





ORIGINAL ARTICLE

Grand challenges and emerging market small and medium enterprises: The role of strategic agility and gender diversity

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Abstract

This paper examines the role played by strategic agility and gender diversity in enabling the creation of value for grand challenges (VCGCs) by small and medium-sized enterprises originating from emerging markets (ESMEs). ESMEs face significant challenges due to the dynamic environments in which they operate and the limited support they receive from formal institutions. In such contexts, strategic agility enables ESMEs to drive VCGCs through responsible collaborative innovation. We further argue that gender diversity is an important boundary condition that influences the effect of strategic agility on VCGCs via responsible collaborative innovation. Utilizing 228 survey responses from ESMEs originating from the United Arab Emirates (UAE), our findings shed light on the vital role played by strategic agility in enhancing ESMEs' VCGCs. Specifically, our findings indicate that responsible collaborative innovation acts as an important mediating mechanism between strategic agility and VCGCs. In addition, gender diversity emerges as an important moderating factor in that, in the presence of more heterogeneous senior management teams, the effect of strategic agility on VCGCs through the mediating mechanism of responsible collaborative innovation is higher. These findings contribute to the literature on dynamic capabilities, upper echelons, and grand challenges by providing important insights into the mechanisms and boundary conditions of VCGCs in the context of emerging market firms.

KEYWORDS

emerging markets, gender diversity, grand challenges, responsible collaborative innovation, SMEs, strategic agility

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1 | INTRODUCTION

For decades, the world has been confronted with grand challenges—that is, “specific critical barrier(s) that, if removed, would help solve an important societal problem with a high likelihood of global impact through widespread implementation” (George et al., 2016, p. 1881). Grand challenges are complex, nonlinear, multifaceted, and uncertain “wicked problems” faced by societies, and their mitigation requires collaborative and transnational efforts. In their simplest form, grand challenges involve multiple issues (e.g., migration crises, natural disasters, extreme poverty, inequality, health, and climate change); however, increased emphasis has been placed on the severity of environmental and social problems (Clarke & Boersma, 2017; Lortie et al., 2017). At the same time, in an effort to understand the nature of grand challenges and eradicate them, the UN has formulated and announced a number of sustainable development goals (SDGs) that include solutions to social and environmental issues as key pillars for the achievement of peace and prosperity for all (UN, 2015). In conjunction to this, a relevant research issue pertains to how organizations can achieve value creation for grand challenges (VCGCs)¹ (El-Haddadeh et al., 2020; Jones et al., 2013).

Increasing narratives have been devoted to the nexus of organizational activities and VCGCs (see Grodal & O'Mahony, 2017; Hamann et al., 2020; van Zanten & van Tulder, 2018). Prior studies suggest that organizations possess large portfolios of resources and capabilities that can be utilized for VCGCs through business practices aimed at economic profit maximization (Buckley et al., 2017; Reade et al., 2019). However, such research is mostly characterized by conceptual studies, with a small number of empirical efforts having mainly been made in the context of multinational enterprises (MNEs) (El-Haddadeh et al., 2020; Liou & Rao-Nicholson, 2021; Topple et al., 2017). Even though MNEs may possess large portfolios of resources and have the capabilities necessary to overcome societal issues (Reade et al., 2019), their activities and operations may be characterized by unethical behaviors—as evidenced by the widespread labor-related issues reported in global value chains coordinated by MNEs (Aïssaoui & Fabian, 2021;

¹Consistent with the grand challenges literature, the term VCGCs refers to the practices that support and promote value creation in the two distinct yet related environmental and societal areas (El-Haddadeh et al., 2020; Jones et al., 2013). Environmental value creation involves practices aimed at protecting the environment, including recycling, eco-packaging, the use of eco-friendly materials, and so on; whereas social value creation emphasizes community development initiatives like social welfare, general well-being, and mentoring (Dhahri et al., 2021; Nylund et al., 2021).

Practitioner points

- Grand challenges present significant leadership and coordination challenges for firms.
- Grand challenges can be effectively addressed through coordinated actions and nurturing organizational capabilities.
- Emerging market-based SMEs can create value for grand challenges by utilizing meta capability (strategic agility), nurturing responsible collaborative innovation, and gender diversity.
- Gender diversity plays an important role in enhancing the impact of strategic agility on value creation for grand challenges.

Soundararajan et al., 2017)—and they may be less responsive to grassroots level challenges. Researchers have suggested that small and medium-sized enterprises (SMEs) can also play a significant role in VCGCs, given their prominence in economic development and employment creation across the world (Govindan et al., 2020; Sinkovics et al., 2021).

In part, due to their closeness to grassroots communities and stakeholders, emerging market SMEs (ESMEs) have a particularly huge potential in VCGCs (Leckel et al., 2020). ESMEs are characterized by more flexible structures, less bureaucratic procedures, and a more innovation-oriented culture, which reduce their response time to grand challenges (Arbussa et al., 2017). ESMEs often possess people-centered cultures that encourage them to engage in rapid learning and quicker decision-making, thereby making them more agile in relation to VCGCs for all stakeholders. They also operate in the challenging environments that characterize emerging markets, with weak institutional reforms, volatile environmental conditions, and limited resources (cf. Khanna & Palepu, 1997; Khanna & Palepu, 2010). Given these challenges, ESMEs need to be agile in quickly adjusting their strategies and rapidly engaging in the iteration and experimentation of innovative ideas in order to co-create value for all stakeholders in dynamic environments. Thus, such firms are more likely to develop and possess *strategic agility*—a *meta-capability* that involves the allocation, development, and deployment of capabilities as well as the agility needed to balance such capabilities over time (Boojihawon et al., 2021; Shams et al., 2021). Strategic agility has been identified as enabling the development of more effective ways to create and deliver value in the midst of environmental turbulence (Doz & Kosonen, 2010; Pereira et al., 2021). As a

concrete meta-capability, strategic agility enables ESMEs to accelerate the renewal and transformation of business models through the realignment of any available resources and the exploitation of any opportunities presented by changing market conditions (Nyamrunda & Freeman, 2021). In this context, strategic agility has significant potential for VCGCs by enabling ESMEs to remain flexible and to quickly adapt to new ideas and technologies, along with encompassing concerns for any socio-economic aspects that fall beyond firm boundaries (Bouguerra et al., 2019; Gölgeci et al., 2019). However, the role played by strategic agility in promoting VCGCs in ESMEs has hitherto remained underexplored (He & Harris, 2020; Ivory & Brooks, 2018; Sinkovics et al., 2021). Our study was therefore aimed at addressing this gap by drawing upon insights from the dynamic capability perspective.

The proponents of the dynamic capability perspective (Teece, 2007, 2018) have suggested that strategic agility is a vital dynamic capability and, more importantly, that ESMEs must undertake strategic actions to leverage value from it (Chan et al., 2019; Khan & Lew, 2018). Scholars assert the effectiveness of dynamic capabilities in dynamic environmental conditions (Barbero et al., 2017; Eisenhardt & Martin, 2000; Helfat & Winter, 2011), which enable firms to deal with societal challenges (Liu et al., 2020). The dynamic nature of strategic agility enables firms to reconfigure their resources and capabilities within a short time frame and to be responsive and adaptable (Khan, 2020). Moreover, it emphasizes the emergence of dynamic capabilities via a path-dependent process. In such a context, scholars have also suggested strategic agility as a dynamic capability and have specifically linked it to innovation and to the adoption of new technologies by small exporting firms (Thoumrunroje & Racela, 2021; Zhou et al., 2019).

Given that addressing grand challenges requires coordinated and collaborative efforts (cf. George et al., 2016, p. 1880), in such contexts, *responsible collaborative innovation* can be an important strategic action through which the strategic agility of ESMEs leads to VCGCs. Responsible collaborative innovation relates to the engagement of diverse communities aimed at the pooling of any complementary and co-specialized resources, which, in turn, supports the development of products and services conducive to promoting sustainable development (Stilgoe et al., 2013; Voegtlin & Scherer, 2017). In their efforts to engage collaboratively, strategic agility can enable ESMEs to remain flexible and quickly adapt to new ideas, besides successfully engaging with government and nongovernment actors in order to develop VCGCs (Battistella et al., 2017; Scherer & Voegtlin, 2020). In other words, responsible collaborative innovation is a

vital mediating mechanism suited to translate the benefits of strategic agility into VCGCs.

Although strategic agility is of an idiosyncratic nature, it may also heavily rely on the strategic cognition of diverse senior managers (Nyamrunda & Freeman, 2021). Thus, gender diversity among senior managers is vital for ESMEs to sense market changes and seek alternatives (Doz, 2020; Tang et al., 2020; Xing et al., 2020). Such gender diversity helps ESMEs to swiftly act and respond to market information, while transforming their strategic agility into responsible collaborative innovation to influence VCGCs (Nyamrunda & Freeman, 2021; Salloum et al., 2019). As such, senior management gender diversity could moderate the relationship between strategic agility and VCGCs via responsible collaborative innovation.

The extant literature on grand challenges provides limited insights into “the processes and relationships that drive and connect articulation, actions and outcomes and give rise to specific trajectories that either mitigate or amplify grand challenges” (cf. Howard-Grenville, 2021, p. 257). Thus, the multilevel perspective we advance in our study offers novel insights in relation to addressing the grand challenges faced by emerging markets with their limited resources and weak formal institutions. This perspective is also in line with scholarly suggestions indicating that a multilevel perspective on a phenomenon enables the tracing and appreciation of the interactions that occur across levels and are critical to how grand challenges arise and to how they might be tackled (cf. Howard-Grenville et al., 2019, p. 357). Consequently, our study was aimed at answering the following research questions: (1) “How can ESME strategic agility drive VCGCs via responsible collaborative innovation?” and (2) “What differential effect does ESME strategic agility have on VCGCs via responsible collaborative innovation under different conditions of gender diversity?”

By answering these questions, our study makes three important contributions to the dynamic capability and grand challenges literature. First, although the extant literature largely emphasizes the importance of VCGCs (DiVito et al., 2021; Martí, 2018), limited empirical research has hitherto been conducted to understand the determinants of VCGCs (Hamann et al., 2020). We highlighted the importance of ESME strategic agility in facilitating VCGCs, and empirically examined their relationships. To do so, we considered strategic agility as a meta-capability capable of promoting ESMEs' VCGCs. Second, our study shows that strategic agility does not influence VCGCs directly; instead, we proposed and empirically demonstrated that responsible collaborative innovation acts as an important mediating mechanism to link ESME strategic agility with VCGCs. Stated differently, strategic agility drives responsible collaborative

innovation, which in turn leads to VCGCs. In doing so, we made an important contribution to the grand challenges literature because we showed that, despite being a meta-capability, ESME strategic agility has limited potential for VCGCs. The true value of strategic agility for VCGCs is realized via responsible collaborative innovation, which enables ESMEs to adopt responsible practices and activities that are conducive for socio-economic benefits. Third, in our study, we considered the moderating role played by gender diversity in the strategic agility and VCGCs relationship via responsible collaborative innovation. While previous studies had highlighted the significance of gender diversity in firm innovation activities (e.g., Guzman & Kacperczyk, 2019; Xie et al., 2020), the ways in which gender diversity can contribute to VCGCs via responsible collaborative innovation in the context of ESMEs remained unclear. Considering that innovation usually involves team or group efforts, it was imperative to emphasize the role played by gender diversity in delineating the boundary conditions necessary for the “strategic agility-responsible collaborative innovation relationship.” Thus, our study offers a multilevel perspective by connecting the important factors and conditions through which ESMEs can create value for grand challenges. Finally, our study empirically contributes to the grand challenges literature by drawing insights from an emerging market context (i.e., that of the UAE). Emerging markets are generally characterized by weaker institutional environments, which compound the challenges faced by ESMEs. For instance, a lack of institutional support and human capital, which can create less favorable conditions for ESMEs, can also make them more agile in actively seeking responsible collaborative innovation in their efforts for VCGCs.

2 | THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

Grand challenges involve “ambitious but achievable objectives that harness science, technology, and innovation to solve important national or global problems and that have the potential to capture the public’s imagination” (US Office of Science and Technology Policy, 2014). Examples of grand challenges include climate change, poverty, inequality, pollution, infrastructure degradation, gender inequality, and environmentally unfriendly production (Buckley et al., 2017; Hamann et al., 2020). These challenges are often regarded as “wicked problems” due to their uncertainty, complexity, and multidimensionality (Reinecke & Ansari, 2016), the addressing of which requires coordinated and collaborative efforts (cf. George et al., 2016, p. 1880). As such, national governments are

struggling to convert their policies into the actions needed to mitigate grand challenges (Ferraro et al., 2015).

Research suggests that firms must take an active role in formulating the goals and targets needed to generate value to solve environmental and societal issues (Buckley et al., 2017; Martí, 2018). In this regard, most existing research (see Appendix A) has focused on the role played by MNEs, which create norms, rules, and standardized procedures to generate VCGCs (Liou & Rao-Nicholson, 2021; van Zanten & van Tulder, 2018; Zhan & Santos-Paulino, 2021). However, such role is often minor and passive, as MNEs tend to limit their contributions to internal actions aimed at avoiding harm (Sinkovics et al., 2015; van Zanten & van Tulder, 2018). Further, they employ private governance measures to greenwash any inadequate actions (Sinkovics et al., 2020). Thus, unlike MNEs and given their prominent role in economic growth and wealth creation, SMEs can be perceived as important actors in addressing grand challenges (Bocquet et al., 2019).

In their responses to marketplace changes and opportunities, SMEs are more flexible, adaptable, agile, and nimble than large firms; as such, they are uniquely placed to address grand challenges. Moreover, SMEs also leverage relational capabilities and knowledge sharing as mechanism for developing strategic agility (Nyamrunda & Freeman, 2021). Further, they are able to develop innovative capabilities through adaptive competencies (Boly et al., 2014).

2.1 | Strategic agility and value creation for grand challenges

Strategic agility is defined as “a thoughtful and purposive interplay” of various capabilities that include: (1) strategic sensitivity—the anticipation and sensing of external changes, the ability to proactively integrate changes into strategic planning and development and to disseminate any adaptation requirements throughout the organization for speedy actions (Doz & Kosonen, 2010; Nyamrunda & Freeman, 2021); (2) collective commitment—the top management’s ability to collaborate and make nimble strategic decisions in order to address any emerging strategic problems (Doz & Kosonen, 2010); and (3) resource fluidity—the capability to flexibly reallocate and reconfigure resources and competencies (Doz & Kosonen, 2010; Nyamrunda & Freeman, 2021). With these conceptualizations, strategic agility can be construed as a dynamic capability that is difficult to imitate, and hence a potential source of competitive advantage for ESMEs. Teece (2007) suggested that “dynamic capabilities relate to high-level activities

that link to management's ability to sense and then seize opportunities, navigate threats, and combine and reconfigure specialized and cospecialized assets to meet changing customer needs, and to sustain and amplify evolutionary fitness, thereby building long-run value for investors" (p. 1344). Synthesizing these definitions, we envisaged ESME strategic agility as a capability that is significant for the attainment of VCGCs (measured in terms of social and environmental performance). Our prediction was based on the following arguments.

First, whilst emerging market firms are resource-constrained, they can develop strategic agility by proactively sensing, adapting, and speedily reacting to changing environmental conditions (Khan, 2020). The extant literature in the context of SMEs suggests that smaller firms' resources and dynamic capabilities are crucial for them to survive (Khan & Lew, 2018). Existing studies indicate that such firms are in a better position to leverage any advantages stemming from their smaller size and less formal and nimble structures (Wiklund et al., 2009), and to make quick strategic decisions. Furthermore, SMEs utilize specialized resources and operating processes that can be tailored for specific markets and customers' needs, which gives them an advantage over larger firms (Maranto-Vargas & Rangel, 2007). In addition, the nature of grand challenges—such as their intractability, complexity, and uncertainty (Ferraro et al., 2015; Howard-Grenville, 2021)—means that an equally dynamic resource and capability, such as strategic agility, is needed to design sustainable solutions. In this regard, despite their resource constraints, ESMEs are in a better position to adjust their internal capabilities in responding to grand challenges. For example, the extant literature suggests that some dynamic capabilities may be vital to addressing environmental issues while enhancing firm environmental performance (Chen et al., 2015; Reyes-Santiago et al., 2019), and that dynamic capabilities such as SME agility play a vital role in disruptive innovation and in the adoption of new technologies (Chan et al., 2019; Thourmrunroje & Racela, 2021). Relatedly, recent research has argued that strategic agility, as a meta-dynamic capability, can promote corporate sustainability by lowering production costs, enhancing brand image, and establishing new markets (Nath & Agrawal, 2020). Scholarship also shows that strategic agility can contribute to grand challenges, including responsiveness during emergencies and the provision of innovative solutions for citizens (cf. Sahasranamam & Soundararajan, 2022). Current research suggests that innovation systems are required to dynamically work with limited resources and organizational structures by re-configuring the resources required to address grand challenges. In other words, agility is linked to addressing grand challenges (Sahasranamam & Soundararajan, 2022).

Second, agile ESMEs can easily adjust their capabilities to reflect the current needs of societies (e.g., by focusing on ethics and social value creation), thus targeting them to the achievement of ethical—rather than financial—performance (Arend, 2014). This means that strategic agility enables ESMEs to reconfigure and reallocate their resources and strategies in order to engage in actions geared toward social value creation (Zhou & Wu, 2010). Thus, although, being resource-constrained, ESMEs may not have the clout needed to engage in social value creation activities, their agility and flexibility enable them to reconfigure their existing resource base for social and environmental performance outcomes.

Third, ESMEs are often embedded in the local communities in which they operate (Leckel et al., 2020), and are therefore more familiar with the issues faced by their stakeholders (Govindan et al., 2020). Contextually, this provides ESMEs with a first-hand appreciation and understanding of the social and environmental issues commonly faced by societies. Such awareness, combined with their agile nature, can thus be very helpful for ESMEs to identify and respond to grand challenges (Sinkovics et al., 2021; Soundararajan et al., 2018) and to improve their social and environmental performance. Accordingly, the benefits of strategic agility, coupled with their nature, can enable ESMEs to attain competitive advantages suited to improve their social and economic performance. Furthermore, they enable ESMEs to enhance their competitiveness, which leads to highly effective decision-making suited to minimize any internal resistance to changes aimed at overcoming emergent challenges and to influence the attainment of VCGCs (Del Giudice et al., 2021). Thus, we posited that:

Hypothesis 1. Emerging market SMEs' strategic agility is positively related to value creation for grand challenges.

2.2 | The mediating role of responsible collaborative innovation

Strategic agility is the important dynamic capability “to constantly and rapidly sense and respond to a changing environment by intentionally making strategic moves and consequently adapting the necessary organizational configuration for successful implementation” (Weber & Tarba, 2014, p. 7). It enables ESMEs to remain flexible and to swiftly adapt to market changes and implement any actions suited to respond to them (Ahammad et al., 2020). The prior literature suggests that strategic agility enables firms to achieve efficiency gains in terms of human resource management (Ahammad et al., 2020;

Xing et al., 2020), the establishment of collaborative relationships (Debellis et al., 2021), international business success (Demir et al., 2021; Shams et al., 2021), firm performance (Kale et al., 2019; Shin et al., 2015), and responses to grand challenges (He & Harris, 2020).

In particular, prior research on grand challenges suggests that ESME can cope with complex environmental problems through the collaborative exploration of complementary and co-specialized knowledge assets and innovation adapted to local community needs (Knudsen & Srikanth, 2014; Olsen et al., 2016). This points to the importance of responsible collaborative innovation—the engagement and collaboration of diverse stakeholders in the development of product and process innovations that are both sustainable and societally desirable (Owen et al., 2021; Stilgoe et al., 2013)—as a missing link between strategic agility and VCGCs. Therefore, and consistent with the framework developed by Dentoni et al. (2020), responsible collaborative innovation represents a core and distinctive mechanism through which strategic agility can affect ESME VCGCs. This is also consistent with the central notion of the dynamic capability perspective, whereby ESMEs need dynamic capabilities to design and implement the mechanisms (or strategic actions) that can direct them toward the achievement of competitive advantage (Teece, 2014, 2018), such as social value creation. Specifically, the rationale underpinning our proposed mediation mechanism is as follows.

First, strategic agility can enable ESMEs to pursue responsible collaborative innovation (Oliva et al., 2019; Pellizzoni et al., 2019). It facilitates the rapid search for diverse stakeholders, the retrieval of any relevant knowledge, and the joint development of collaborative innovation solutions that are conducive to addressing any grassroot-level problems faced by societies (Cegarra-Navarro et al., 2016; Gali et al., 2020). As strategic agility enables ESMEs to scan the environment for any upcoming opportunities, it can lead to the realization of responsible collaborative innovation, such as the development of innovative products and processes with diverse stakeholders. For example, strategic sensitivity enables ESMEs to recognize any existing and latent responsible collaborative innovation opportunities and to be sensitive to the timely renewal and reconfiguration required in collaborative relationships. Further, collective commitment enables stakeholders to make bold decisions and commit to the engagement needed to find responsible innovation solutions (Scherer & Voegtlin, 2020). In addition, the resource fluidity resulting from agility contributes to the sourcing of external knowledge resources and to their efficient deployment for responsible collaborative innovation (Ivory & Brooks, 2018). Thus, those ESMEs that fail to translate their dynamic capabilities into strategic

actions cannot expect to realize the full benefits of such capabilities (Ray et al., 2004). Together, strategic sensitivity, collective commitment, and resource fluidity enable ESMEs to rapidly attain the knowledge that can support responsible collaborative innovation.

In H1, we proposed that strategic agility can drive ESME VCGCs. However, grand challenges are complex, uncertain, and intractable (Ferraro et al., 2015), which means that those ESMEs that merely rely on their strategic agility may be unable to attain the necessary competitive advantage (Hamann et al., 2020) due to their internal inertia and “not-invented here” syndrome. To tackle grand challenges effectively, VCGCs require strategic responses that involve reinforcing mechanisms suited to coordinate and sustain the efforts made by diverse stakeholders in response to clearly articulated problems (George et al., 2016; Hamann et al., 2020). Thus, while strategic agility is likely to result in value creation in relation to social and environmental performance, the related benefits can only be maximized when it is used to develop strategic actions through coordinated and collaborative efforts (George et al., 2016). Hence, this suggests that strategic agility affects VCGCs via the mediating mechanism of responsible collaborative innovation.

Second, responsible collaborative innovation is an important strategic action that involves the engagement of diverse stakeholders in the combination of resources and the development of products and services aimed at sustainable development and at the attainment of VCGCs (Voegtlin & Scherer, 2017). Thus, any innovations realized by collaborating with supply chain partners, competitors, universities, and governments can enable ESMEs to effectively respond to grand challenges and to create social value. Specifically, engaging in responsible collaborative innovation can build ESME legitimacy within communities and reduce the potential for harm, thus enabling VCGCs (Genus & Iskandarova, 2018; Voegtlin & Scherer, 2017). The legitimacy gained through responsible collaborative innovation enables ESMEs to organize their resources and innovation activities with diverse external partners and collaborators to the end of creating social and environmental value (Genus & Iskandarova, 2018; MacDonald et al., 2019). When an ESME is strategically agile, it can rapidly adapt its organizational structure and understand any market changes in relation to the development of suitable product offerings (Nyamrunda & Freeman, 2021). Hence, these arguments provide support for responsible collaborative innovation as a mediating mechanism.

To recap, as strategic agility is an important dynamic capability for recognizing and seizing opportunities to achieve responsible collaborative innovation (El-Haddadeh et al., 2020; Ivory & Brooks, 2018), we argued

that responsible collaborative innovation mediates the relationship between strategic agility and VCGCs in ESMEs. Thus, strategic agility helps to swiftly develop collaborative innovation solutions consistent with the needs of local communities that ultimately enable ESMEs to realize VCGCs (Brammer et al., 2019; Dentoni et al., 2020). This led us to suggest that:

Hypothesis 2. In emerging markets SMEs, responsible collaborative innovation mediates the positive effect of strategic agility on value creation for grand challenges.

2.3 | The moderating role of gender diversity

In the preceding sections, we have argued that, in the ESME context, strategic agility and responsible collaborative innovation are important in tackling grand challenges. However, additional factors may mitigate or amplify such challenges. In our study, we focused on one of the most important factors (i.e., gender diversity) that may influence strategic agility and responsible collaborative innovation for VCGCs. Theoretically, the tenets of upper echelons theory (UET) postulate that firms' activities are influenced by their top management teams' (TMT) compositions and characteristics (Hambrick & Mason, 1984). Increasing gender diversity has been suggested to play a vital role in enhancing performance and entrepreneurial activities in firms (Lyngsie & Foss, 2017). The extant literature adopting the UET perspective further suggests that gender diversity and TMT composition can encourage novel thinking in firms, thus enhancing their growth and ability to deal with external crises (Carpenter et al., 2004; Dwyer et al., 2003; Puthusserry et al., 2022). This postulation underlies that ESMEs are reflections of their TMTs and of their strategic actions. Thus, any diversity in the characteristics of the TMT influences its strategic choices and actions (Triana et al., 2014), consequently affecting firm performance (Li & Tan, 2013; Strese et al., 2018). The UET further argues that a TMT's decisions are affected by its cognitive diversity—with gender diversity being a good proxy for cognitive assortment (Bromiley & Rau, 2016). Gender diversity is a branch of the wider team diversity literature, which describes the differences found among team members in terms of education, skills, and gender and highlights the role played by such differences in enhancing creativity and innovation. Yet, limited research has hitherto been conducted on when and/or how gender diversity may affect certain performance outcomes (see Garcia Martinez et al., 2017), as well as help dealing with grand challenges and crises (Puthusserry et al., 2022).

The gender diversity of a TMT is defined as the degree of parity in gender proportions found among its members (Quintana-García & Benavides-Velasco, 2016). Prior studies suggest that gender diversity can facilitate decision-making and help bring out the innovation and creativity linked to other forms of diversity (Dai et al., 2018). In gender-diverse TMTs (i.e., those in which both genders are well represented), mutual understanding can be established between team members, thus facilitating information exchange (Xie et al., 2020). For example, given that diversified management can utilize its human and social capital for value creation, TMT gender diversity can smooth out the interaction of ESMEs with external stakeholders to promote innovation efficiency (Bocquet et al., 2019; Ruiz-Jiménez et al., 2016). Relatedly, the context of our study suggests that gender diversity is an unexplored boundary condition that may yield interesting findings and implications, especially in relation to grand challenges. In particular, in the Middle Eastern context, studies have highlighted how the inclusion of women is a source of heterogeneity in senior management (Lythreathis et al., 2020).

Indeed, Middle Eastern ESMEs provide a unique research setting because of the role played by gender diversity in enhancing collaborative innovation, given the particular vulnerability of women and their marginalization in decision-making (Budhwar et al., 2019). Ashourizadeh and Schött (2013) stated that the presence of women in management roles in the Middle East can improve gender diversity, which improves ESME development and growth. The inclusion of women in TMTs and boards in Middle Eastern ESMEs can “provide additional innovation, skills, experience, and collective willingness for better collaboration and decision-making” (Salloum et al., 2019, p. 259). Taking a cue from these authors' statement, we suggested that a gender-diverse management team could enhance the effect of strategic agility on collaborative innovation. Therefore, we posited that TMT gender diversity is an important moderating factor influencing the impact of strategic agility on value creation for grand challenges via responsible collaborative innovation. The following arguments support such moderating effect.

First, as suggested by the social cognitive perspective, socialization experience—for example, professional experience or participation in social collaboration—differs between men and women (Manolova et al., 2007). For example, female leadership is based on a higher sensitivity to the needs of all firm members and to a greater flexibility in their roles (Tan, 2008; Wellalage et al., 2019). These experiences eventually produce different strategic choices and effective decisions aimed at making an ESME more agile (Ruiz-Jiménez et al., 2016). In addition, the greater

engagement of women in local communities provides complementary informational and social benefits to any already agile ESMEs to the end of developing successful innovations (Neumeyer et al., 2019; Rosca et al., 2020). Thus, team gender-diversity complements ESME strategic agility in driving collaborative innovation.

Second, compared to their male counterparts, female senior managers are better prepared to make effective decisions (Arzubiaga et al., 2018) in groups and social settings because they are more inclusive, friendly, and warm, they demonstrate greater legitimacy, and they adopt a more open managerial style (Dai et al., 2018). That said, women usually have a better understanding of the market environment and are capable of designing more effective responses to opportunities (Ruiz-Jiménez et al., 2016). This is consistent with the opinion that women trust their instincts and intuitions, instead of merely relying on analysis (Martinez Jimenez, 2009). In addition, as senior managers, women are more active in institutionally weak emerging markets, and hence have the potential to influence ESME decision-making and innovation development activities (Saeed et al., 2016; Shoham et al., 2020; Ye et al., 2019). Despite these characteristics, women are more risk-averse (Berger et al., 2014; Wang et al., 2019), which suggests the need for the presence of male counterparts who, as risk-takers, complement the seemingly situational shortcomings of women within the management team. As strategic agility requires higher flexibility, collaboration, risk-taking, and openness to change, a gender-diverse management team will complement ESME strategic agility to enhance responsible collaborative innovation. Thus, greater diversity in ESME TMTs suggests better-qualified managers and better talents (Colovic & Williams, 2020; Dai et al., 2018) across all genders, potentially aiding a firm's dynamic capabilities (strategic agility) in jointly affecting collaborative innovation and value creation.

Third, women have the ability to organize and integrate knowledge and ideas drawn from different sources within a team (Dai et al., 2018) in order to devise novel solutions through a collaborative and consensual approach. As gender diversity is construed as a form of social diversity (Guo et al., 2017), its existence within TMTs can help ESMEs to successfully integrate the knowledge possessed by all team members, which is vital to anticipating and responding to changes in market opportunities and conditions. In effect, when knowledge integration (from gender-diverse teams) combines with strategic agility, ESME responsible collaborative innovation will be enhanced. To summarize, we argued that ESMEs characterized by heterogeneous TMT gender composition are more likely to swiftly

react to external changes and to socialize with diverse stakeholders. In such a setting, ESMEs are more likely to effectively exploit their strategic agility to interact and exchange knowledge with stakeholders for responsible collaborative innovation, thereby leading to greater VCGCs. Accordingly, we developed the following hypothesis.

Hypothesis 3. In emerging market SMEs, gender diversity moderates the indirect effect of strategic agility on value creation for grand challenges via responsible collaborative innovation.

Indeed, by combining insights drawn from the dynamic capability perspective (Teece, 2007) and UET (Hambrick, 2007; Hambrick & Mason, 1984), we developed the multilevel conceptual framework shown in Figure 1. We posited that strategic agility promotes VCGCs, and that responsible collaborative innovation mediates the relationship between strategic agility and VCGCs. Further, TMT gender diversity moderates the indirect effect of strategic agility on VCGCs via responsible collaborative innovation in ESMEs.

3 | CONTEXT AND METHODS

We tested our hypotheses on a unique sample of SMEs operating in the UAE. This context was particularly important for two reasons. First, the UAE is a fairly new emerging Middle Eastern market with a rapidly evolving economy and new opportunities for young businesses (Godinho, 2020). According to UAE government data (2021), SMEs account for 94% of all companies operating in the country and provide more than 86% of the private sector's jobs. In Dubai alone, SMEs represent nearly 95% of all companies. Second, the UAE has made significant progress in relation to the UN SDGs by shaping its national agenda, establishing devoted governance, and arranging several initiatives. In particular, the Dubai SME campaign aims to highlight the alignment of SME initiatives toward GCs.

Our study's sampling frame was drawn from the Commercial Directory of the Dubai Chamber of Commerce and Industry (DCCI, 2018–2019). We screened the firms in this directory to ensure that they would meet the following criteria: (1) firms that were private and independent and not affiliated to any group; (2) firms with fewer than 250 employees (to be classified as ESMEs); (3) firms for which the full contact information of the TMT was provided; and (4) firms that needed to collaborate with external partners (e.g., suppliers, customers, research bodies, community leaders, and franchisers). A

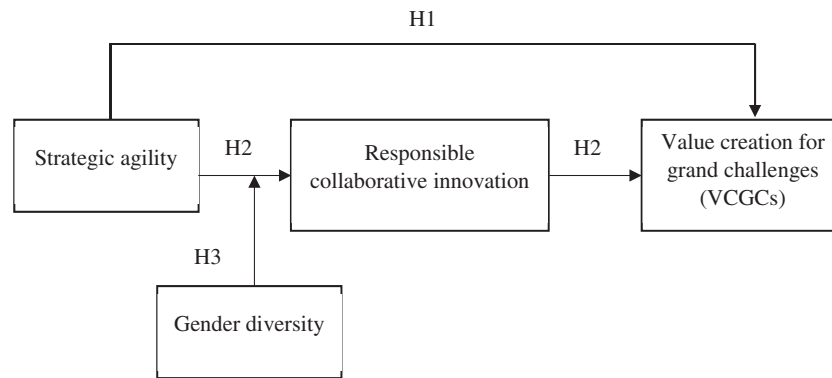


FIGURE 1 Conceptual framework of the study.

TABLE 1 Sample characteristics ($N = 228$).

Sample description	Percentages
Firm size (employees)	
Fewer than 50	78 (34.2%)
50–100	64 (28.1%)
101–250	86 (37.7%)
Firm age (years)	
0–5	42 (18.4%)
6–10	66 (28.9%)
11–15	43 (18.9%)
Above 15	77 (33.8%)
Job position	
Owners/CEOs	128 (56.1%)
Senior managers	100 (43.9%)
Industry	
Manufacturing	119 (52.2%)
Services	109 (47.8%)

total of 378 firms matching these criteria were found. In line with those of other studies (Dangelico et al., 2013; Filser et al., 2018), we took a key informant approach to collect data from top managers (e.g., owners, CEOs, and senior managers), who could be expected to have first-hand information and a comprehensive understanding of their respective firms' activities.

We designed a questionnaire and administered it in English, as the most common first or second language spoken in most UAE organizations (Al Ariss & Guo, 2016). Prior to the main data collection, the questionnaire was pilot tested with ESME managers to check for clarity and accuracy of the items in the context of the UAE. The final questionnaire was thus designed based on their comments. Following previous survey studies (Fang, 2008; Fang et al., 2008), we included a screening question in the questionnaire to determine whether our sample ESMEs had

entered into collaborations with external partners. Accordingly, only those respondents who answered this question positively were considered for our study. The questionnaire was administered using the in-person delivery and collection technique (Story et al., 2015). This data collection technique is prominently used in emerging markets due to the proven ineffectiveness of mail and online surveys (Chen et al., 2014; Nakos et al., 2019) and to the need to establish trust and social ties in order to overcome any negative perceptions of a study. In total, 246 ESMEs agreed to fill out our questionnaire and passed the screening process, yielding a 65.07% response rate. Among these, 18 were deleted due to indications of low-quality data and incomplete information. Thus, our final useable sample contained 228 ESMEs, representing an effective response rate of 60.32%. The sample statistics, in terms of firm size, firm age, respondent type, and industry are reported in Table 1.

Nonresponse bias was assessed by comparing the early and late respondent groups for study variables. The results of the *t*-test were found to indicate no significant difference between the two groups, suggesting that our data set was not affected by nonresponse bias (Armstrong & Overton, 1977).

3.1 | Measures

This section presents the details of the measures used in our study. The variables were measured on a seven-point Likert scale. A full list of the measurement items used in our study is reported in Appendix B.

3.1.1 | Value creation for grand challenges

We measured VCGCs along the two first-order dimensions of social and environmental value creation. As argued by Marti (2018), grand challenges “are seemingly

intractable societal problems” (p. 970). The VCGCs requires firms to contribute to the betterment of society by reducing any negative external effects or creating positive ones for the natural environment and society (Ferraro et al., 2015; Markman et al., 2019). We therefore deemed it logical to consider social and environmental value creation as underlying dimensions of VCGCs (Hamann et al., 2020; Roulet & Bothello, 2021). Social value creation focuses on the relations established by focal firms with their local communities and social well-being, whereas environmental performance is related to the containment of any environmental damage and to protection from resource exploitation (Melnik et al., 2003). We measured social value creation using a five-item scale adopted from Jones et al. (2013) and Lortie et al. (2017), and environmental performance using four items adopted from Akhtar et al. (2018) and Lisi (2015). These measurements help to capture the extent to which a firm creates social good and address the natural environment as part of VCGCs (Felício et al., 2013; Rao et al., 2006).

3.1.2 | Strategic agility

Strategic agility is conceptualized as the ability of ESMEs to renew themselves and remain flexible without sacrificing efficiency (Doz & Kosonen, 2008). Following prior studies (e.g., Junni et al., 2015), we operationalized strategic agility along the three first-order dimensions of strategic sensitivity, collective commitment, and resource fluidity. To measure such dimensions, we used a nine-item three-factor scale, as developed by Hock et al. (2016). This scale is particularly relevant for ESMEs in the UAE because it captures the intangible investments in flexibility, nimbleness, and adaptivity (while retaining purposefulness) in strategic decisions made in response to market dynamism and to the opportunities it presents (Kale et al., 2019).

3.1.3 | Responsible collaborative innovation

Responsible collaborative innovation is defined as the development of products or services conducted through the sharing of ideas and knowledge with external partners to the end of solving or alleviating social and environmental problems (Halme & Laurila, 2009; Ketchen et al., 2007). It was measured using five items adopted from Dwivedi and Weerawardena (2018), Martinez-Conesa et al. (2017), and Mishra and Shah (2009). Our respondents were asked to evaluate the extent to which their respective firms relied on diverse stakeholders

(e.g., suppliers, customers, research bodies, community leaders, franchisers, etc.) in developing social and/or responsible products and processes. This measure is particularly important in emerging-developing countries, wherein responsible collaborative innovation may help ESMEs to overcome any hurdles related to weak institutional structures and to muster any support available to address grand challenges.

3.1.4 | Gender diversity

We measured TMT gender diversity—defined as the degree of parity in gender proportions found among the top executives of ESMEs (Quintana-García & Benavides-Velasco, 2016)—using the index developed by Blau (1977), which was appropriate and has been widely used for this purpose in the literature (Harrison & Klein, 2007; Reguera-Alvarado et al., 2017). The Blau index is measured as $1 - \sum_{i=1}^n P_i^2$, where P_i is the percentage of senior management members in each category (specifically, male and female). The value of gender diversity ranges from 0 (a single gender senior management) to 0.50 (an equal number of men and women in senior management). The mean score of the gender diversity measured in our sample was found to be 0.19, which is representative of the UAE. While women made up 52.1% of the UAE labor force in 2019 (World Bank, 2021), the female share of employment in senior management was 15.75% in 2018 (World Bank, 2021). According to the Dubai Labor Force Survey 2019, women make up 49% of the workforce in Dubai, but only 13.3% of managerial positions (Dubai Statistics Centre, 2021).

3.1.5 | Control variables

Several other factors could have affected our study's variables. Thus, following prior studies (Arend, 2014; Hock et al., 2016), we controlled for a number of managerial- and firm-level variables that could affect responsible collaborative innovation and VCGCs. To control for managerial-level effects, we included variables linked to job position, managerial tenure, and managers' age. Job position was measured by creating a dummy variable for owners/CEOs (0) and senior managers (1). Managerial tenure was measured by means of the years in which each participating manager had been employed in his/her current position (Boling et al., 2016). Managers' age was measured in years (Oehmichen et al., 2017).

We also controlled for a number of firm-level effects. We included firm size, which we measured as the natural logarithm of the number of employees, and firm age,

TABLE 2 Descriptive and correlation estimates.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1. Strategic sensitivity	4.72	1.70	0.93																
2. Collective commitment	5.19	1.35	0.39***	0.86															
3. Resource fluidity	5.10	1.32	0.44***	0.41***	0.87														
4. Responsible collaborative innovation	5.26	1.12	0.27***	0.36***	0.33***	0.78													
5. Social value creation	4.86	1.34	0.12 ⁺	0.13 ⁺	0.11 ⁺	0.21**	0.83												
6. Environmental value creation	4.98	1.33	0.08	0.12	0.19**	0.33***	0.18**	0.83											
7. Slack resources	5.00	1.22	0.17**	0.04	0.03	0.12 ⁺	0.08	0.12 ⁺	0.85										
8. Gender diversity	0.19	0.24	-0.06	0.07	-0.09	-0.14*	-0.07	-0.18*	0.01	1.00									
9. Firm size ^a	1.86	0.36	-0.02	-0.06	-0.02	0.03	0.09	0.04	-0.06	-0.09	1.00								
10. Firm age ^a	0.99	0.32	0.00	-0.07	-0.02	-0.14*	0.00	0.03	0.05	-0.09	0.11	1.00							
11. Industry ^b	0.52	0.50	-0.09	0.00	0.00	-0.05	0.00	0.02	-0.07	-0.01	-0.06	0.01	1.00						
12. R&D intensity	0.21	0.33	-0.13*	0.00	-0.12	0.07	-0.07	0.02	0.07	0.01	-0.37***	0.06	0.13 ⁺	1.00					
13. Job position	0.44	0.50	0.00	-0.06	-0.01	0.03	-0.01	0.12	0.04	0.07	0.03	0.14*	0.01	-0.01	1.00				
14. Managerial age ^a	1.65	0.10	-0.06	0.05	0.06	0.04	-0.13	-0.02	0.01	0.03	0.00	0.01	0.02	0.06	-0.03	1.00			
15. Managerial tenure	9.35	5.94	0.02	-0.12	0.09	0.03	0.12	0.17**	0.146*	-0.06	0.05	0.17*	0.02	-0.02	0.16*	-0.10	1.00		
16. Technology-focus	0.46	0.50	0.01	-0.05	-0.09	-0.11	-0.05	-0.05	-0.01	0.00	-0.02	0.04	0.74***	0.07	0.00	0.03	0.01	1.00	

Note: Square roots of average variance extracted are reported in the diagonal. Abbreviations: R&D, Research and development; SD, standard deviation.

^aNatural logarithm transformation of original values.

^bDummy variable.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; ⁺ $p < 0.10$.

which we measured as the natural logarithm of the number of years since a sample firm had been founded. Industry effect was measured by creating a dummy variable set to 0 for manufacturing firms and to 1 for service ones. Technology-focus was measured by creating a dummy variable for high- (0) and low-technology firms (1). R&D intensity was measured as the ratio of R&D employees to total ones (Schmid et al., 2014). Slack resources were based on a three-item scale that rated the availability of uncommitted resources for specific organizational activities (Troilo et al., 2014).

4 | ANALYSIS AND RESULTS

For our analysis, we used structural equation modeling (SEM) with maximum likelihood estimation using the AMOS 26.0 software. We took a two-step SEM approach (Kline, 2015). In the first, we validated the measurement model using confirmation factor analysis (CFA). Following previous studies (Bagozzi & Yi, 2012), we assessed the model fit by means of a range of indices that included normed chi-square (χ^2/DF), root mean square error of approximation (RMSEA), standardized root-mean square residual (SRMR), normed fit index (NFI), and comparative fit index (CFI). In the second step, we tested the hypothesized paths in a structural model.

4.1 | Measurement model results

The measurement model, which is presented in Appendix B, showed good model fit: $\chi^2/DF = 322.02/259 = 1.24$; RMSEA = 0.03; SRMR = 0.04; NFI = 0.93; and CFI = 0.99. Further, we validated the model by assessing the validity and reliability of all the constructs. First, we evaluated reliability by considering Cronbach's alpha (CA) and composite reliability (CR). As all the constructs' estimates for CA and CR were found to be higher than 0.70, we were able to assume construct reliability (Hair et al., 2018). Second, we evaluated convergent validity using standardized factor loadings. The Appendix B results show that all factor loadings were found to be significant and higher than 0.70 (Kline, 2015), thereby confirming convergent validity. We further assessed construct-level convergent validity by considering the average variance extracted (AVE). We found this to be higher than 0.50 for all constructs (Bagozzi et al., 1991), thus suggesting that the constructs explained more than half of their items' variance and confirming convergent validity (Fornell & Larcker, 1981). Third, we assessed discriminant validity by comparing the correlation between the latent constructs and the

square root of the AVE (Fornell & Larcker, 1981). We found the square root of AVE to be greater than the inter-construct correlation, thereby satisfying the condition for discriminant validity (see Table 2).

As we relied on single informant data, common method bias (CMB) could have been a concern and thus needed to be addressed. Accordingly, we relied on several ex-ante and ex-post measures to assess the likelihood of CMB. For our ex-ante measures, we followed several procedures during the questionnaire design process (Podsakoff et al., 2003): (1) mixing the order of the questions; (2) using diverse rating scales; (3) using reverse-coded items; (4) assuring our participants that there were no right or wrong answers; and (5) guaranteeing complete participant anonymity and confidentiality. In terms of our ex-post measures, we assessed three competing CFA models: (1) a method-only model wherein all items were loading onto a single latent construct: $\chi^2/DF = 8.53$; RMSEA = 0.18; SRMR = 0.17; CFI = 0.49; and NFI = 0.46; (2) a trait-only model wherein each item was loaded onto its respective latent construct: $\chi^2/DF = 1.24$; RMSEA = 0.03; SRMR = 0.04; CFI = 0.99; and NFI = 0.93; and (3) a method-and-trait model wherein a common factor was linked with items in model 2: $\chi^2/DF = 1.14$; RMSEA = 0.03; SRMR = 0.04; CFI = 0.99; and NFI = 0.93. A comparison of the three models was found to suggest that Models 2 and 3 were superior to Model 1, and that Model 3 was not markedly better than Model 2. This suggested that CMB did not describe our data and was thus not a concern in our study.

4.2 | Structural model results

The structural model, which included the hypothesized paths and control variables, was found to show good model fit: $\chi^2/DF = 1.35$; RMSEA = 0.04; SRMR = 0.03; NFI = 0.94; and CFI = 0.98. Given the significant correlation found between a number of variables, we investigated for the presence of any multicollinearity issue by using variance inflation factors (VIFs). The highest VIF value was found to be 1.36, much lower than the most conservative rule-of-thumb maximum threshold of 3.00 (Kutner et al., 2004). Subsequently, we estimated seven models, with VCGCs as the dependent variable in Models 1–2 and 6–7, and responsible collaborative innovation as the dependent variable in Models 3–5. Models 1 and 3 were baseline models with all the control variables. Table 3 provides the standardized parameter estimates and significance levels for each path in the seven models we tested.

We had argued (H1) that ESME strategic agility has a positive impact on VCGCs. Table 3 (Model 2) suggests that ESME strategic agility does indeed positively

TABLE 3 Results of structural path analyses.

Independent variables	Dependent variables						
	Responsible collaborative innovation			VCGCs			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Control effects							
Firm size	0.13 (1.09)	0.17 (1.40)	0.09 (1.25)	0.13 ⁺ (1.83)	0.08 (0.76)	0.07 (0.60)	0.08 (0.74)
Firm age	-0.05 (-0.45)	-0.06 (-0.49)	-0.18* (-2.52)	-0.17* (-2.66)	0.05 (0.45)	0.05 (0.47)	0.04 (0.41)
Industry	0.12 (0.95)	0.05 (0.47)	0.08 (0.78)	0.08 (0.86)	0.07 (0.71)	0.07 (0.69)	0.07 (0.69)
R&D intensity	0.04 (0.32)	0.09 (0.75)	0.11 (1.53)	0.18* (2.52)	0.01 (0.02)	-0.02 (-0.14)	0.01 (0.05)
Slack resources	0.22 ⁺ (1.81)	0.16 (1.37)	0.13 ⁺ (1.86)	0.08 (1.71)	0.13 (1.23)	0.12 (1.16)	0.11 (1.08)
Job position	0.10 (0.91)	0.10 (0.92)	0.07 (0.99)	0.09 (1.45)	0.09 (0.87)	0.09 (0.85)	0.09 (0.87)
Managerial age	-0.09 (-0.78)	-0.11 (-1.01)	0.04 (0.57)	0.03 (0.49)	-0.10 (-1.00)	-0.10 (-1.01)	-0.11 (-1.04)
Managerial tenure	0.27* (2.37)	0.30* (2.47)	0.03 (0.48)	0.04 (0.60)	0.27* (2.48)	0.26* (2.46)	0.27* (2.49)
Technology-focus	-0.14 (-1.33)	-0.11 (-1.01)	-0.15 (-1.64)	-0.16 (-1.65)	-0.06 (-0.60)	-0.06 (-0.60)	-0.06 (-0.60)
Direct effects							
Strategic agility (SA)		0.37** (3.05)		0.43*** (6.14)	0.11 (1.04)		0.12 (1.03)
Mediation effect							
Responsible collaborative innovation					0.58*** (4.39)	0.61*** (5.35)	0.58*** (4.67)
Moderating variable							
Gender diversity					-0.13* (-2.21)		
Interaction effect							
Strategic agility × gender diversity					0.19** (3.15)		
Fit indices							
χ^2/DF		1.51		1.09	1.11	1.14	1.08
CFI		0.97		0.99	0.99	0.99	0.99
NFI		0.93		0.95	0.95	0.96	0.96
RMSEA		0.05		0.02	0.02	0.03	0.02
SRMR		0.03		0.02	0.02	0.03	0.03

Note: t-values are in parentheses.

Abbreviations: CFI, comparative fit index; NFI, normed fit index; RMSEA, root mean square error of approximation; SRMR, standardized root-mean square residual; VCGCs, value creation for grand challenges. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; ⁺ $p < 0.10$.

TABLE 4 Results of PROCESS macro.

	Estimates	LL 95% CI	UL 95% CI
Direct effects			
Strategic agility → VCGCs	0.20 ^a	0.08	0.31
Strategic agility → Responsible collaborative innovation	0.41 ^a	0.29	0.53
Responsible collaborative innovation → VCGCs	0.29 ^a	0.16	0.41
Indirect effects			
Indirect effect	0.12 ^a	0.05	0.19
Total effect	0.20 ^a	0.08	0.31
Conditional indirect effects			
Gender diversity	0.10	0.01	0.21
Low-level gender diversity	0.09 ^a	0.03	0.17
High-level gender diversity	0.19 ^a	0.09	0.31

Abbreviations: CI, confidence intervals; LL, lower limit; UL, upper limit; VCGCs, value creation for grand challenges.

^aIndicates non-zero within the boundaries (significant).

influence VCGCs ($\beta = 0.37, p < 0.01$), thus providing support for Hypothesis 1.

In H2, we had argued that responsible collaborative innovation has a mediating effect on the relationship between ESME strategic agility and VCGCs. To examine the mediating effect, we followed the steps proposed by Baron and Kenny (1986). Model 2 was found to indicate that ESME strategic agility has a significant impact on VCGCs ($\beta = 0.37, p < 0.01$); Model 4 was found to suggest that ESME strategic agility is significantly related to responsible collaborative innovation ($\beta = 0.43, p < 0.001$); and Model 6 was found to indicate that responsible collaborative innovation is significantly related to VCGCs ($\beta = 0.61, p < 0.001$). When strategic agility and responsible collaborative innovation were included in Model 7 at the same time, the impact of ESME strategic agility on VCGCs was found to disappear ($\beta = 0.13, p > 0.10$), but responsible collaborative innovation was seen to have a significant impact on VCGCs ($\beta = 0.58, p < 0.001$). The above results suggest that responsible collaborative innovation has a full mediating effect on the relationship between ESME strategic agility and VCGCs. As Baron and Kenny's (1986) approach has been criticized for not providing an explicit test of mediation, we used Hayes's (2013) PROCESS macro approach. The results for the 95% confidence interval presented in Table 4—which we obtained by means of a bootstrapping approach performed on 5000 subsamples for responsible collaborative innovation ($\beta = 0.12$; LL = 0.05–UL = 0.19)—do not contain zero, thus enabling the assumption of a mediating effect and providing support for Hypothesis 2.

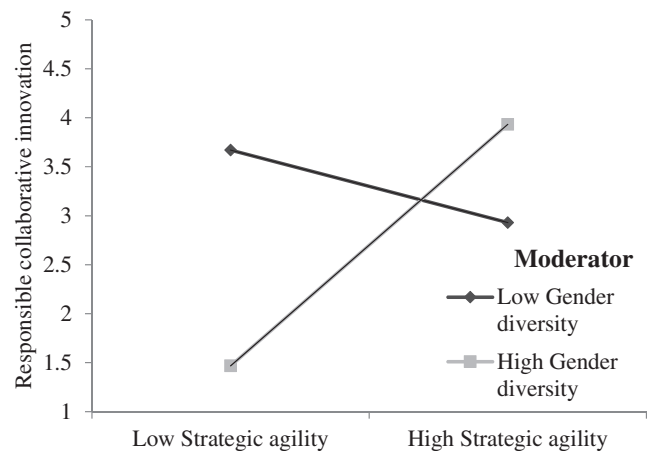


FIGURE 2 The moderating role of gender diversity.

In H3, we had proposed that gender diversity moderates the indirect effect of ESME strategic agility on VCGCs via responsible collaborative innovation. The results (Model 5) in Table 3 indicate that the interaction between strategic agility and gender diversity has a positive and significant impact on responsible collaborative innovation ($\beta = 0.19, p < 0.01$). Also, the 95% confidence interval findings, which we obtained by taking a bootstrapping approach performed on 5000 subsamples—do not contain zero ($\beta = 0.10$; LL = 0.01–UL = 0.21) for the conditional indirect effect of responsible collaborative innovation. These results further confirm the moderated mediation effect hypothesized in H3. Figure 2 illustrates that ESME strategic agility has a more positive impact on the

TABLE 5 Results of structural path analyses based on split-sample (gender diversity).

Dependent variables		Low gender diversity (N = 143)				High gender diversity (N = 85)			
Independent variables	Model 1 Strategic agility → responsible collaborative innovation	VCGCs			Model 5 Strategic agility → responsible collaborative innovation	VCGCs			Model 8 Responsible collaborative innovation → VCGCs
		Model 2 Strategic agility → VCGCs	Model 3 Responsible collaborative innovation → VCGCs	Model 4 Mediation		Model 6 Strategic agility → VCGCs	Model 7 Responsible collaborative innovation → VCGCs		
Control effects									
Firm size	0.08 (0.83)	0.39* (2.09)	0.30 ⁺ (1.83)	0.37* (2.14)	0.17 (1.61)	-0.07 (-1.01)	-0.18 (-1.03)	-0.14 (-0.96)	
Firm age	-0.11 (-1.28)	-0.06 (-0.40)	-0.02 (-0.10)	-0.01 (-0.04)	-0.26* (-2.69)	-0.01 (-0.09)	0.02 (0.13)	-0.01 (-0.05)	
Industry	-0.07 (-0.53)	0.19 (1.32)	0.22 (1.42)	0.22 (1.41)	0.28* (2.18)	-0.01 (-0.03)	-0.02 (-0.12)	0.04 (-0.15)	
R&D intensity	0.20* (2.18)	-0.02 (-0.15)	-0.16 (-1.02)	-0.07 (-0.42)	0.16 (1.57)	0.21 (1.03)	0.10 (0.55)	-0.02 (-0.15)	
Slack resources	0.16 ⁺ (1.80)	0.26 (1.61)	0.25 (1.61)	0.22 (1.43)	0.00 (0.04)	-0.08 (-0.44)	-0.05 (-0.35)	-0.01 (-0.06)	
Job position	0.03 (0.37)	-0.01 (-0.09)	-0.02 (-0.14)	0.02 (0.11)	0.12 (1.33)	0.23 (1.29)	0.16 (1.03)	0.14 (1.07)	
Managerial age	-0.02 (-0.21)	-0.21 (-1.37)	-0.20 (-1.33)	-0.20 (-1.38)	0.09 (1.03)	-0.02 (-0.13)	-0.07 (-0.47)	0.00 (-0.00)	
Managerial tenure	0.01 (0.15)	0.16 (1.04)	0.15 (0.97)	0.16 (1.08)	0.03 (0.30)	0.49* (2.42)	0.43* (2.53)	0.29 (2.14)	
Technology-focus	-0.04 (-0.31)	0.10 (-1.15)	0.14 (-1.00)	-0.17 (-1.06)	-0.29* (-2.23)	-0.30 ⁺ (-1.79)	-0.23 (-1.51)	-0.31 ⁺ (-1.81)	
Direct effects									
Strategic agility (SA)	0.33*** (3.72)	0.46* (2.37)		0.32 ⁺ (1.92)	0.54*** (4.85)	0.32* (2.76)		-0.19 (-1.21)	
Mediation effect									
Responsible collaborative innovation			0.60** (3.12)	0.49** (2.77)			0.58*** (3.50)	0.59*** (3.25)	
Fit indices									
χ^2/DF	1.11	1.11	0.14	1.06	0.19	1.37	1.28	1.32	
CFI	0.99	0.99	0.99	0.99	0.98	0.95	0.97	0.97	
NFI	0.92	0.94	0.94	0.93	0.92	0.91	0.91	0.91	

(Continues)

TABLE 5 (Continued)

Dependent variables		High gender diversity (N = 85)							
Low gender diversity (N = 143)		Responsible collaborative innovation							
Responsible collaborative innovation		VCGCs							
Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Strategic agility → responsible collaborative innovation	Strategic agility → VCGCs	Responsible collaborative innovation → VCGCs	Mediation	Strategic agility → responsible collaborative innovation	Strategic agility → VCGCs	Responsible collaborative innovation → VCGCs	Responsible collaborative innovation → VCGCs	Strategic agility → responsible collaborative innovation	Strategic agility → VCGCs
0.03	0.03	0.03	0.02	0.04	0.05	0.05	0.05	0.05	0.05
RMSEA	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
SRMR	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
									Mediation
									0.05
									0.04

Note: t-values are in parentheses. Abbreviations: CFI, comparative fit index; NFI, normed fit index; RMSEA, root mean square error of approximation; SRMR, standardized root-mean square residual; VCGCs, value creation for grand challenges. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; + $p < 0.10$.

responsible collaborative innovation in the presence of high levels of gender diversity.

4.3 | Additional analyses

To confirm the robustness of our study findings, we conducted additional analyses. First, we performed a multi-group analysis to test the moderating effect of gender diversity (Williams et al., 2009). We thus divided the sample into two groups according to the value of the gender diversity variable: low gender diversity ($n = 143$) and high gender diversity ($n = 85$). The hypothesized paths in each group were estimated separately, and the differences in path coefficients between subsamples were observed accordingly (Qureshi & Compeau, 2009). The results, which are reported in Table 5, suggest that responsible collaborative innovation has a partial mediation effect on the relationship between ESME strategic agility and VCGCs in the presence of low gender diversity. Conversely, a full mediation effect of responsible collaborative innovation on the relationship between ESME strategic agility and VCGCs can be observed in the case of high gender diversity. This indicates that, with high levels of gender diversity, ESMEs are better able to exploit their strategic agility for VCGCs via responsible collaborative innovation. Stated differently, responsible collaborative innovation is a vital mediating mechanism between ESME strategic agility and VCGCs in the presence of higher gender diversity in TMTs.

Second, we replicated the empirical results by testing the independent and mediating variables on both social performance and environmental performance. This analysis helped us to determine whether the hypothesized mechanism is the same for each VCGCs dimension. The results show that ESME strategic agility is significantly related to both social ($\beta = 0.15, p < 0.05$) and environmental performance ($\beta = 0.16, p < 0.05$). Also, we found that responsible collaborative innovation is significantly related to both social ($\beta = 0.17, p < 0.05$) and environmental performance ($\beta = 0.29, p < 0.01$), while the effect of ESME strategic agility on social ($\beta = 0.07, p > 0.10$) and environmental performance ($\beta = 0.04, p > 0.10$) becomes insignificant when responsible collaborative innovation is added in the model. Thus, we concluded that the proposed mediating mechanism is similar for both VCGCs dimensions.

Third, we performed the same analysis based on high and low technology industry classification. Specifically, we split our sample into high-tech (sample size = 123) and low-tech (sample size = 105) firms, as such classification has important implications for firm innovativeness (Rubera & Kirca, 2012). For the low-tech sample, we

found significant relationships between strategic agility and responsible collaborative innovation ($\beta = 0.42$, $p < 0.01$), strategic agility and VCGCs ($\beta = 0.23$, $p < 0.05$), and responsible collaborative innovation and VCGCs ($\beta = 0.39$, $p < 0.01$). However, we did not find support for our moderating hypothesis—that is, that gender diversity moderates the indirect effect of ESME strategic agility on VCGCs through responsible collaborative innovation ($\beta = 0.03$, $p > 0.10$). Regarding our high-tech subsample, the results indicate significant relationships between strategic agility and responsible collaborative innovation ($\beta = 0.43$, $p < 0.01$), strategic agility and VCGCs ($\beta = 0.22$, $p < 0.05$), and responsible collaborative innovation and VCGCs ($\beta = 0.30$, $p < 0.01$). Unlike the low-tech sample, the high-tech one confirmed that gender diversity enhances the indirect effect of strategic agility on VCGCs via responsible collaborative innovation ($\beta = 0.31$, $p < 0.01$). Specific to our study, we were able to infer that the effect of responsible collaborative innovation on VCGCs does not differ significantly between low-tech and high-tech firms.

Finally, there could have been a potential endogeneity bias between strategic agility and responsible collaborative innovation—thus implying that responsible collaborative innovation may, in fact, drive strategic agility. To assess the potential endogeneity bias caused by any omitted variables, measurement errors, or reverse causality, we adopted the instrumental variable approach (Wooldridge, 2016) by selecting an instrument (internal learning culture) directly correlated with strategic agility but not with responsible collaborative innovation. Accordingly, we found a significant correlation between firm internal learning culture and strategic agility ($r_w = 0.18$, $p < 0.01$) but an insignificant one with responsible collaborative innovation ($r_w = 0.03$, n.s.). As part of the estimation procedure, the Durbin–Wu–Hausman test of the selected instrument did not show any evidence of endogeneity. Further, we used the instrumental variable in a two-stage least squares (2SLS) regression analysis, and found that strategic agility still positively relates to responsible collaborative innovation ($\beta = 0.38$, $p < 0.001$)—suggesting that any endogeneity derived from omitted variables, measurement errors, or reverse causality was not a serious concern for our empirical analysis.

5 | DISCUSSION AND CONCLUSION

There has been increasing interest in examining how diverse stakeholders address grand challenges (Clarke & Boersma, 2017; George et al., 2016). With their strong

resource constraints and limited formal home market institutional support, ESMEs may face significant hurdles in addressing grand challenges; an aspect on which we know relatively little (cf. Khanna & Palepu, 1997, 2010). The aim of our study was thus to examine how SMEs based in environments in which formal institutions are in a state of flux address grand challenges through coordinated and collaborative efforts. The empirical context of our study was that of SMEs originating from the UAE, which is one of the most important emerging markets in the Middle East.

We examined the role played by ESME strategic agility and responsible collaborative innovation in achieving VCGCs (cf. Hamann et al., 2020). Our findings indicate that strategic agility is positively associated with VCGCs. More importantly, the findings of our mediation analysis reveal that strategic agility has an indirect effect on VCGCs via responsible collaborative innovation. This provides support for the proposition, made by prior studies, that agile and reflexive responses promote collaborative innovation aimed at achieving VCGCs (McGahan et al., 2020; Scherer & Voegtlin, 2020). The findings also suggest that the mediation effect of responsible collaborative innovation on the strategic agility and VCGCs nexus is dependent on the degree of TMT gender diversity. Strategic agility has a stronger effect on VCGCs via responsible collaborative innovation when ESME TMT gender diversity is high. This finding is in line with that of Ruiz-Jiménez et al. (2016), who suggested that higher degrees of gender diversity can compensate for any weakness found in some TMT members and reinforce strategic agility to generate responsible collaborative innovation. Overall, our findings suggest that ESME strategies (i.e., strategic agility, responsible collaborative innovation, and top management composition-gender diversity) lead to the ecological and social performance of ESMEs and contribute to addressing grand challenges. These findings offer important theoretical and practical implications.

5.1 | Theoretical implications

Our study has several theoretical implications. First, it contributes to the literature on grand challenges. Although prior research has argued for the importance for organizations in promoting community development in an effort to create value for grand challenges (Brammer et al., 2019; Hamann et al., 2020), it has focused comparatively less on elaborating and empirically testing the process underlying the VCGCs in the context of emerging markets. As such, our study theorized and empirically investigated the role played by

ESME strategic agility in VCGC within emerging markets. Our findings suggest that ESME strategic agility acts as a capability suited to overcome any environmental challenges inherited in emerging markets, while remaining flexible to adapt to volatile market conditions in order to achieve VCGCs. Their strategic agility enables ESMEs to make rapid changes while preserving their momentum in emerging markets through VCGCs (Rademakers et al., 2019). Thus, by uncovering the interlinkages between strategic agility and VCGCs in emerging markets, our study responds to the calls made to address an important gap in the grand challenges literature (Kistruck & Slade Shantz, 2021).

Second, our study helps to close the knowledge gap regarding the mediating mechanisms that connect strategic agility with VCGCs in ESMEs. This is in line with the recent call for the understanding of how agility can contribute to responsive innovation to the end of addressing grand challenges (Sahasranamam & Soundararajan, 2022). In this endeavor, we considered the mediating role played by responsible collaborative innovation. We argued and found that ESMEs endowed with strategic agility can better tackle the challenges linked to working with external partners in emerging markets and succeed in responsible collaborative innovation. In turn, responsible collaborative innovation enables ESMEs to find solutions for wicked problems and for VCGCs (Dahlander et al., 2021). This is in line with the point made by the proponents of the dynamic capability perspective to incorporate managerial actions in dynamic capability theorizing (Teece, 2007). Although dynamic capabilities contain strong elements of diagnosis, these must be connected with coherent actions and strategies to achieve competitive advantage (Teece, 2007, 2014). Therefore, our study suggests that strategic agility is a meta-capability that is vital to undertake responsible collaborative innovation-related strategies, which ultimately lead to VCGCs in emerging markets. As prior researchers had overlooked the linkages between strategic agility, responsible collaborative innovation, and VCGCs, these findings confirm that our study extends the dynamic capability and grand challenges literature in a relevant fashion (Arslan & Tarakci, 2020; Bertello et al., 2021).

Third, our study considered the moderating role played by TMT gender diversity in the indirect relationship between strategic agility and VCGCs. By combining dynamic capability and UET, our findings suggest that the effect of strategic agility on responsible collaborative innovation is stronger in the presence of higher degrees of TMT gender diversity (Ruiz-Jiménez et al., 2016; Xie et al., 2020). This is consistent with the UET, in that the characteristics of TMTs provide a unique explanation for corporate decisions and responsiveness (Hambrick, 2007).

ESMEs with greater TMT gender diversity are better able to exploit the advantages of strategic agility for responsible collaborative innovation (Attah-Boakye et al., 2020). With a more balanced participation of both genders in TMTs, ESMEs can become more resilient and can more rapidly cope with the volatility that can ultimately promote responsible collaborative innovation (Kim et al., 2020). This study combined the upper echelons and dynamic capability perspectives, given that research on this intersection in its infancy (von den Driesch et al., 2015). By linking these two perspectives, our study shows that dynamic capabilities are more influential under conditions of high gender diversity.

Fourth, in an attempt to address the recent call for scholarly work on corporate governance in responsible collaborative innovation (Bacq & Aguilera, 2022), our study demonstrates that ESME strategies (i.e., strategic agility, responsible collaborative innovation, and TMT composition) lead to VCGCs. Our findings suggest that firms should deliberately adopt such strategies to the end of enhancing social and environmental value creation. This resonates with the perspective that deliberate learning approaches cultivate dynamic capabilities and that routineness and centralization impede dynamic capabilities (Arndt et al., 2018). From this perspective, our findings suggest that strategic agility—as a dynamic capability—contributes to VCGCs via responsible collaborative innovation (Teece et al., 1997). The proponents of UET suggest that organizations are strongly affected by their TMTs, which shape strategic choices and actions such as responses to external crises (Helfat & Martin, 2014; Helfat & Peteraf, 2015). Similarly, these managerial capabilities play an important role in terms of the sensing, seizing, and exploitation of opportunities (Teece, 2007); we thus connected the upper echelons and dynamic capability view in shedding light on how ESMEs create value for grand challenges. Thus, our study complements the dynamic capability perspective and links it with UET by focusing on how ESMEs can attain VCGCs. By integrating insights drawn from the dynamic capability view and UET, our study offers a novel perspective on how firms can create value for grand challenges. By doing so, it advances a much-needed multilevel perspective and sheds important light on the mechanisms and conditions suited to enable the effective addressing of grand challenges in the context of emerging markets.

Finally, from an empirical perspective, our study extends the grand challenges literature (Buckley et al., 2017) by focusing attention on ESMEs operating in the UAE—an emerging economy characterized by weak institutions. Although investors are looking at emerging economies for opportunities, these markets still face several common challenges, including weak governance,

poor infrastructure, issues in social well-being, and environmental degradation. Given the role played by SMEs in emerging economies, it is essential to understand their importance and potential contributions to VCGCs (Lessidrenska, 2019). Our findings indicate that strategically agile UAE SMEs may be able to take advantage of responsible collaborative innovation in their quest for VCGCs.

5.2 | Practical implications

Besides its theoretical contributions, our study makes important practical ones. First, ESME managers can boost their VCGCs by making use of the insight pertaining to the influence strategic agility has on them via responsible collaborative innovation. In the wake of societal and environmental grand challenges, whereby practitioners and policymakers are increasingly resorting to responsible collaborative innovation (Voegtlin et al., 2022), SME managers should nurture strategic agility to promote responsible collaborative innovation and achieve VCGCs. ESMEs could utilize the greater flexibility they possess compared to their developed country counterparts to nurture their strategic agility to enhance both responsible collaborative innovation and VCGCs.

Second, our study's findings indicate that, for ESMEs, the effects of strategic agility on responsible collaborative innovation are greater in the presence of higher degrees of gender diversity. Specifically, this implies the important role played by top management in unpacking responsible collaborative innovation to meet challenges associated with environmental and social performance. This indicates that ESMEs should employ both men and women in senior management positions, as gender diversity seems to strengthen the mediation effect of strategic agility on VCGCs via responsible collaborative innovation. As environmental, social, and governance (ESG) issues are gaining the increasing attention of stakeholders, the managers of firms based in emerging markets should pay greater attention to and strengthen the score on these dimensions in order to improve the social reputation and value of their firms.

Third, our findings offer implications for the career development of women in the UAE, where they are often underrepresented in senior management teams. Thus, women should be offered opportunities at the upper echelons of ESMEs. Prior studies have highlighted that family responsibilities interfere with women's work commitments (i.e., that there is a work-life conflict) (Kossek & Lautsch, 2017). In this regard, ESME managers and UAE policymakers should establish mechanisms aimed at reducing the barriers to the professional

career orientations of women in the country. In addition, flexible work policies should be offered to women by encouraging values of equity and family. The inclusion of women in senior management teams could also create role models for women and overcome the stereotypes of masculinity found in emerging markets.

5.3 | Limitations and future research directions

Despite its contributions, our study has some limitations that provide avenues for future research. First, it was based on cross-sectional data, which did not allow to draw causal claims. We would therefore encourage scholars to use longitudinal mixed-method designs to investigate the nexus between strategic agility, responsible collaborative innovation, and VCGCs in emerging markets. In addition, experiential designs and random assignment techniques could be beneficial to make causal claims. Relatedly, as we collected data only from SMEs, it would be interesting for future studies to collect longitudinal data from other market and nonmarket actors. This could help to address the limitations associated with cross-sectional data.

Second, due to the difficulties encountered in obtaining secondary data, we used subjective measures to capture VCGCs. Future studies could develop a single overall evaluation index of grand challenges for each country, which would help in avoiding any measurement bias.

Third, while our study makes a novel contribution by considering strategic agility, gender diversity, and responsible collaborative innovation in relation to the promotion of VCGCs, future studies could consider alternative antecedent mechanisms; for example, the roles played by human resource management practices and leadership styles in promoting innovation to tackle grand challenges. Also, researchers could provide complementary perspectives by combining meso-level (e.g., institutional environment and governance structure) and macro-level (e.g., regional and global ecosystems, digitization, and platforms) factors to influence the strategic actions undertaken to tackle grand challenges. Moreover, our study focused on gender diversity as a moderator, but there may be other contingency factors that merit future scholarly attention; for example, the moderating effects of corporate governance, such as board independence and CEO duality, on the strategic agility and responsible collaborative innovation relationship.

Finally, our research represented an effort to consider responsible collaborative innovation for VCGC. In going beyond, future studies could explore the implications of open innovation for VCGCs (Dahlander et al., 2021). Specifically, they could consider open innovation in terms of

technological, organizational, and societal developments and attempt to uncover their implications for addressing grand challenges (Borrás & Edler, 2020; DiVito et al., 2021). Relatedly, it would also be worthwhile to investigate the role played by formal (e.g., contractual) and informal (e.g., relational norms and trust) governance mechanisms in monitoring the activities of partners in open innovation and to determine their relevance for value creation versus value capture in addressing grand challenges. Going forward, scholars could combine the capabilities-based view with the governance approach (cf. Barney, 1991; Nickerson et al., 2012; Teece et al., 1997) and examine the creation of value for grand challenges by different types of firms.

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CONFLICT OF INTEREST

There is no conflict of interest.

ETHICS STATEMENT

The ethical approval was obtained from the University of Starthclyde.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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