SMEs to benefit from relational capital to build trust and promote environmental knowledge integration that is conducive to environmental performance (Ali et al., 2020; Bojica et al., 2017). Consequently, we pose the following questions: (1) How does environmental knowledge integration serve as a boundary condition to the relationship between relational capital and environmental performance? And (2) how does this impact differ at different levels of ties strength? To answer these research questions, we rely on survey data obtained from SMEs operating in a developing-emerging economy within the Middle East: United Arab Emirates (UAE).

In doing so, we contribute to the *Business, Strategy and the Environment* literature in three manners. First, this study advances the strategic alliance and environmental management research by drawing on the tents of RBV and social capital literature to theoretically specify and empirically validate the relationship between relational capital, environmental knowledge integration, and environmental performance. We explain how relational capital (an intangible resource capturing trust and reciprocal commitment) influences actionable environmental knowledge integration for an onward effect on environmental performance. This conceptualization is consistent with the

RBV argument that resources pave the way for actions (Ketchen et al., 2007; Ndofor et al., 2011).

Second, in view of the scholarship interest in understanding the boundary conditions that determine environmental performance (Liao, 2018c), this study accounts for the moderating role of ties strength for relational capital-environmental knowledge integration-environmental performance relationships. Specifically, we show that ties strength is a key contingency factor for strengthening the effect of relational capital on environmental performance through environmental knowledge integration.

Third, our study makes an empirical contribution by collecting survey data from SMEs operating in the under-researched context of UAE. SMEs' environmental performance is deemed a key pillar of the UAE National Agenda in line with Vision 2021 and Green Agenda 2030 to create and develop a sustainable environment (UAE Government Portal, 2021). In this context, the government prioritizes and requires firms to balance economic and social development by ensuring sustainable development and preserving the environment (UAE-Vision, 2021). Remarkably, the UAE government has published the UAE Green Business Toolkit for SMEs to guide their green and environmental-friendly activities (UAE-SDGs, 2021). Therefore, our study provides contextual contribution by understanding how SMEs in the UAE enhance their environmental performance.

The remainder of this research paper is structured as follows. Section 2 discusses the theoretical framework and develops the main research hypotheses; Section 3 describes the research methodology; Section 4 presents the empirical results and robustness checks; Section 5 concludes the main findings, limitation and recommendations.

## 2 | THEORETICAL CONSIDERATIONS AND HYPOTHESES DEVELOPMENT

### 2.1 | Resource-based view theory

Prior studies (e.g., Akhtar et al., 2018; Aragón-Correa & Sharma, 2003; Bowen, 2007; Hart, 1995) indicate that the social resources of firms can play a crucial role in improving their environmental performance. Furthermore, scholars have tried to link social resources, including relational capital, knowledge integration and ties strength to the resource-based view (RBV) theory (Aragón-Correa & Sharma, 2003; Bowen, 2007). The RBV theory tackles SMEs-level heterogeneities regarding resources and strategic endowments (Barney, 1991; Wernerfelt, 1984); thus, it serves as a theoretical foundation to

understand how the development of various types of social resources may lead to enhancing the environmental performance of SMEs such as green energy consumption, reusable packaging, waste reduction, material efficiency, and protecting the physical environment (Akhtar et al., 2018; Coff & Kryscynski, 2011; Foss, 2010).

Despite the scholarly efforts dedicated to SMEs resources and environmental performance, limited studies have explored the determinants of environmental performance from the perspective of RBV (Yang et al., 2020; Zhang, Liang, et al., 2020). Accepting the indisputable evidence that social resources, such as relational capital, may result in creating competitive advantages (Jean et al., 2017; Yu & Huo, 2019), this body of literature has often neglected to investigate how SMEs' relational resources and environmental knowledge capabilities can enhance the environmental performance (cf. Frynas & Yamahaki, 2016; Mellahi et al., 2015). Most relatedly, the previous body of literature has largely failed to link important fundamentals underpinning RBV (i.e., relational capital, ties strength and knowledge integration) with environmental performance. Importantly, the RBV approach of environmental performance has recently started to grow vigorously within the *Business, Strategy and the Environment* Literature (e.g., Jiang et al., 2020; Lin & Niu, 2018; Song et al., 2020; Zhang, Liang, et al., 2020). Accordingly, Figure 1 shows the conceptual model of the current study. This model explains the main relationships that are examined in our study from an RBV perspective. We mainly seek to examine how factors of RBV such as relational capital, ties strength and environmental knowledge integration can influence corporate environmental performance. The following section develops the main research hypotheses based on an RBV theoretical approach.

### 2.2 | Relational capital and environmental knowledge integration

From the RBV perspective, relational capital is an integral component of social capital that is developed as a result of the growing complexity of modern business actions, which are massively connected through data and information flows (i.e., knowledge integration) among alliance relationships (Schoenherr et al., 2015). These alliance relationships are likewise connected on the basis of satisfaction, trust, and collaborative decision-making process that contribute towards enhancing the environmental performance of SMEs (Elfenbein & Zenger, 2013; Yoo et al., 2016). Prior studies (e.g., Akhtar et al., 2018; Swan & Scarbrough, 2005) state that the strategic alliances can play a

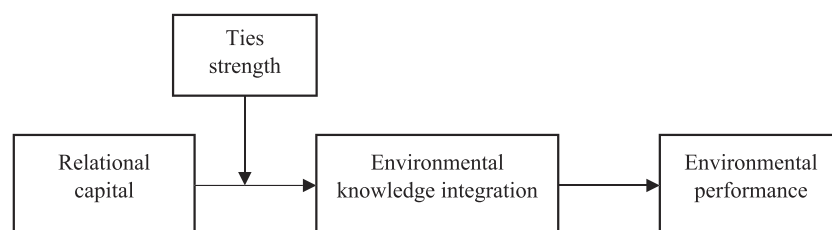


FIGURE 1 Conceptual framework

crucial role in mediating access to valued resources; hence allowing knowledge integration and leading to an organizational change that may help to advance SMEs' environmental agenda (Schoenherr et al., 2015). This notion closely associates with more innovative ways of creating environmental initiatives, such as waste reduction, green and ethical purchasing (Martinez-Conesa et al., 2017). Thus, relational capital could be predominantly significant for offering valuable knowledge by promoting trust and developing environmental policies among allies (Kohtamäki et al., 2012). In other words, relational capital potentially triggers innovative ways to integrate environmental knowledge among the alliance partners.

Because of its considerable role, extant literature highlighted the enabling role of relational capital in transferring valuable environmental knowledge resources across SMEs that seemed to equip them with resources to deal with unsustainable practices (Tortoriello et al., 2011; Yu & Huo, 2019). Since relational capital exhibits higher levels of respect and trust among alliance partners, such social relationships build superior platforms for sharing environmental data and information, leading to creating a collaborative decision-making process for better performance (Babu et al., 2020; Rai et al., 2006). Collectively, higher levels of trust and personal friendship in the strategic alliance have been believed to be better connected to more positive integration of environmental knowledge (Jiang et al., 2020; Lin & Niu, 2018). Thus, we hypothesize the link between relational capital and environmental knowledge integration as follows:

**Hypothesis 1.** Relational capital is positively related to environmental knowledge integration.

### 2.3 | Environmental knowledge integration and environmental performance

Previous studies state that relational capital is believed to build superior platforms for sharing environmental data and information, resulting in the creation of a collaborative decision-making process for better environmental performance (Kohtamäki et al., 2012; Onofrei et al., 2020; Rai et al., 2006). Crucially, SMEs can gain significant market shares by using satisfied and trusted alliance relationships, which appeared to allow them to deal with market changes effectively (Akhtar et al., 2018). Such associated business partners can work together to collect, analyze and integrate environmental data (i.e., integrate their environmental knowledge) in order to enhance the functionality of their joint decision-making process (Ferreira et al., 2018; Yi et al., 2016). This allows them to scrutinize any operational deficiencies and advance logistics influencing environmental components such as material efficiency, waste reduction, and overall environmental performance (Gölgeci et al., 2019; Zhang, Liang, et al., 2020). Given the logic of collaborative sharing of resources, incremental changes, such as commitment, joint decision-making, and knowledge integration, would likely be positively attributed to the SMEs' environmental performance (Ben Arfi et al., 2018; Machado et al., 2020; Yi et al., 2016). We accordingly hypothesize the

association between SMEs' environmental knowledge integration and environmental performance as follows:

**Hypothesis 2.** Environmental knowledge integration positively influences environmental performance.

### 2.4 | The mediating role of environmental knowledge integration

The empirical evidence is in its infancy stage on how relational-based alliances (i.e., characterized by mutual trust and reciprocity) share the best environmental knowledge and influence environmental performance. Therefore, integrating insights from RBV and social capital theory, this study considers the impact of relational capital on environmental knowledge integration and ultimately on SMEs' environmental performance (Ben Arfi et al., 2018; Schoenherr et al., 2015). Conceptually speaking, Maurer et al. (2011) argue that knowledge transfer mediates the association between relational capital and organizational performance. More relatedly, Liao (2018c) indicates that relational capital has a positive effect on environmental performance. Collectively, previous scholarship indicates that relationship-based resource (i.e., relational capital) allows SMEs to manage complex alliance relationships for gaining tacit information and integrating environmental knowledge (Adomako, 2020; Xie et al., 2016). In turn, environmental knowledge integration allows SMEs to adapt innovative environmental approaches that assist SMEs to obtain environmental advantages over competitors and enhance their environmental performance (Jiang et al., 2020; Shu et al., 2018; Song et al., 2020; Xie et al., 2016). Given this, we hypothesize the relationship between relational capital and environmental performance through environmental knowledge integration as follows:

**Hypothesis 3.** Environmental knowledge integration positively mediates the effect of relational capital on environmental performance.

### 2.5 | The moderating role of ties strength

Even with the prominence of strategic alliances, much still to be learnt about the unique ways in which the social capital (i.e., relational capital and ties strength) can affect environmental knowledge integration and environmental performance. Schoenherr et al. (2015) reported numerous benefits of relational capital and ties strength, including better demand planning, reduced alliance complexity, increased visibility, cost reductions, and other operational developments leading to better environmental performance. In this study, we posit that ties strength moderate the influence of relational capital on environmental performance through environmental knowledge integration. More importantly, stronger ties allow an SME to nurture relational capital by promoting trust and reciprocity among alliance partners to

influence environmental knowledge integration, thereby leading to better environmental performance (Liao, 2018c; Maurer et al., 2011). Furthermore, stronger ties help SMEs to identify potential risks in their environmental policies (Jiang et al., 2016; Liao, 2018a, 2018c) and exploit relational capital to enhance environmental knowledge integration for environmental performance. In other words, the existence of strong ties complements the relational capital in reacting to changing environmental regulations by fostering environmental knowledge integration, which seemed to be positively affecting the environmental performance of SMEs (Hemmer, 2019; Onofrei et al., 2020). This is consistent with the RBV argument that complementary resources are essential for firms to enhance their competitive advantage (Espino-Rodríguez & Padrón-Robaina, 2006; Foss & Ishikawa, 2007). Relational capital and ties strength act as complementary resources to integrate environmental knowledge from alliance partners, improving SMEs' environmental performance (Ali et al., 2020; Carmeli & Azeroual, 2009; Liu, 2017). Summing up, the strength of alliance ties can interact with relational capital to foster environmental knowledge integration for the environmental performance of SMEs. Accordingly, we hypothesize the moderating effect of ties strength on the relationship between relational capital and environmental performance through environmental knowledge integration as follows:

**Hypothesis 4.** The presence of ties strength strengthens the positive indirect effect of relational capital through environmental knowledge integration on environmental performance.

In the next section, the main research design is explained and justified.

### 3 | METHODOLOGY

#### 3.1 | Study context

The study hypotheses were tested using data collected from SMEs in the UAE. The choice of study context is justified based on several reasons. First, the UAE is a relatively emerging market with a fast-growing economy (Nakos et al., 2019). The UAE's economic growth increased from 1.7% in 2018 to 2.0% in 2019 (TradingEconomics, 2020). Second, the discovery of oil has allowed the UAE to move away from fishing to establishing a regional business hub and a top tourism destination (Nakos et al., 2019). Over the last few years, the UAE has tried to eliminate its excessive reliance on oil reserves by developing the non-oil sector (Parceró & Ryan, 2017). This has led to the liberalization of the UAE market that has helped attract foreign investors and start new businesses. Third, SMEs in the manufacturing and services sectors make up 95% of firms in the UAE and are responsible for 43% of the total workforce (DCCI, 2020). Fourth, the government has pledged to make the UAE a sustainable economy and set ambitious targets to achieve this vision (UAE Government Portal, 2021). Specifically, green building

initiatives, innovative measures, and efficiency standards are introduced. The UAE government has enacted laws to ban waste and oil sludge into the water by companies in order to protect the environment (UAE-Government, 2021b). In addition, a policy is announced by the Environmental Agency to reduce the use of plastic material through promoting the culture of recycling and encouraging sustainable practices in the country (UAE-Government, 2021b). Being an important engine of the economy, SMEs also need to adhere to UAE government legislation and policies to ensure a sustainable environment (Mathew & Giersch, 2020; UAE-Government, 2021a). However, resource constraints and small size make it difficult to adhere to sustainability principles and achieve environmental performance (Adomako & Nguyen, 2020a). Thus, examining how relational capital affect the SMEs' environmental performance in the UAE provides fresh insights on environmental management in the context of an emerging market.

#### 3.2 | Data collection

Primary data were collected from SMEs operating in Dubai, UAE. The key respondents included chief executive officers (CEOs) and financial officers. The CEOs and financial officers were deemed appropriate respondents for two reasons. First, in SME research, CEOs are considered the "single most knowledgeable and valid information sources" (Lechner et al., 2006, p. 525). CEOs have a particular impact on SMEs' management, values, and decision-making (Eggers et al., 2013). Therefore, CEOs are widely accepted key informants in SMEs research (e.g., Amankwah-Amoah et al., 2019; Danso et al., 2019). Second, to avoid single-informant bias, we used financial officers to report on the environmental performance of SMEs. They possess significant knowledge about sustainability targets, firm growth, and performance of SMEs (Adomako & Nguyen, 2020a; Adomako & Nguyen, 2020b; Tang & Hull, 2012).

We identified a sample of 560 SMEs from the commercial director of the Dubai Chamber of Commerce and Industry (DCCI, 2018–2019). The selection of the sample met the following criteria: (1) firms must be independently owned and not have any subsidiary established; (2) firms with less than 250 employees; (3) firms operating in manufacturing and service industries; and (4) firms with complete contact details of the CEOs and financial officers. We contacted SMEs by telephone to ask them for their participation in our study. Subsequently, we identified 295 SMEs as being involved in alliance activities and willing to participate in the study.

The CEOs were approached in person with a questionnaire to provide information on relational capital, ties strength, and environmental knowledge integration. We collected 224 complete responses from CEOs. Next, we approached the financial officers of the 224 SMEs with another questionnaire to capture the environmental performance. In return, we received a total of 216 complete responses, suggesting a response rate of 73.22%. The responses from financial officers were collected to avoid the issue of common method bias (Podsakoff et al., 2003).

The average age of the respondent firms was 21 years, and the average size was 88 employees. The respondent firms operated in manufacturing ( $n = 158$ ) and services ( $n = 58$ ) industries. The average managerial tenure was 15 years.

### 3.3 | Measurements

The study measures were adapted or adopted from previous studies. The pilot study was conducted with CEOs of SMEs in the UAE to check the interpretability and utility of the questionnaire. Their comments helped to modify the clarity and accuracy, thereby finalizing the questionnaire. All of the study items were measured based on a

7-point Likert scale. The details of the measures are provided in Table 1.

#### 3.3.1 | Relational capital

Relational capital was measured using four items from Kale et al. (2000). Although Kale et al. (2000) originally developed and validated these measures in a developed country (i.e., United States), these measures are widely used in the developing countries contexts, such as China and Turkey (Yayla et al., 2018; Yu et al., 2020). To avoid context bias, we asked the CEOs to assess the degree to which their relationship with alliance partners in UAE is characterized by mutual respect and trust.

**TABLE 1** Measurement details and reliability and validity results

Description	Factor loadings
<b>Relational capital (CA = 0.92; CR = 0.92; AVE = 0.74)</b>	
1. The relationship between my firm and its alliance partners is characterized by mutual respect.	0.83
2. The relationship between my firm and its alliance partners is characterized by mutual trust.	0.83
3. The relationship between my firm and its alliance partners is characterized by high reciprocity.	0.94
4. The relationship between my firm and its alliance partners is characterized by personal friendship.	0.82
<b>Ties strength (CA = 0.89; CR = 0.89; AVE = 0.80)</b>	
1. We frequently interact with our alliance partners.	0.95
2. We maintain a close connection with our alliance partners.	0.85
<b>Environmental knowledge integration (CA = 0.88; CR = 0.88; AVE = 0.56)</b>	
<i>Our alliance partners have provided us with knowledge about:</i>	
1. Environmental issues	0.80
2. Environmental management techniques and manuals	0.73
3. Product/process design to improve environmental efficiency	0.71
4. Use of recyclable materials	0.81
5. Pollution prevention skills	0.73
6. Environmental technologies	0.70
<b>Environmental performance (CA = 0.94; CR = 0.94; AVE = 0.76)</b>	
1. Our firm reduced wastes and emissions from operations.	0.85
2. Our firm reduced the environmental impacts of its products/service.	0.90
3. Our firm reduced the negative impacts on the natural environment.	0.89
4. Our firm reduced the risk of environmental accidents and spills.	0.87
5. Our firm reduced the use of non-renewable materials, chemicals, and components.	0.85

#### 3.3.2 | Ties strength

Ties strength was captured using two items from Shu et al. (2018). It was conceptualized as the closeness and communication frequency among the alliance partners (Maurer et al., 2011).

#### 3.3.3 | Environmental knowledge integration

We capture environmental knowledge integration using five items from Hung et al. (2014), Jiang et al. (2016), and Sun et al. (2018). It captures the extent to which a firm acquires environmental knowledge and expertise from the alliance partner.

#### 3.3.4 | Environmental performance

Four items for environmental performance were taken from Paillé et al. (2014). The respondents evaluated the extent to which they have taken environmental concerns seriously.

#### 3.3.5 | Control variables

We included several control variables to account for their effect on the mediating and dependent variables. These include managerial tenure, educational level, firm size, firm age, industry type, and alliance experience. Managerial tenure was measured using the number of years a manager has been employed in this firm (Boling et al., 2016). Educational level was assessed by asking the respondents to choose from the following: 1 = "high school," 2 = "diploma," 3 = "bachelor," 4 = "master," 5 = "doctorate." Firm size was captured using the number of full-time employees. Firm age was measured as the number of years since a firm was founded. Industry type was measured with two options: 1 = "manufacturing," 2 = "service." Alliance experience was captured as the number of alliances formed in the last three years (Heimeriks & Duysters, 2007).



### 3.4 | Potential bias, validity, and reliability assessment

We examined the non-response bias by comparing the two groups: early respondents ( $n = 111$ ) and late respondents ( $n = 105$ ). As shown in Table 2, the  $t$  test results reveal no significant difference between the two groups of respondents ( $p < .05$ ) in terms of demographics (managerial tenure, education level, firm size, and firm age) and main variables (e.g., relational capital, environmental knowledge integration, and environmental performance). Thus, we concluded that non-response bias is not a serious concern for our study sample.

The potential for common method bias was assessed using two statistical procedures. First, we estimated three competing confirmatory factor analysis (CFA) models (see Table 3). Firstly, a method-only model (M1) was estimated where all the items were loaded on a single latent construct. The results showed a poor model fit:  $\chi^2/d.f. = 8.66$ ; normed fit index (NFI) = 0.68; comparative fit index (CFI) = 0.70; goodness of fit index (GFI) = 0.65; root mean square error of approximation (RMSEA) = 0.19; and standardized root mean square residual (SRMR) = 0.15. Secondly, a trait-only model (M2) was estimated where each item was loaded on its respective latent construct. The results suggested a good model fit:  $\chi^2/d.f. = 1.26$ ; NFI = 0.96; CFI = 0.99; GFI = 0.94; RMSEA = 0.04; SRMR = 0.04. Thirdly, a method-trait model (M3) was estimated where a common factor was linked with all the items in the M3. Results offer a good model fit:  $\chi^2/d.f. = 1.21$ ; NFI = 0.96; CFI = 0.99; GFI = 0.94; RMSEA = 0.03; SRMR = 0.04. Further, the comparison of three models suggests that

M2 and M3 are better than M1, and M3 is not significantly better than M2.

Second, we followed the approach by Lindell and Whitney (2001) and introduced a marker variable—that is, theoretically unrelated to the main variables of the study. The used marker variable was “I am more productive under the complex working situation.” The correlation results suggested nonsignificant relationships ranging from  $-.04$  to  $.05$ . Overall, the results of the two statistical procedures confirm that common method bias does not describe our data.

Subsequently, the reliability and validity of measures were assessed using CFA in AMOS 27.0. The results of reliability and validity are reported in Table 1. First, we examined a measurement model in which the items of the four constructs were loaded distinctively according to their hypothesized relationships (Kline, 2015). The results show a good model fit:  $\chi^2/d.f. = 1.26$ ; NFI = 0.96; CFI = 0.99; GFI = 0.94; RMSEA = 0.04; SRMR = 0.04. Second, the Cronbach alpha and composite reliability of all the constructs exceeded the threshold value of  $.70$  (Bagozzi & Yi, 2012), indicating a high level of internal reliability. All the factor loadings were over  $.70$  and significant, which guarantees item reliability. Third, the values of AVE exceeded the cut-off value of  $0.50$  (Bagozzi & Yi, 2012), suggesting the existence of a high level of convergent validity. Fourth, the square root of AVE for each construct was greater than the inter-construct correlation (see Table 4), indicating satisfactory discriminant validity (Fornell & Larcker, 1981). The means and standard deviations of the study constructs are reported in Table 4.

**TABLE 2**  $T$  test for non-response bias

Variables	Groups	$t$ value	d.f.	$p$ value	Mean difference	Std. error difference
Managerial tenure	Early respondents	-1.06	214.00	.29	-0.95	0.90
	Late respondents	-1.07	213.02	.29	-0.95	0.89
Education level	Early respondents	1.47	214.00	.14	0.21	0.15
	Late respondents	1.47	212.13	.14	0.21	0.15
Firm size	Early respondents	0.16	214.00	.87	1.44	8.94
	Late respondents	0.16	213.25	.87	1.44	8.94
Firm age	Early respondents	-1.11	214.00	.27	-2.82	2.53
	Late respondents	-1.10	193.63	.27	-2.82	2.55
Relational capital	Early respondents	0.50	214.00	.62	0.09	0.17
	Late respondents	0.50	212.10	.62	0.09	0.17
Environmental knowledge integration	Early respondents	-0.24	214.00	.81	-0.04	0.15
	Late respondents	-0.24	213.17	.81	-0.04	0.15
Environmental performance	Early respondents	-0.43	214.00	.67	-0.08	0.18
	Late respondents	-0.43	213.91	.67	-0.08	0.18

**TABLE 3** Results of common method bias test

Models	$\chi^2/d.f.$	NFI	CFI	GFI	RMSEA	SRMR	Conclusion
Method-only model (M1)	8.66	0.68	0.70	0.65	0.19	0.15	-
Trait-only model (M2)	1.26	0.96	0.99	0.94	0.04	0.04	M2 > M1
Method-and-trait model (M3)	1.21	0.96	0.99	0.94	0.03	0.04	M3 = M2

## 4 | EMPIRICAL RESULTS

The hypotheses of the study are tested using a structural equation model (SEM) analysis in AMOS 27.0. We mean-centered all the variables involved in the interaction to attenuate the potential multicollinearity problem (Aiken et al., 1991). Prior to testing the

hypotheses, we also examined the variance inflation factor (VIF) and found that the maximum VIF is 1.61. The value of VIF is far below the recommended threshold value of 10; thus, multicollinearity is not a serious concern (Neter et al., 1990). Subsequently, we assessed the hypothesized model using SEM and found a good model fit:  $\chi^2/d.f. = 1.37$ ; NFI = 0.97; CFI = 0.99; GFI = 0.97; RMSEA = 0.04; SRMR = 0.03.

**TABLE 4** Descriptive statistics and inter-constructs correlations

No	Constructs	M	SD	1	2	3	4	5	6	7	8	9	10
1	Managerial tenure <sup>a</sup>	1.12	0.23	1.00									
2	Educational level <sup>b</sup>	3.83	1.07	-.03	1.00								
3	Firm size <sup>a</sup>	1.77	0.46	.11	-.11	1.00							
4	Firm age <sup>a</sup>	1.23	0.29	-.03	-.04	-.10	1.00						
5	Industry type <sup>b</sup>	1.27	0.44	-.15 <sup>*</sup>	.06	-.06	.06	1.00					
6	Alliance experience	2.15	1.15	.07	.04	-.01	.10	-.04	1.00				
7	Relational capital	4.94	1.28	.11	.15 <sup>*</sup>	-.04	-.09	-.02	-.03	.86			
8	Ties strength	5.43	1.34	.02	.30 <sup>***</sup>	.03	.04	-.10	-.09	.11	.90		
9	Environmental knowledge integration	5.17	1.11	.15 <sup>*</sup>	.35 <sup>***</sup>	.01	-.02	-.09	-.14 <sup>*</sup>	.44 <sup>***</sup>	.40 <sup>***</sup>	.74	
10	Environmental performance	5.41	1.31	.07	.18 <sup>**</sup>	-.05	.02	-.11	-.10	.23 <sup>***</sup>	.29 <sup>***</sup>	.55 <sup>***</sup>	.87

Abbreviations: M, mean; SD, standard deviation.

<sup>a</sup>Natural logarithm transformation of the original values;

<sup>b</sup>Dummy variable.

<sup>\*</sup> $p < .05$ .

<sup>\*\*</sup> $p < .01$ .

<sup>\*\*\*</sup> $p < .001$ .

**TABLE 5** Multilevel path analysis

Independent variables	Environmental knowledge integration			
	Model 1	Model 2	Model 3	Model 4
<b>Control effects</b>				
Managerial tenure <sup>a</sup>	0.16 <sup>**</sup> (2.61)	0.11 <sup>+</sup> (1.96)	0.11 <sup>*</sup> (2.01)	0.12 <sup>*</sup> (2.23)
Educational level <sup>b</sup>	0.37 <sup>***</sup> (5.93)	0.31 <sup>***</sup> (5.30)	0.22 <sup>***</sup> (3.82)	0.20 <sup>***</sup> (3.74)
Firm size <sup>a</sup>	0.02 (0.33)	0.03 (0.47)	0.01 (0.16)	-0.02 (-0.39)
Firm age <sup>a</sup>	0.03 (0.48)	0.06 (0.95)	0.03 (0.59)	0.01 (0.13)
Industry type <sup>b</sup>	-0.10 (-1.59)	-0.09 (-1.50)	-0.05 (-0.97)	-0.06 (-1.16)
Alliance experience	-0.17 <sup>**</sup> (-2.71)	-0.14 <sup>*</sup> (-2.45)	-0.11 <sup>*</sup> (-1.99)	-0.12 <sup>*</sup> (-2.20)
<b>Main effect</b>				
Relational capital (RC)		0.38 <sup>***</sup> (6.62)	0.36 <sup>***</sup> (6.61)	0.36 <sup>***</sup> (6.73)
<b>Mediating effect</b>				
Environmental knowledge integration				
<b>Moderation effect</b>				
Ties strength (TS)			0.27 <sup>***</sup> (4.72)	0.30 <sup>***</sup> (5.36)
RC x TS				0.21 <sup>***</sup> (4.05)

Note: Standardized coefficients are reported; test of significance.

<sup>a</sup>Natural logarithm transformation of the original values;

<sup>b</sup>Dummy variable.

<sup>+</sup> $p < .10$ ;

<sup>\*</sup> $p < .05$ ;

<sup>\*\*</sup> $p < .01$ ;

<sup>\*\*\*</sup> $p < .001$ .



TABLE 5 (Continued)

Independent variables	Environmental performance			
	Model 5	Model 6	Model 7	Model 8
<b>Control effects</b>				
Managerial tenure <sup>a</sup>	0.07 (0.99)	0.04 (0.66)	-0.02 (-0.42)	-0.02 (-0.39)
Educational level <sup>b</sup>	0.20** (2.93)	0.16* (2.51)	-0.01 (-0.20)	-0.01 (-0.21)
Firm size <sup>a</sup>	-0.04 (-0.54)	-0.03 (-0.42)	-0.04 (-0.75)	-0.04 (-0.77)
Firm age <sup>a</sup>	0.05 (0.69)	0.06 (0.96)	0.03 (0.59)	0.03 (0.55)
Industry type <sup>b</sup>	-0.12 <sup>+</sup> (-1.86)	-0.12 <sup>+</sup> (-1.83)	-0.07 (-1.25)	-0.07 (-1.24)
Alliance experience	-0.12 <sup>+</sup> (-1.84)	-0.12 <sup>+</sup> (-1.77)	-0.03 (-0.61)	-0.03 (-0.59)
<b>Main effect</b>				
Relational capital (RC)		0.20** (2.95)		-0.03 (-0.45)
<b>Mediating effect</b>				
Environmental knowledge integration			0.57*** (9.35)	0.58*** (8.71)
<b>Moderation effect</b>				
Ties strength (TS)				
RC x TS				

Note: Standardized coefficients are reported; test of significance.

<sup>a</sup>Natural logarithm transformation of the original values;

<sup>b</sup>Dummy variable.

<sup>+</sup> $p < .10$ ;

<sup>\*</sup> $p < .05$ ;

<sup>\*\*</sup> $p < .01$ ;

<sup>\*\*\*</sup> $p < .001$ .

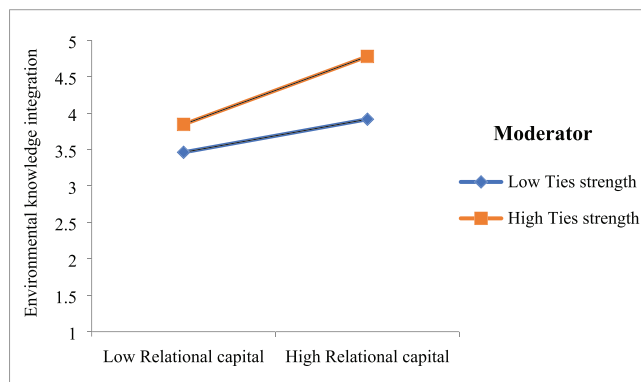


FIGURE 2 Interaction between relational capital and ties strength [Colour figure can be viewed at wileyonlinelibrary.com]

#### 4.1 | Results of path analyses

The results of the path analyses are presented in Table 5. Models 1–4 contain environmental knowledge integration as a dependent variable. Models 5–8 include environmental performance as a dependent variable. Model 1 and Model 5 are baseline models with all the control variables.

Hypothesis 1 predicts the positive effect of relational capital on environmental knowledge integration. As results show in Model 2 in Table 5, relational capital positively and significantly influences

environmental knowledge integration ( $\beta = .38, p < .001$ ); thus, providing support for Hypothesis 1. Hypothesis 2 argues for the positive effect of environmental knowledge integration on environmental performance. The results support Hypothesis 2 as environmental knowledge integration (i.e., mediating variable) is positively related to environmental performance (i.e., dependent variable) ( $\beta = .57, p < .001$ ) in Model 6. Ties strength is included in Model 3, where the effect of relational capital on environmental knowledge integration remains significant ( $\beta = .36, p < .001$ ). In Model 4, the interaction term is included that is significant ( $\beta = .21, p < .001$ ), indicating that ties strength moderates the relationship between relational capital and environmental knowledge integration. Thus, Hypothesis 4 is supported. To better understand the effect of relational capital on environmental knowledge integration at high and low levels of ties strength, we plotted the interactive effect in Figure 2. As evident in Figure 2, the effect of relational capital on environmental knowledge integration is more positive when the level of ties strength is high.

Models 6–8 test the mediating effect of environmental knowledge integration by following the suggested approach by Zhao et al. (2010). First, relational capital (i.e., independent variable) is positively related to environmental knowledge integration (i.e., mediating variable) in Model 2 ( $\beta = .38, p < .001$ ). Second, as shown in Model 6, environmental knowledge integration (i.e., mediating variable) is positively related to environmental performance (i.e., dependent variable) ( $\beta = .57, p < .001$ ). Third, the relationship between the independent and dependent variables should reduce or become insignificant

with the inclusion of the mediating variable in the model. Accordingly, in Model 8, relational capital and environmental knowledge integration are together added to the model. The results suggest a positive and significant effect of environmental knowledge integration on environmental performance ( $\beta = .58, p < .001$ ), but the direct effect of relational capital on environmental performance becomes nonsignificant ( $\beta = -.03, ns$ ). Thus, the results support the mediating effect of environmental knowledge integration for the relationship between relational capital and environmental performance, thereby confirming Hypothesis 3.

## 4.2 | Robustness analysis

To further validate our study findings, we conducted two additional analyses. First, we used the PROCESS macro (Hayes, 2017) to establish the mediating and moderating effects. Using PROCESS macro (Model 4), we find that positive effects of relational capital on environmental knowledge integration ( $\beta = .32, p < .001$ ). In turn, environmental knowledge integration is positively related to environmental performance ( $\beta = .69; p < .01$ ). More importantly, the indirect effect of relational capital on environmental performance through environmental knowledge integration is significant (index = 0.23; 95% bias-corrected CI [0.14, 0.33]). Thus, Hypothesis 3 is supported. In addition, we conducted the moderated mediation analysis using PROCESS macro (Model 7) to test the indirect conditional effect. The results suggest the positive and significant index of moderated mediation (index = 0.09, 95% bias-corrected CI [0.02, 0.16]). Thus, Hypothesis 4 is supported. The results are summarized in Table 6.

Second, we treated the issue of multicollinearity by going beyond the mean-centering approach. Specifically, we randomly estimated 85% of the data to test the plausibility and stability of coefficients (Echambadi & Hess, 2007). The results suggest no instability in the regression coefficients. Thus, we concluded that multicollinearity is not a problem in this study.

## 4.3 | Key findings

For Hypothesis 1, our empirical evidence is consistent with some prior studies (e.g., Adomako, 2020; Carmeli & Azeroual, 2009; Yu &

Huo, 2019) where relational capital is positively and significantly associated with environmental knowledge integration. Evidence of a positive and significant relationship between environmental knowledge integration and environmental performance is also found in support of Hypothesis 2, which is again in line with previous scholarship (Jiang et al., 2020; Liao, 2018b). More importantly, adding to the RBV (Barney, 1991), the third finding (i.e., environmental knowledge integration mediates the linkage between relational capital and environmental performance) suggests that environmental knowledge integration is an important mechanism that channels the association between relational capital and SMEs' environmental performance. Thus, Hypothesis 3 is supported. The fourth finding (i.e., ties strength moderates the relational capital-environmental knowledge integration-environmental performance relationship) supports Hypothesis 4 and offers a fresh insight into the conditions under which relational quality is more effective for environmental knowledge integration and subsequent environmental performance (Liao, 2018c).

## 5 | DISCUSSION AND CONCLUSION

Drawing on the social capital perspective (Nahapiet & Ghoshal, 1998) and the RBV (Barney, 1991), the current study aimed to investigate whether and under which conditions relational capital influences environmental performance. By doing this, we respond to the recent calls (e.g., Chang & Gotcher, 2020; Dzhengiz & Niesten, 2020; Zou et al., 2019) to assess the effectiveness of relational capital in promoting environmental knowledge integration and enhancing environmental performance. Using insights from SMEs in the UAE, the findings of our study suggest that SMEs in developing countries can benefit from trust-based strategic alliances and environmental initiatives. Overall, the obtained study findings have important theoretical and practical implications.

### 5.1 | Theoretical and practical implications

The study offers several theoretical contributions. First, this study advances the RBV (Barney, 1991) and social capital (Nahapiet & Ghoshal, 1998) literature to understand the relationship between relational capital and environmental performance. While applying RBV to link relational capital with environmental performance, we argue that relational capital is vital to promote mutual trust and competitive gains (Cucculelli et al., 2019), but not sufficient to directly influence environmental performance, especially in the context of UAE as an emerging economy (Singh et al., 2020). Indeed, relational capital is an important resource and must be deployed in a manner that should become difficult to imitate by competitors (Barney, 1991; Ndofo et al., 2011). We suggest that SMEs should use relational capital to derive environmental knowledge integration, which, in turn, promotes environmental performance (Adomako, 2020; Adomako & Nguyen, 2020a; Onofrei et al., 2020). Thus, our study offers a more

**TABLE 6** Result of conditional indirect effects

	Estimates	95% confidence interval	
		Upper limit	Lower limit
<i>Indirect effect</i>	0.23	0.14	0.33
<i>Conditional indirect effects</i>	0.08	0.02	0.16
−1 SD of moderator	0.09	0.03	0.19
Mean of the moderator	0.24	0.14	0.34
+1 SD of the moderator	0.35	0.19	0.51

Note: Results are based on 5000 bootstrap samples.  
Abbreviation: SD, standard deviation.

nuanced understanding of how relational capital increase SMEs' environmental performance through environmental knowledge integration.

Second, we extend the understanding of the boundary conditions under which relational capital promotes SMEs' environmental performance. Specifically, we provide a contingency perspective that demonstrates that the strength of the ties of SMEs seemed to offer a critical boundary condition for the effectiveness of relational capital in promoting environmental performance (Liao, 2018c). Thus, our study complements the social capital and environmental management literature by investigating the relational capital conditions under which the indirect association between relational capital and environmental performance is effectual. In particular, the findings suggest that SMEs are more likely to use relational capital to drive environmental knowledge integration, which can generate environmental performance, more when the strength of the ties is stronger among alliance partner.

Our study offers several suggestions to SMEs' executives and managers on how relational capital can promote environmental performance. First, we suggest that investing in relational capital is important for SMEs because it can help to nurture mutually beneficial relational resources that are deemed necessary for environmental knowledge integration. Relational capital is essential to acquire knowledge about climate changes, environmental protection and waste management issues (Sun et al., 2018). Therefore, we suggest that SMEs' managers should encourage investment in relational capital to help their firms to integrate environmental knowledge to stay competitive and relevant in the dynamic markets. Second, our study suggests that environmental performance depends on environmental knowledge integration. Therefore, we suggest that environmental knowledge integration should not be reflexive to stakeholder pressure but proactive action at reducing sustainability issues to enhance environmental performance (Singh et al., 2020). Furthermore, our findings suggest that executives and managers in SMEs should utilize relational capital to promote environmental knowledge integration in order to enhance environmental performance. Third, SMEs should consider ties strength as an important resource. We had posited that ties strength moderates the impact of relational capital on environmental performance through environmental knowledge integration. Therefore, consistent with our findings, we suggest that managers should encourage stronger relational ties to promote the effect of relational capital on environmental knowledge integration and environmental performance.

## 5.2 | Limitations and future research directions

Despite the noteworthy contributions, our study has several limitations that warrant future research attention. First, our study relied on relational factors to derive the environmental performance of SMEs. However, arguments can be made that firm-level constructs, such as managers' environmental beliefs, leadership attributes, and big data analytics capability (Shamim et al., 2020; Singh et al., 2020), can complement the effect of relational capital on environmental knowledge

integration. Thus, the *Business Strategy and the Environment* literature will be enhanced if future studies integrate firm-level constructs in our study.

Second, while we investigated the moderating role of ties strength, there can be other boundary conditions for the indirect effect of relational capital on environmental performance. For example, stakeholder pressure can encourage SMEs to practices environmental knowledge to sustain their reputation and environmental performance (Konadu et al., 2020). Thus, future studies could consider potential moderating factors, including stakeholder pressure, resource commitment, environmental uncertainty, and so on.

Third, our study was conducted in the newly emerging yet under-researched context of UAE. Though the UAE shares some common characteristics with other countries in the Middle East, understanding contextual peculiarities of other developing countries can offer additional insights for the development of theory. For example, future studies can investigate how contextual differences among developing countries, especially in the Middle East, can promote the environmental performance of SMEs.

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