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MNEs engagement with environmental sustainability in an emerging economy: Do dynamic capabilities and entrepreneurial orientation matter?

Abderaouf Bouguerra [a,*], M. Selim Cakir [b], Tazeeb Rajwani [a], Kamel Mellahi [a], Ekrem Tatoglu [c,d]

[a] Surrey Business School, University of Surrey, Guildford, United Kingdom
[b] University of Birmingham, Birmingham Business School, United Kingdom
[c] Gulf University for Science and Technology, College of Business Administration, Kuwait
[d] Ibn Haldun University, School of Business, Turkey

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ABSTRACT

In this study, we investigate the link between multinational enterprises' (MNEs) dynamic capabilities (DC) and their environmental collaboration with suppliers mediated by entrepreneurial orientation (EO) and moderated by environmental complexity. Drawing on responses from 249 managers of MNEs in Türkiye, we find that DC improve environmental collaboration with suppliers. Moreover, we posit that through EO, MNEs achieves greater environmental collaboration with suppliers for effective environmental solutions, especially at a low level of environmental complexity. The results enrich the role of organizational capabilities in strengthening environmental collaboration with suppliers to achieve environmental sustainability, and provide suggestions for managers and policymakers to better understand capabilities for the purpose of attaining sustainability.

1. Introduction

Environmental sustainability issues, such as climate change and scarcity of natural resources, remain troublingly persistent (Brammer et al., 2019). Given that around 90% of environmental pollution occurs in global supply chains (CDP, 2021), multinational enterprises (MNEs) are uniquely positioned to reduce environmental harm in their supply chains (López et al., 2019; Patchell, 2018; Souisa, 2018; Soundararajan et al., 2021). As such, businesses are increasingly responding to sustainability issues by engaging in collaboration with their suppliers to make progress in environmental sustainability (Doh et al., 2019; Han et al., 2018; Stadtler & Lin, 2019). In particular, MNEs are deemed to collaborate with suppliers in the global supply chains and meet environmental goals and objectives. To achieve this, MNEs' organizational capabilities need to induce the willingness to make collaborative efforts with suppliers in order to reduce environmental harm. That is, dynamic capabilities (DC), that underpin a firm's ability to adapt and reconfigure the resource/competence base and react quickly to external changes (Teece, 2007; 2014), can enable MNEs to form and drive environmental collaboration with suppliers for environmental solutions.

Previous empirical research shows strong links between DC and environmental performance, but the results are inconclusive (see Table 1), often providing unclear understandings on how and when DC increase or decreases a firm's environmental performance (Eikelenboom & Jong, 2019; Knoppen & Knight, 2021; Mohaghegh et al., 2021). This is primarily due to the long-linked relationship between DC and environmental performance, with variations and inconsistencies in measuring environmental performance (Dragomir, 2018; Singh et al., 2020; Pezeshkan et al., 2016). There is a need for breaking down this long-linked relationship between DC and environmental performance in order to provide a more nuanced picture on how organizations make effective and practical progress in sustainability agenda. Therefore, in this paper we focus on environmental collaboration between MNEs and their suppliers, which is a critical step towards better environmental performance (see Table 2). The underlying assumption is that DC are driven by different mechanisms and contingencies (Zahra et al., 2022); so, investigating the underlying mechanisms and boundary conditions on the DC-environmental collaboration link is crucial to uncovering how DC contributes to environmental sustainability. Specifically, tackling complex sustainability issues in the supply chain rests not only on the firm's ability to renew and reconfigure organizational capabilities, but also on entrepreneurial posture which enables firms to proactively identify new opportunities and renew their capabilities (Kim, 2018). Thus, our study asks the following core question: *Do DC of MNEs foster environmental collaboration with their supply chain partners for environmental sustainability?*

* Corresponding author.
E-mail address: a.bouguerra@surrey.ac.uk (A. Bouguerra).

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To answer this important question, we examine the link between DC and the formation of environmental collaboration with suppliers, and the role of entrepreneurial orientation (EO) as an intervening mechanism that enable the formation of environmental collaboration. We draw on the DC theory, as it enables firms to reconfigure, adapt, innovate, and react to change in the external environment (Hughes et al., 2021). We propose and demonstrate that while DC in MNEs foster collaboration with suppliers for environmental sustainability (Chan & Ma, 2016), they need to be combined with appropriate strategic posturing such as a firm's EO. In so doing, we argue theoretically and demonstrate empirically that EO, as a mechanism, and environmental complexity, as a boundary condition, determine the extent to which firms benefit from their DC.

While DC enable firms to sense opportunities and reconfigure resources, they do not guarantee the realization of desired outcomes. A successful application of DC is rooted in the firm's ability to continuously create, define, discover, and exploit entrepreneurial opportunities (Teece et al., 2014; Zahra et al., 2006). As such, EO as a strategic posture of the firm (Hughes et al., 2022; Riviere & Romero-Martínez, 2021) has long been incorporated in the definition of international entrepreneurship as a combination of innovative, proactive, and risk–seeking behaviours that crosses national borders and is intended to create value in organizations (Covin & Miller, 2014; McDougall & Oviatt, 2000). This strategic posturing enables a firm to take more risk, and be more innovative and proactive in order to achieve greater environmental collaboration for sustainable solutions (Souisa, 2018; Wales et al., 2016).

This study offers theoretical contributions to the burgeoning international business (IB) literature, particularly, how MNEs are dealing with the grand challenges and sustainable development, as well as linking into the EO literature. Firstly, several studies have recently supplicated for opening the 'black box' on the antecedents of sustainable development (Arora & De, 2020; Buzzao & Rizzi, 2020; Han et al., 2018; Oh & Oetzel, 2022). We respond to this call by examining the organizational capabilities that assist MNEs in engaging with sustainable development in emerging economies. We posit that MNEs' DC help promote environmental collaboration with suppliers to achieve environmental sustainability. Although there is a growing literature in the international business field on the antecedents and outcomes of DC (Baía & Ferreira, 2019; Ferreira et al., 2020; Wilden et al., 2013), and while few studies have examined how DC influence commitment towards sustainability (Bouguerra et al., 2021), these studies did not unpack the complex relationships between DC and the formation of sustainable collaboration. Therefore, there is a need to break down the association between DC and sustainability practices through accounting for collaborative efforts. Building upon this view, in this study, we demonstrate whether DC enable the effective formation of collaboration for environmental sustainability in the supply chain.

Secondly, we uncover the underlying mechanisms that convert DC into environmental collaborations with suppliers geared towards sustainability. This is important as there is a paucity of research that explores the mechanisms linking forms of managerial capabilities, processes, and behaviors to sustainability (Arora & De, 2020). To close

Table 1
Key studies on the relationship between dynamic capabilities and environmental/social performance.

Author (s)	Theoretical perspective used	Methods used	Type of outcomes	Relationship between DC and environmental / social outcomes	Main findings
Mohaghegh et al. (2023)	Dynamic capabilities	Quantitative (survey data from 113 manufacturing firms in Italy)	Economic, social and environmental performance	Direct	Internal learning fully mediates the link between agility and economic performance and partially mediates the link between agility and social performance. Also, reconfiguration fully mediates the link between agility and economic/ environmental performance and partially mediates the agility-social performance relationship.
Fores et al. (2023)	Dynamic capabilities	Quantitative (survey data from database of 748 family tourism firms)	Environmental performance	Direct	Dynamic capabilities have a positive effect on environmental performance. Also, having a high degree of family managerial involvement positively moderates the effect of dynamic capabilities on environmental performance but only in family firms with highly-developed dynamic capabilities
Knoppen and Knight (2021)	Dynamic capabilities	Qualitative (15 case studies)	Environmental and social performance	Not significant	Organizational goals and impact in terms of 'sustainability advantage', that is, maximization of environmental and social performance within the constraint of economic viability
Mohaghegh et al. (2021)	Dynamic capabilities	Quantitative (survey data from 99 Italian firms)	Economic, environmental, and social performance	Indirect	Firms to become "lean adopters", they are required not only to consider lean as a full package but also to constantly establish and develop higher-order or "lean-related dynamic capabilities
Eikelenboom and de Jong (2019)	Dynamic capabilities	Quantitative (survey data from 219 Dutch SMEs)	Social, environmental and economic performance	Direct	Integrative dynamic capabilities affect all forms of sustainability (social, environmental and economic performance) of SMEs
Kabongo and Boiral (2017)		Qualitative (interviews with 60 managers)	Eco-efficiency	Not significant	Industrial ecology efficiency largely depend on the integration and coordination of competencies, innovations and new routines, as dynamic capabilities
Leonidou et al. (2015)	Dynamic capabilities	Quantitative (102 hotel chains)	Green competitive advantage	Direct	Organizational learning, shared vision, and cross-functional integration are conducive to creating a green competitive advantage, though this is not the case with relationship building and technology sensing/response
Arend (2013)	Dynamic capabilities	Quantitative (survey data from US SMEs)	Ethical performance	Direct	Dynamic capabilities have a positive impact on SMEs ethical performance

this gap, we bring in EO to explain how through EO, MNEs collaborate with suppliers and adopt best practices to attain environmental sustainability. As MNEs often change their course of action and operations due to environmental pressures (Chan, 2005), we highlight that an MNE's proactiveness, innovativeness, and risk-taking facilitate environmental collaboration with suppliers to attain environmental success. Moreover, entrepreneurially oriented firms are more likely to serve stakeholders' interests and develop innovative and proactive practices to meet environmental demands (Bouguerra et al., 2023). Therefore, EO enables MNEs to be proactive, innovative, predict environmental challenges, and to better adjust their operations to react accordingly to stakeholders' requirements.

Thirdly, we extend the growing stream of research on sustainable development by explicating the underlying boundary conditions through which MNEs can deploy their capabilities effectively to achieve higher environmental collaboration with suppliers and meet environmental goals. DC do not automatically translate into organizational outcomes (Buzzao & Rizzi, 2020), as they are prone to contextual factors that may affect their impact on sustainable development. This is particularly evident in emerging markets, where the environment is continuously changing, which may affect how MNEs' capabilities are deployed for environmental sustainability purposes. Moreover, the effect of external conditions in the form of environmental dynamism, hostility, and complexity on organizational outcomes has been acknowledged in the strategy and IB research (Matanda & Freeman, 2009; Patel et al., 2018). For example, the complex environmental setting can pose challenges and opportunities for organizations (Child, 1972). It can catalyse innovation and competitiveness or increase cost and time to deploy and integrate capabilities and processes successfully. In fact, the complexity of the external environment is initially a common feature of emerging economies because these economies are undergoing frequent institutional, economic, and political changes. From this, we integrate the boundary condition of environmental complexity to understand when MNEs better collaborate with suppliers as key stakeholders and respond effectively to environmental sustainability issues.

2. Theory and hypotheses development

2.1. Dynamic capability theory

The extension of the resource-based view (RBV) into DC theory offers a fresh perspective for explaining how firms deploy DC to realize environmental collaboration for environmental solutions (Bocken & Geradts, 2020; Wu et al., 2012). Defined as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997: 516), DC enable organizational learning, establishment of new combinations of assets and renewal of internal and external competencies (Helfat & Winter, 2011). There are three dimensions underpinning DC: *sensing*, *seizing* and *reconfiguring*. Sensing refers to the ability of firms to perceive, filter, and recognize the opportunities and challenges in the business environment (Teece, 2007). Sensing is also a form of learning which enables the firm to anticipate market changes and stakeholders' requirements and behaviours (Weerawardena & O'Cass, 2004). Seizing is about mobilizing internal and external resources to capture value. Reconfiguring refers to the firm's ability for continuous renewal of resources and capabilities to react to market changes increase firm value (Teece, 2007). Together, the dimensions of DC allow firms to conduct necessary changes by continuously improving resource base and ordinary capabilities (Ambrosini & Bowman, 2009; Teece, 2014) and then make market-orientated decisions (Barreto, 2010).

Due to the complexity and magnitude of global challenges, for firms to transcend beyond financial returns and tackle environmental and social issues, they are required to not only deploy DC but also other organizational attributes (Bocken & Geradts, 2020; Schilke et al., 2018). Building on this, we posit that DC are conducive to environmental collaboration with suppliers for environmental sustainability, but the relationship is driven by different mechanisms and contingencies.

We propose that the link between DC and environmental collaboration with suppliers is mediated by EO and moderated by environmental complexity for two main reasons. Firstly, DC theory posits that

Table 2
Key studies on the implications of environmental collaboration for environmental performance.

Author (s)	Theoretical perspective used	Methods used	How has environmental collaboration been used?	Main findings
Bouguerra et al. (2023)	Stakeholder Theory	A sample of 249 MNEs in Türkiye	Outcome (DV) of entrepreneurial orientation	Entrepreneurial orientation positively impacts environmental collaboration with suppliers. A high level of work engagement and a low level of market environment complexity moderate this relationship.
Bouguerra et al. (2021)	Microfoundations view	A sample of 249 MNEs in Türkiye	Outcome (DV) of operational agility	Operational agility positively affects environmental collaboration with suppliers. Operational agility through individual creativity and flexible work arrangements leads to greater environmental collaboration.
Golgeci et al. (2019)	Relational view	A sample of 270 firms in Türkiye	Mediator	Environmental collaboration mediates the impact of social capital and relational capability on environmental performance.
Bae and Grant (2018)	Stakeholder view	A sample of 222 firms in Korea	Outcome (DV) of learning capability and organisational culture Antecedents (IV) of environmental performance	Learning capability was found to positively affect environmental collaboration. However, organisational culture does not affect environmental collaboration. Environmental collaboration was found to positively affect environmental performance.
Grekova et al. (2016)	Extended resource-based view	Survey with 139 Dutch food and beverage firms	Antecedent (IV) of firm performance	Environmental collaboration with suppliers can improve the performance (cost savings). However, collaboration is not likely to assist firms seeking to improve environmental sustainability of their internal processes.
Paulraj et al. (2014)	Relational exchange view	A survey with 114 US firms	Outcome (DV) of governance mechanisms (process and structural) Mediator between governance mechanisms and environmental and social performance	There is a positive impact of process governance mechanisms on environmental collaboration. However, the impact of structural governance mechanisms on environmental collaboration was found to be insignificant. Also, environmental collaboration positively mediates governance mechanisms and environmental and social performance.
Vachon and Klassen (2008)	Natural resource-based view	Semi-structured interviews with six executives and a survey with 366 plants	Antecedent of firm performance (quality, cost, delivery) and environmental performance	There is a positive link between environmental collaboration with suppliers and manufacturing performance. Also, environmental collaboration with suppliers positively affects environmental performance.

DC are enhanced when supported by EO behavior (Teece, 2014; Zahra et al., 2006), especially in dynamic and competitive environments compelling the firm to take more risks and be more proactive and innovative to respond to environmental and social challenges accordingly. As such, EO helps the firm to catalyze a shift within the firm towards environmental practices by driving innovation and engaging proactively with market and stakeholders' demands. Through risk-taking, innovativeness, and proactiveness, the firm orients more towards proactive and innovative forms of participation with stakeholders for environmental sustainability.

Secondly, a firm is influenced by external environmental conditions, namely, complexity, dynamism, and hostility. An environment is considered complex where uncertainties and complexities surrounding MNEs to remain competitive are high. This is more prevalent in emerging economies. Moreover, the adverse economic conditions in the emerging economy context generate even more turbulence and barriers for firms (Shirokova et al., 2020). Such environmental conditions are likely to change the firms' behavior and focus on exploiting new opportunities and subsequently support and optimize the extent of DC (Zahra & Garvis, 2000).

2.2. The effect of dynamic capabilities on environmental collaboration

A firm's DC is crucial to make progress in sustainability agenda (Chowdhury al., 2019). These capabilities enable for firms to change objectives, strategies, and processes in line with competitive, social, and environmental requirements (Zollo et al., 2016). The ability of firms to sense, i.e. identify and assess opportunities outside its boundaries, and reconfigure, i.e. renew, and upgrade the resources and capabilities to match market demand, help them to understand changing environmental demands and stakeholder requirements, and adapt upon these changes accordingly (Ghosh et al., 2022; Mishra et al., 2022). The pressure to meet environmental sustainability pushes firms to alter their priorities and strategic tasks. Such an unexpected change can be tackled if a firm engages with stakeholders to respond to social and environmental goals in a timely manner (Panda & Sangle, 2020). Indeed, MNEs developing DC can gain local knowledge and react to changes through their relationships and interactions with stakeholders in that environment (Michailova & Zhan, 2015).

DC are particularly essential for MNEs because they need to adapt, often simultaneously, to the changes in multiple locations with increased environmental pressure (Perez-Batres et al., 2012; Schotter et al., 2017). MNEs with DC deploy their fluid resources to sense the environment and renew their resources and capabilities in order to swiftly meet emerging environmental demands. Furthermore, they remain attuned to environmental change, where they can each deploy DC to press and collaborate for change in supplier practices. When MNEs operate in dynamic environments (e.g., emerging economies), they are likely to confront various tensions and complexities regarding environmental sustainability (Djekic et al., 2021; Mishra et al., 2022). These MNEs, then, are likely to adapt and adjust to changing environmental demands and collaborate across geographical boundaries to find environmental solutions (Rebs et al., 2019). With the augmented environmental expectations of multiple stakeholders, MNEs must sense the environment and reconfigure their strategies and processes to collaborate with their supply partners and then reduce environmental footprint (Matysiak et al., 2018; Watson et al., 2018; Xiao et al., 2020). When MNEs read and respond to the external environment, they can develop coordination strategies with suppliers for enhanced clean production and waste reduction. Moreover, DC spark change in suppliers' attitudes towards new ways of waste reduction, cleaner production, and serving the focal MNEs' environmental goals. Based on this discussion, we hypothesize that:

Hypothesis 1. *MNEs' DC are positively associated with environmental collaboration with suppliers for environmental sustainability in an emerging economy context.*

2.3. The mediating effect of entrepreneurial orientation

EO represents a strategic posture comprising proactive, innovative, and risk-taking behaviors (Wales et al., 2016). Accordingly, EO denotes a firm's approach to accepting and implementing innovative practices, procedures, and decision-making practices that introduce new and distinctive value offerings (Lumpkin & Dess, 1996; Wiklund & Shepherd, 2011). It is fundamentally about developing innovative ideas and processes and also anticipating and acting upon future opportunities and challenges within the external environment (Hughes et al., 2021; Wales, 2016). This implies that EO plays a significant role in meeting stakeholders' requirements (e.g., Marshall et al., 2015; Morgan & Anokhin, 2020; Teece, 2012) due to its role in facilitating a proactive and innovative approach to new offerings for suppliers and customers. In emerging economies, MNEs need to continually adapt to shifting institutional changes and pressures (Wright et al., 2005), making EO extremely important. Specifically, MNEs involved in supply chains face an increased level of uncertainty in emerging economies due to the lack of governance mechanisms for directing environmental initiatives (Tatoglu et al., 2014). Emerging economies, in turn, face a high level of pressure from stakeholders to meet environmental sustainability goals. Thus, EO provides an intermediary mechanism to convert DC into greater environmental collaboration with stakeholders (suppliers) for environmental sustainability.

Research shows that DC are crucial to adjusting core competencies against rapidly changing internal and external environments (Teece, 2007). One of the key mechanisms through which DC facilitate environmental collaboration is EO. Firms with high EO have a better sense of changing trends around them. The confidence in keeping up with the trends leads to the proactive pursuit of opportunities, such as new ways to collaborate promptly with suppliers and find environmental solutions (Swoboda & Olejnik, 2016). For instance, the aspects of risk-taking, innovativeness, competitive aggressiveness, proactiveness, and an intentional tendency toward autonomous action, help MNEs to chase novel opportunities and react to any disruptive changes in supply chains (Bouguerra et al., 2023). Also, MNEs with EO are more likely to find effective ways to coordinate with suppliers in terms of creating new methods of managing waste and enhancing cleaner production, and also reacting in a timely manner to any risks that may harm environmental sustainability (Kuratko et al., 2014).

Moreover, risk-taking, innovativeness, and proactiveness are essential attributes of entrepreneurially oriented MNEs in emerging economies. They can play a salient role in strengthening DC's influence on environmental collaboration with suppliers (Jantunen et al., 2005). For instance, proactive and entrepreneurially oriented MNEs can be better at leveraging DC for understanding and reacting to stakeholders' demands, such as environmental initiatives, as they identify future trends in the market and adjust relationships with suppliers accordingly. Thus, we hypothesize that:

Hypothesis 2. *EO mediates the relationship between MNEs' DC and environmental collaboration with suppliers for environmental sustainability in an emerging economy context.*

2.4. The moderating effect of environmental complexity

The prevailing view in the literature suggests that dynamic capabilities are more relevant in complex environments markets (Buccieri et al., 2020), where levels of environmental complexity affect DC mechanisms and outcomes (Ambrosini & Bownman, 2009). As one of the defining characteristics of market environments, environmental complexity is an element of a firm external environment (Newkirk et al., 2003). A complex environment can be characterized by changing customer purchasing habits, stiffened competition, and diversity in

products/services that can subsequently influence the firm's capabilities and behaviors (Rueda-Manzanares et al., 2008). Environmental complexity is typical in emerging economies (Wright et al., 2005). A higher level of environmental complexity leads to unpredictable and uncertain outcomes, through which it imposes critical competitive threats capable of reshaping business capabilities and behaviors (Lee et al., 2019). Although complexity has always been a feature of the business environment, particularly that of emerging economies, the unprecedented levels of advancement and integration in the global economy led to a growing number of external shocks with unpredictable implications for businesses (Tidd & Bessant, 2018).

Environmental complexity in emerging economies means that DC become more critical to collaborating proactively and innovatively with suppliers (Golgeci et al., 2019). Considering that DC enable firms to manage external (environmental) complexities, their application in highly complex environments could be used to hedge against unpredictable challenges and attenuate failures in the supply chain (Lengnick-Hall & Beck, 2009). As such, MNEs based in emerging economies deploying DC to achieve higher environmental collaboration may find them to be more difficult in complex environments. Moreover, when faced with environmental complexities, organizational resources and efforts tend to be directed towards offsetting those pressures (i.e., surviving) via collaborating with suppliers.

Further, in complex environments, rapid changes in technologies and stakeholders' preferences give rise to more opportunities for firms to benefit from entrepreneurial behaviors (Cao et al., 2015). In other words, within this setting, firms perceive more unpredictable changes in stakeholders and market demands, are likely to not sense and reconfigure resources and processes promptly, and be entrepreneurially active. This is because these firms are often constrained by the capacity to deploy additional resources and capabilities resources in managing environmental issues within the supply chain (Cao et al., 2015).

Thus, following these circumstances, we argue that the degree of environmental complexity can moderate the relationship between firms' DC and environmental collaboration through EO. We, therefore, hypothesize the following:

Hypothesis 3. *MNEs' DC have a stronger effect on environmental collaboration with suppliers for environmental sustainability via EO where environmental complexity is high (*vs. *low) in an emerging economy context.*

3. Method

3.1. The survey context

Türkiye reflects the context of our research for several reasons. First, Türkiye is amongst the most significant economies in Europe and the Middle East, and it is a member of the G20. In the aftermath of the 2001 economic turmoil, the country introduced major economic and political reforms, especially in improving its financial system (e.g., initiating a floating exchange approach), becoming one of the primary recipients of inward foreign direct investment (FDI) in the region. Second, the environment in Türkiye is continuously changing and highly vibrant, where organizations need to develop more dynamic practices to thrive and remain competitive (Arda et al., 2019; Tatoglu et al., 2014). Third, like leading emerging economies, Türkiye is attempting to impose pressure on organizations to incorporate environmental and social practices into their operational and strategic tasks and alleviate environmental impact (Cakar & Alakavuklar, 2014). In particular, MNEs operating in Türkiye are more pressured by global and environmental constituents to improve their environmental practices and reduce environmental impact (Tatoglu et al., 2020). In response to this competitive setting, MNEs increasingly invest in achieving sustainable development goals in parallel with maximizing financial returns. Considering these circumstances, MNEs operating in the emerging Turkish economy provide an appropriate research setting to investigate how MNEs deploy their DC to enhance cooperation with suppliers for environmental sustainability.

3.2. Sample and data collection procedure

The data is extracted from the Turkish Ministry of Trade's FDI database, which lists all MNEs operating in Türkiye. There are over 75,000 FDI firms in the database as of 2021. MNEs with a small capital size (less than 10 million USD) and fewer than 10% foreign equity stake are excluded from our sample in line with Demirbag et al. (2007). This procedure resulted in including 2345 FDI firms as our sample population. Next, 500 MNEs are randomly chosen to participate in the present study. In line with Dillman's (2007) recommendation, we screened and targeted potential respondents in each of the selected MNE, depending on the participant's knowledge, experience, and engagement in strategic and operational decision-making. We used multiple respondents' approaches to increase the veracity and validity of responses.

Following Brislin's (1986) recommendation, we employed the back-translation approach from English to Turkish to develop our survey, where the survey was checked by two bilingual scholars. A total of 1800 questionnaires (2–5 questionnaires sent to each firm) were mailed, soliciting that the participants have a comprehensive understanding of managerial behaviors, processes, and decisions, and especially a high level of operational knowledge. Participants were carefully designated by the organization to answer the questions. For instance, upon our request, the organization distributed the questionnaire to the right people, where it selected core employees with relevant knowledge and expertise on the organizational and operational practices and performance. We obtained a total of 257 responses after two rounds, of which 249 were usable in our study. This process yielded a response rate of 13.8%, which is an acceptable rate compared to previous studies in similar contexts (Kriauciunas et al., 2011).

3.3. Measurement of variables

Consistent with prior research (Singh et al., 2016), perceptual measures are used to depict organizational capabilities, behaviors, and outcomes. All measures were administered using five-point Likert scales (1 =“strongly disagree” to 5 =“strongly agree”).

3.3.1. Independent variable

Dynamic capabilities are measured using items adopted from Wilden et al. (2013) and Jantunen et al. (2018). The items focus on two dimensions (i.e., sensing and reconfiguring) of dynamic capabilities for the purpose of this study. Due to low factor loading, we removed one item from DC. As a result, three items reflect the sensing dimension of DC, which entail activities for knowledge and resource acquisition and identifying opportunities in the external environment, and seven items reflect reconfiguring dimension representing a firm's ability to renew strategy, processes, and procedures (Jantunen et al., 2018).

We used a similar approach as previous research to measure DC (see for example Pavlou & El Sawy, 2011; Ellonen et al., 2011; Jantunen et al., 2018). As DC are abstract, intangible, and difficult to explain, we modelled them with a higher-order model.

3.3.2. Dependent variable

Environmental collaboration with suppliers measures how firms collaborate with suppliers to improve and enhance environmental sustainability. Four items are drawn from Vachon and Klassen's (2006) items that measure environmental collaboration.

3.3.3. Mediating variable

Entrepreneurial orientation assesses the firm's proactive, risk-taking, and innovative behavior (Naman & Slevin, 1993; Wiklund, 1998). We removed one item due to low factor loading, so the final measure comprised of eight items. The Wiklund (1998) and Naman and Slevin's (1993) items demonstrate the strategic posture of the firm exhibiting

innovative, proactive, and risk-taking behaviour.

3.3.4. Moderating variable

Environmental complexity measured the extent of complexity in the firm's external environment based on three items (i.e., diversity of consumer purchasing habits, competition, and product line) that are drawn from Newkirk et al. (2003) and Chen et al. (2015).

3.3.5. Control variables

Consistent with prior literature (Chang et al., 2015; Schweisfurth & Raasch, 2018), our controls for this study are as follows: *firm size, industry sector*, *managerial level, work experience*, and *managers' educational level*. Previous research shows that these variables can influence DC and their associated impact.

3.4. Analysis method

The mediating effect of entrepreneurial orientation on the link between DC and environmental collaboration is tested using the Monte Carlo Markov Chain (MCMC) online tool. The significance of the mediation effect is manifested when confidence intervals do not contain zero (Bauer et al., 2006; Selig & Preacher, 2008). Furthermore, we conducted a moderated mediation test following Edwards and Lambert's (2007) procedure. In doing so, we employed this approach to estimate the mediation effect both above (high) and below (low) the mean of the variables, specifically, environmental complexity. Bias-corrected bootstrapped standard errors and confidence intervals for the indirect effect were computed for environmental complexity and used to assess the statistical significance of the indirect effect at each level of these variables. If the bootstrapped confidence interval for the index excludes zero, one can conclude that there is evidence of moderated mediation (Hayes, 2015).

4. Results

4.1. Confirmatory factor analysis

We conducted confirmatory factor analysis (CFA) to assess the validity of our measurement model. The CFA results presented in Table 3 indicate a good fit with the data [χ^2/df= 2.83, $p < .01$; IFI= .90; CFI= .90; RMSEA= .06]. The χ^2/df ratio of 2.83 falls within an acceptable range, indicating reasonable model fit considering the sample size. Additionally, both the Incremental Fit Index (IFI) and Comparative Fit Index (CFI) values of.90 suggest an adequate overall fit of the model to the data. Furthermore, the Root Mean Square Error of Approximation (RMSEA) value of.06 indicates a low level of discrepancy between the observed data and the model, supporting the validity of our measurement approach.

4.2. Common method bias

We reduce the possibility of common method bias (CMB) by employing several methodological techniques. We also use post hoc statistical methods, including Harman's single factor and marker variable methods, to check whether CMB poses a concern for this study.

As per the methodological techniques, first, we scanned potential respondents knowledgeable and experienced about the research topic. We provided information to all potential respondents that their responses would be treated strictly confidential and anonymous throughout the whole research process. Second, multiple responses are generated at each firm (e.g., two to five responses per each MNE) to foster our data's validity and rigor (Craighead et al., 2011). Possessing several responses in our data allows us to capture better a firm's capabilities and behaviors and their impacts. Third, a pilot test was undertaken with five managers in Türkiye that increased the quality and consistency of our question items. Following their suggestions, we improved the question items (providing a clear structure and adjusting some items according to the context of our study). Taken together, we promoted the level of clarity, validity, and consistency of our survey questionnaire and alleviated any concerns related to CMB.

Table 3
Results of confirmatory factor analysis.

Constructs/items	Standardized loadings[a]	CR[b]
Dynamic capabilities		**.81**
Sensing	.80	
In our organization, people participate in professional business association activities.		
Our employees attend scientific and professional conferences.	.81	
We connect with our active network of contacts with the scientific and research community.	.63	
Reconfiguration	.78	
Implementation of a new or substantially changed organizational strategy.		
Implementation of new kinds of management methods.	.79	
New or substantially changed marketing method or strategy.	.82	
New or substantially changed technological equipment, manufacturing, or service delivery process.	.79	
Substantial renewal of business processes.	.65	
Initiation of new procedures or systems.	.79	
New or substantially changed ways of achieving our targets and objectives.	.80	
Entrepreneurial orientation		**.84**
We are among the first to implement progressive and innovative production processes and practices.	.58	
The management of our organization supports the projects that are associated with risks and expectations for returns higher than average.	.75	
We actively observe and adopt the best practices in our sector.	.61	
We actively observe the new practices developed in other sectors and exploit them in our own business.	.72	
We recognize early on such technological changes that may affect our organization.	.60	
We are able to take on unexpected opportunities.	.73	
We search for new practices all the time.	.74	
In uncertain decision-making situations, we prefer bold actions to ensure possibilities are exploited.	.62	
Environmental complexity		**.70**
In our external environment, there is considerable diversity in customer buying habits.	.74	
In our external environment, there is considerable diversity in the nature of competition.	.67	
In our external, there is considerable diversity in product/service lines.	.70	
Environmental collaboration with suppliers		**.83**
Our organization encourages its suppliers to develop new source reduction strategies.	.71	
Our organization cooperates with its suppliers to improve their waste reduction initiatives.	.66	
Our organization works with its suppliers for cleaner production.	.83	
Our organization collaborates with its suppliers to acquire materials, parts, and/or services that support its environmental goals.	.80	

Notes: [a]All loadings are significant at $p < .01$
[b]CR = Composite reliability

4.3. Hypotheses testing

Table 4 displays the descriptive statistics and reliability estimates. Also, the variance inflation factors (VIF) and tolerance values for any potential multicollinearity issues were inspected in this study. The VIF values are between 1.02 and.09, and all tolerance values vary between.90 and.93, suggesting that multicollinearity is not a problem for our study.

Table 4
Descriptive statistics.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. Industry sector	3.85	0.86	1									
2. Firm size	4.65	0.71	-.23 * *	1								
3. Firm age	4.77	1.03	-.22 * *	.37 * *	1							
4. Work experience	3.68	1.13	-.08	.15 *	.30 * *	1						
5. Educational level	2.15	0.56	.13 *	-.06	-.09	-.10	1					
6. Managerial level	4.07	0.73	-.02	.06	.02	-.33 * *	-.13 *	1				
7. Dynamic capabilities	5.56	0.81	.04	.18 * *	.08	.12 *	.13 *	-.15 *	1			
8. Entrepreneurial orientation	5.99	0.94	.04	.25 * *	.17 * *	.04	.01	-.10	.64 * *	1		
9. Environmental complexity	5.05	1.31	-.02	-.05	-.01	-.11	.12 *	.10	.11	.07	1	
10. Environmental collaboration with suppliers	5.51	1.13	-.11	.29 * *	.22 * *	.09	-.04	-.02	.42 * *	.40 * *	.19 * *	1

Notes: N = 249 managers of MNEs.
*p < .05; * *p < .01.

The findings are shown in Table 5a and include five models. Model 1 consists of only control variables. Model 2 contains the independent variable of DC and reports the direct effect on environmental collaboration with suppliers. Models 3–5 include the mediating effect of EO on the DC—environmental collaboration with suppliers' link.

The findings in Model 1 (Table 5a) report that the control variables do not have a significant effect on environmental collaboration with suppliers. Model 2 shows that DC is positively associated with environmental collaboration with suppliers (β = .54, p < .01). Thus, Hypothesis 1 is supported.

We used Models 3–5 to investigate the mediating effect of EO (Hypothesis 2). Model 3 shows that DC facilitates EO (β = .71, p < .01) and Model 4 reports that EO has a positive impact on environmental collaboration with suppliers (β = .50, p < .01). Finally, Model 5 shows that the impact of DC on environmental collaboration with suppliers is reduced when controlling EO. Furthermore, the confidence interval at 95% (CI:.08 –.33) of the mediation did not contain the value of zero. Hence, Hypothesis 2 is supported.

For Hypothesis 3, which tests the moderated mediation effect, in line with MacKinnon and Fairchild's (2009) recommendation, we split the sample into two subsamples: high environmental complexity (above the mean) and low environmental complexity (below the mean). Table 5b reports that the mediation exists ($\beta = .15$, p > .01) at low environmental complexity (95% CI:.22 –.62), while it is not significant ($\beta = .28$, p > .01) at high environmental complexity (95% CI: −.13 –.11). The confidence interval at 95% excludes the value of zero at a low level of environmental complexity. Hence, Hypothesis 3 is supported.

Table 5b
Results of moderated-mediation effects.

Variables	Environmental complexity (H3)					
	Low			High		
	β	SE	t-value	β	SE	t-value
Intercept	3.93 * *	.43	9.13	3.85 * *	.32	12.03
Control variables						
Industry sector	-.01	.01	-1.00	.00	.01	.00
Firm size	.02	.05	.40	-.06	.04	-1.50
Work experience	-.07	.05	-1.40	-.01	.04	-.25
Educational level	-.03	.06	-.50	.02	.04	.50
Managerial level	.08	.09	.88	.02	.07	.28
Indirect effect of entrepreneurial orientation	.53 * *	.13	4.07	-.02	.11	-.18
Confidence interval 95%	*.22 –.62*			*-.13 –.11*		

Notes: N = 249 managers of MNEs.
* * *p* < .01.

5. Discussion and conclusion

The study investigated the link between MNEs' DC and environmental collaboration with suppliers mediated by EO and moderated by environmental complexity. Our findings advance our understanding in answering the overarching question: '*Do DC of MNEs foster environmental collaboration with their supply chain partners for environmental sustainability*'. The findings support our hypotheses. Specifically, we found that MNEs' DC, through EO at a low level of environmental complexity, enable MNEs to collaborate effectively with suppliers and attain greater environmental sustainability in an emerging economy context.

5.1. Theoretical implications

This study provides several contributions to the burgeoning IB literature on grand challenges. Firstly, we applied the DC theory to explicate the relationship between MNEs' DC and their approaches to

Table 5a
Results of direct and mediation effects.

Variables	Model 1: Environmental collaboration with suppliers			Model 2: Environmental collaboration with suppliers			Model 3: Entrepreneurial orientation			Model 4: Environmental collaboration with suppliers			Model 5: Environmental collaboration with suppliers		
	B	*SD*	*t*	*B*	*SD*	*t*	*B*	*SD*	*t*	*B*	*SD*	*t*	*B*	*SD*	*t*
Intercept	3.99 *	.31	12.87	3.91 *	.28	13.96	4.03 *	.21	19.19	4.04 *	.30	13.46	3.84 *	.27	14.22
Industry sector	-.01	.01	-1.00	-.01	.00	.00	-.01	.00	.00	-.01	.00	.00	-.01	.00	.00
Firm size	-.01	.01	-1.00	-.01	.01	-1.00	.00	.01	.00	-.03	.03	-1.00	-.01	.01	-1.00
Work experience	-.04	.04	-1.00	-.02	.03	-.66	.03	.03	1.00	-.03	.04	-.75	-.03	.04	-.75
Educational level	-.05	.04	-1.25	-.05	.04	-1.25	-.04	.03	-1.33	.00	.04	.00	-.03	.03	-1.00
Managerial position	-.01	.04	-.25	.01	.04	.25	-.01	.03	-.33	.10	.08	1.25	.01	.04	.25
Dynamic capabilities				.54 *	.07	7.71	.71 *	.05	14.20				.34 *	.09	3.77
Entrepreneurial orientation										.50 *	.07	7.14	.28 *	.07	4.00
R-squared	.51	.04		.41	.04		.24	.02		.37	.03		.38	.03	

Notes: N = 249
*p < .01.

improve environmental collaboration with suppliers for environmental sustainability in emerging economies. DC theory is often used explain how firm develop their ability to integrate, build, and reconfigure resources and capabilities for responding to changing market conditions in highly dynamic business environments like emerging economies (Teece, 2014; 2020; Teece et al., 1997). This tenet also posits that a firm's success in dynamic markets is likely to help firms develop other distinct capabilities that match a specific context (Helfat & Peteraf, 2015; Salvato & Vassolo, 2018). Consequently, we explain that DC are necessary, but not sufficient to drive a greater level of environmental collaboration in the supply chain. Given the magnitude and complexity of tackling sustainability issues in emerging economies, firms can be more challenged to adapt and reconfigure their capabilities to collaborate innovatively and proactively with their stakeholders and attain environmental success (Zollo et al., 2016). To overcome this disadvantage, firms need to deploy not only DC but also need to possess EO, as a strategic posture, for effective coordination with suppliers in a timely manner. Fig. 1.

Secondly, we provide a plausible explanation of how MNEs' DC react to institutional pressures and tackle sustainability issues, especially across the global supply chain. Existing research indicates a robust association between DC and environmental performance. However, the results are mixed whether DC enhance or diminish environmental performance (Eikelenboom & Jong, 2019; Knoppen & Knight, 2021; Mohaghegh et al., 2021). Therefore, there is a need to break down the link between DC and sustainability practices by accounting for collaborative efforts. Our study builds on this to explain how DC improve environmental collaboration with stakeholders, especially suppliers, then alleviate environmental impacts. We demonstrate that DC promote environmental collaboration with suppliers to facilitate environmental solutions.

Thirdly, we explore the underlying mechanisms through which MNEs with DC better collaborate with suppliers to adopt best practices. In particular, we provide evidence that through EO, MNEs are better at collaborating with suppliers to attain environmental success. Despite compelling theoretical arguments as to how and why firms deploy their EO to meet the requirements of the external environment and enhance business performance (Covin & Slevin, 1991; Cui et al., 2018; Ferreira et al., 2020; Wales et al., 2016), few studies have examined the mediating effect of EO in increasing social and environmental benefits (e.g., Gali et al., 2020; Marshall et al., 2015; Rosenbusch et al., 2013). We provide empirical evidence that EO as an intervening mechanism through which DC can shape environmental sustainability. Specifically, we suggest that firms benefit from DC if they possess a high level of EO. The core argument here is that a successful implementation of DC depends on firms' ability to take more risks and be more proactive and innovative. This implies that to solve unpredictable and growing complex environmental challenges in supply chains in emerging economies, MNEs need to deploy various organizational capabilities to manage their collaboration with external stakeholders, such as suppliers, in a more proactive and innovative manner.

Finally, we make a further contribution by revealing the boundary conditions that set contingencies for when and how DC have a greater impact on environmental collaboration through EO for environmental sustainability. This study reveals that the impact is stronger where the complexity of the environment is low. Channeling DC and EO in environmental sustainability may require additional effort in complex environments. This could create barriers for MNEs to engage in innovative environmental initiatives with suppliers as they may feel that environmental complexity would disrupt necessary conditions for successfully executing such innovative and collaborative practices. Thus, firms operating in complex environments are unlikely to invest in innovative, collaborative processes geared towards sustainability.

5.2. *Practical implications*

Our findings have major and relevant practical implications for both managers and policymakers. First, results suggest that deploying DC enables MNEs to collaborate with suppliers and improve environmental sustainability. The ability to sense the external environment and reconfigure processes and strategies is critical to react to any pressures from stakeholders to prioritize sustainable supply chains and support the sustainability of their suppliers, which is essential to meeting sustainable development. Moreover, we inform policymakers about the intermediary mechanisms and capabilities that firms need to develop sustainable environmental solutions. Policymakers can encourage MNEs in the policy uptake and also support them to adopt specific types of capabilities and behaviors to attain environmental success.

Results also highlight that environmental complexity reduces the positive effects of DC and EO on environmental collaboration with suppliers. This could be because MNEs may not be interested in long-term cooperative relationships when the environment is complex, and behaviors are hard to predict. Furthermore, we suspect that this tendency could be attributed to the fact that in a complex business environment, MNEs often prioritize short-term financial objectives and market positions over sustainability initiatives, which may yield benefits in the medium and long term. Therefore, managers should explore possibilities in order to make sustainability initiatives among

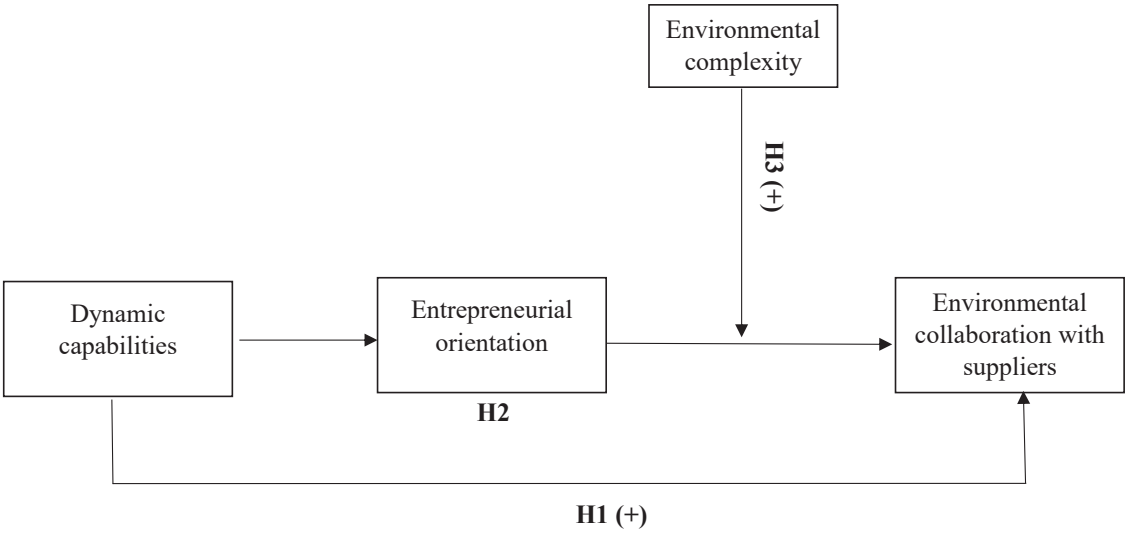

Fig. 1. Conceptual model.

stakeholders less impacted by market conditions. Research suggests that firms need allocated resources for the effective translation of DC and EO on organizational processes and outcomes (Qaiyum & Wang, 2018). In this respect, MNEs may benefit from holding slack resources to be used for sustainability endeavors. With the availability of slack resources, managers enjoy a greater level of discretion to pursue new initiatives, such as environmental collaboration with suppliers for environmental sustainability.

5.3. Limitations and future research agenda

Like most empirical studies, this study is subject to some limitations, which provide avenues for future research. Collaboration among stakeholders is a crucial element for achieving sustainable development. In this respect, our study contributes to the literature by investigating mechanisms through which MNEs facilitate environmental collaboration with their suppliers. Nevertheless, although collaborative efforts has a vital role, it does not necessarily mean that each collaboration, such as the one between MNEs and suppliers, will substantially contribute to environmental performance. Future studies can extend our research by examining the link between environmental collaboration with suppliers and objective environmental performance outcomes (e.g., carbon footprints and waste reduction).

Consistent with extant IB research (e.g., Lee et al., 2011; Purkayastha et al., 2021), we operationalize DC and EO as unidimensional constructs. Nevertheless, future studies could examine subdimensions of DC and EO and their attendant impact on environmental collaboration with suppliers. Although we explored the possibility of different explanations at subdimension level, we limit our subdimension analysis to the dimensions provided in Teece (2007). Also, our DC and EO constructs are static. Future research can, for example, treat sensing and reconfiguration as a continuous measure, based on different observations and frequencies in a particular year or over several years. Another important extension to our findings would be to test our hypotheses using objective variables collected at organizational level.

In conclusion, we aimed to better understand the role of MNEs' dynamic and entrepreneurial capabilities in promoting collaboration with stakeholders for environmental solutions. We stress that partnership among stakeholders is a prerequisite to achieving sustainable development. In this regard, we investigated the capabilities and mechanisms through which MNEs collaborate with their suppliers for environmental sustainability. Overall, this study explains the role of organizational capabilities and mechanisms in promoting stakeholder relationships and meeting sustainable goals.

Data Availability

Data will be made available on request.

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