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CSR and green process innovation as antecedents of micro, small, and medium enterprise performance: moderating role of perceived environmental volatility

Awele Achi¹

The Open University Business School

The Open University

Milton Keynes, United Kingdom

Email: awele.achi@open.ac.uk

Ogechi Adeola

Lagos Business School

Pan-Atlantic University

Lagos, Nigeria

Email: oadeola@lbs.edu.ng

Francis Chukwuedo Achi

The Business School

Edinburgh Napier University

Edinburgh, United Kingdom

Email: francis.achi@napier.ac.uk

¹ Corresponding author

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Abstract

Despite the recognised importance of corporate social responsibility (CSR) to firms, it is far from clear how and when CSR can drive the success of micro, small, and medium-sized enterprises (MSMEs). Drawing on the dynamic capabilities approach and using time-lagged survey data collected from 176 MSMEs operating in a major sub-Saharan African economy, we examine the role of green process innovation and perceived environmental volatility in linking CSR to MSME performance. We find that green process innovation mediates the positive relationship between CSR and MSME performance. Additionally, we discover that perceived environmental volatility negatively moderates the indirect relationship between CSR and MSME performance through green process innovation, lending support to a moderated mediation model. We conclude with a discussion on the theoretical and managerial implications of our findings and provide avenues for future research.

Keywords: Corporate social responsibility (CSR), environmental volatility, green process innovation, firm performance, MSMEs, Nigeria

1. Introduction

Corporate social responsibility (hereafter CSR) has become a key strategic element for the success of small firms, in developing economies (Amaeshi, Adegbite & Rajwani, 2016; Jamali, Lund-Thomsen & Jeppesen, 2017; Jamali & Sidani, 2012). Interestingly, the owners/managers of micro, small, and medium enterprises (hereafter MSMEs) (Perrini, 2006; Russo & Tencati, 2009) feel they are personally responsible for their communities and employees and engage in philanthropic actions to drive their MSME performance (Demuijnck, & Ngnodjom, 2013; Torugsa, O'Donohue & Hecker, 2012). It has been suggested that CSR is a tool that can be utilised to make the operations of MSMEs more agile and improve business outcomes – especially, in this pandemic and post-pandemic era (Bigot and Germon, 2021). One of such outcomes is improved MSME performance (Hernández, Yáñez-Araque, & Moreno-García, 2020), hence, there is a continuous effort, from scholars and practitioner communities to explicate how CSR influences MSME performance (Bahta, Yun, Islam & Bikanyi, 2020; Smith, 2013; Yáñez-Araque, Hernández, Gutiérrez-Broncano & Jiménez-Estévez, 2021).

Findings from past research on CSR, however, remain inconsistent and do not fully explain the processes by which CSR affects MSME performance (Bhattacharyya & Rahman, 2019; Lee & Park, 2009; Úbeda-García, Claver-Cortés, Marco-Lajara, & Zaragoza-Sáez, 2021). Studies have suggested that intervening mechanisms could play a role in explicating how firms may achieve superior performance from their engagement in CSR practices (Bai & Chang, 2015; Saeidi, Sofian, Saeidi, Saeidi & Saeidi, 2015). This implies that CSR requires specific activity-based mechanisms to transmit its influence on performance of firms; however, such knowledge remains underdeveloped in the existing literature (Pham and Tran, 2020; Jain, Vyas & Roy, 2017).

Further, previous research suggests that firms' engagement in CSR and its linkage to their performance may be dependent on the context in which CSR is practised (Duthler & Dhanesh, 2018; Ertuna & Tukul, 2010; Martinez-Conesa, Soto-Acosta & Palacios-Manzano, 2017). Taking into

consideration the context-dependent nature of CSR and the potential variations in societal expectations, the existing literature continues to encourage researchers to explore the boundary conditions of the CSR-performance linkage (Aguinis & Glava, 2012; Liu, Lei & Buttner, 2020; Lee, Seo & Sharma, 2013). In addition, our understanding of how CSR influences the performance of firms continues to lack theoretical precision and an examination of possible contingencies that could condition the relationship.

Moreover, prior findings on CSR are mainly driven by research from developed economies in Europe and North America, with very little evidence from developing economies. This is another ground for more investigation as the relationship between CSR and performance of firms is unlikely to be universal and immune to external contingencies. Consequently, there are calls for scholars to investigate the role of CSR on firms' operations in developing economies' contexts (Choongo, 2017; Demuijnck & Ngnodjom, 2013; Jamali, Lund-Thomsen & Khara, 2017). Scholars often contend that environmental conditions shape CSR (Achabou, 2020; Aggerholm & Trapp, 2014; Pedersen, 2009), hence, admitting that CSR activities of MSMEs "tend to be born out of necessity in the developing world" (Jamali *et al.*, 2017, p. 12). From these identified gaps in existing literature, there is an apparent paucity of knowledge on how and when CSR influences MSME performance, particularly, in developing economies, characterised by many of these firms operating in volatile and resource-constrained environments (Adomako & Nguyen, 2020; Ofori-Dankwa & Julian, 2013). Our study, therefore, is built on the argument that green process innovation acts as a mediating mechanism in the linkage between CSR and MSME performance and that perceived environmental volatility functions as a boundary condition of the indirect relationship between CSR and MSME performance channelled through green process innovation in a major developing economy context.

Drawing on the dynamic capabilities approach, we position CSR and green innovation processes as capabilities firms utilise to balance and align the perceived volatile changes in their environments, to enhance their business outcomes. Our study, thus, makes three important

contributions to existing knowledge. First, we respond to ongoing calls for additional research on CSR in developing economies' contexts (Adomako & Nguyen, 2020; Yáñez-Araque *et al.*, 2021) and the mechanisms through which CSR influences MSME performance (Pham & Tran, 2020); specifically, we demonstrate that CSR, when channelled through green process innovation, can positively influence MSME performance. Second, our study contributes to existing CSR literature (Kraus, Rehman & García, 2020; Shahzad, Qu, Javed, Zafar & Rehman, 2020) by showing the contingency role of perceived environmental volatility on the indirect relationship between CSR and MSME performance via green process innovation, thereby generating new information about how and when CSR can predict MSME performance. Finally, we extend previous research by testing our research model in a less frequently studied developing economy context - MSMEs operating in Nigeria. Our study helps to broaden the empirical scope on the relationship between CSR and firms' performance, thus, presenting a more balanced perspective of CSR, which has so far been restricted to developed economies.

The rest of our paper is structured as follows. First, we present the theoretical background and hypotheses of the study. Next, we discuss the study methods and present the results. Finally, we conclude with the implications of our findings for MSMEs' operations and suggestions for possible future related studies.

2. Theoretical background and hypotheses

2.1 Dynamic capabilities approach

The dynamic capabilities approach suggests that firms can align and configure their operational resources and capabilities to meet the needs of a changing environment (Teece & Pisano, 1994; Teece, Pisano & Shuen, 1997). This follows arguments in existing literature that a firm's application of dynamic capabilities is dependent on the level of dynamism in the environment where the firm operates (Fainshmidt, Wenger, Pezeshkan & Mallon, 2019; Salvato & Vassolo, 2018). Teece *et al.*, (1997, p. 516) define dynamic capabilities as "the firm's ability to integrate, build, and reconfigure

internal and external competencies to address rapidly changing environments”. The approach encourages firms to maximise their potential opportunities to gain a competitive edge and enjoy superior performance against competitors (Eisenhardt & Martin 2000; Teece, 2014; Vogel & Guttel, 2013). This can be done by building, renewing, and reconfiguring their firm activities, when necessary, to create or respond to changes in the environment (Teece, 2018).

Moreover, ‘dynamic capabilities’ describes how MSMEs can configure their resources to sense and react appropriately to volatile environmental changes that influence their corporate practices (Chen 2008; Huang & Li, 2017; Nedzinskas, Pundzienė, Buožiūtė-Rafanavičienė, & Pilkienė, 2013). Previous studies have shown that the application of dynamic capabilities improves MSMEs’ performance (Branzei & Vertinsky, 2006; Hernández-Linares, Kellermanns & López-Fernández, 2020, Swoboda & Olejnik, 2016) through the development of CSR-based capabilities for the effective handling of environmental issues (Frank, Güttel & Kessler, 2017; Torugsa, O’Donohue & Hecker, 2013). For instance, Bocean *et al.*, (2014), suggest that dynamic capabilities allow firms to reconfigure their routines to maintain a strategic fit between available resources and external CSR expectations. Also, firms build pro-sustainability capability by leveraging on the CSR values of their owners/managers to gain social legitimisation from stakeholders (see Angus-Leppan, Metcalf & Benn, 2010; Font, Garay, & Jones, 2016). Stekelorum, Laguir, Courrent, and Jaegler (2018) argue that MSMEs can utilise co-evolving capabilities to increase the reach of their CSR practices for their market stakeholders. Further, through engaging with their stakeholders, firms develop stakeholder-focused dynamic capabilities that can assist in managing issues of social and environmental concerns (Dentoni, Bitzer & Pascucci, 2016). As such, firms can scan and give primacy to the CSR concerns of stakeholders (Wu, He & Duan, 2014). This is important given that the activities of firms can assist in improving their respective societies to acquire credibility and sustain legitimacy (Ciravegna & Nieri, 2021; Mazboudi, Sidani & Al Ariss, 2020).

Also, due to the non-static nature of sustainable environmental practices (Dangelico, Pujari & Pontrandolfo, 2017; Lin & Chen, 2017), prior studies recommend that firms can develop their own required ‘green knowledge’ through pro-environmental capabilities; this will ensure that they respond timely and relevantly to stakeholders’ environmental needs while balancing their business objectives (Morrow & Mowatt, 2020; Strauss, Lepoutre & Wood, 2017; Yousaf, 2021). Firms with strong green dynamic capabilities (Chen & Chang, 2013), advertently implement green practices that are crucial for achieving competitive advantage and environmental sustainability (Albort-Morant, Leal-Millán & Cepeda-Carrión, 2016; Dangelico, 2016; Yook, Choi, & Suresh, 2018). Prior studies propose that firms employ green process innovation to enhance their performance in – financial, organisational and environmental – aspects (Huang & Li, 2017; Xie *et al.*, 2019; Xie, Huo, Qi & Zhu, 2015).

With this background, in our study, we attempt to draw on the tenets of the dynamic capabilities approach that links environment, capabilities, and performance (Teece, 2007) to propose a theoretical model which identifies a possible indirect link between CSR and MSME performance through green process innovation, and that such a mediated mechanism is moderated by perceived environmental volatility.

2.2 CSR and its outcomes in MSMEs

The environment is usually perceived as the cornerstone for firms’ CSR actions (Babiak & Trendafilova, 2011; Williamson, Lynch-Wood & Ramsay, 2006). For this research, CSR is defined as the “actions that appear to further some social good beyond the interests of the firm” (McWilliams & Siegel, 2001, p. 117). CSR, thus, is perceived as the actions of firms that go beyond purely economic interests (Turker, 2009). Moreover, the dynamic capabilities approach suggests that firms recognise the prevailing environmental issues in their society (Ramachandran, 2011) and then integrate CSR activities that offer a potential for promoting positive environmental behaviours (Hayter & Cahoy, 2018; Hernández, Yañez-Araque, & Moreno-García, 2020; Tian & Robertson, 2019). Besides, Since firms invest considerably and subsequently benefit substantially from engaging

in CSR practices (Malik, 2015; McWilliams & Siegel, 2000; Perrini, 2006); this has triggered a growing body of research that theorises on and empirically examines the relationship between CSR and firms' performance (Lu *et al.*, 2020; Rhou, Singal & Koh, 2016; Yang, Lau, Lee & Cheng, 2020).

However, empirical evidence from previous studies on the relationship between CSR and firm performance in existing literature remains conflicting and inconclusive (Bai & Chang 2015; Waheed & Zhang, 2020). Hou (2019) and Yoon and Chung (2018) reported a positive association; Crisóstomo, de Souza Freire and De Vasconcellos (2011), Lee, Singal and Kang (2013), and Selcuk and Kiyamaz (2017) found a negative or null relationship between CSR and firm performance, while other researchers have found a neutral relationship (Chih, Chih, & Chen, 2010; Surroca, Tribó & Waddock, 2010). These inconsistencies in the relationship between CSR and firm performance may be attributable to a 'missing element' that could assist in explicating any linkage that might exist (Bai & Chang, 2015; Bocquet, Le Bas, Mothe & Poussing, 2017; Yu & Choi, 2014).

Consequently, some studies suggest that intervening mechanisms could have a significant role to play in evaluating the CSR-performance link (Margolis & Walsh, 2003; Saeidi *et al.*, 2015; Úbeda-García *et al.*, 2021). We build on this insight and position CSR as a firm's capability that can influence performance when channelled through green process innovation. Green process innovation refers to the use of eco-friendly processes and methods in manufacturing and operational activities, in a bid to reduce cost, waste, and pollution (Chang, 2011; Chen, Lai & Wen, 2006). Existing studies contend that from engaging in CSR, firms can initiate green process innovation, which would demonstrate their environmental legitimacy and support the attainment of competitive advantage (Lozano, 2013; Wong, 2013). This mirrors the dynamic capabilities view of the significance of the environment on organisational capabilities and firms' performance (Fainshmidt *et al.*, 2019; Teece, 2018; Teece *et al.*, 1997).

Extant studies indicate that CSR, when linked to green strategy, can assist firms to conserve the economic, social, and cultural elements of the environment in which they operate (Abbas, 2020;

Siegel, 2009). By doing this, firms adapt to external pressures and conduct business in an environmentally friendly manner, designed to increase cooperation among social actors (Bossink, 2004; Gluch, Gustafsson & Thuvander, 2009), while improving firms' outcomes (Dangelico & Pujari, 2010; Gupta & Barua, 2018). This because MSMEs activities are considered a doorway for generating positive social and environmental impact because of their closeness to the society (Sendlhofer, 2020). It can, thus, be argued that CSR augments firms' ability to develop sustainable green practices while, at the same time, enabling them to respond effectively to environmental problems (Blowfield, 2010; Handayani, Wahyudi & Suharnomo, 2017). For example, Xie *et al.*, (2019) explain that green innovations can be developed from the CSR activity reports of firms. Úbeda-García *et al.*, (2021) suggest that undertaking CSR activities enables firms to implement strong green management practices. A study by Kraus *et al.*, (2020) on MSMEs suggests that strong CSR actions are more likely to increase green innovation, and, in the process, reduce operational costs. Also, scholars argue that environmentally responsible firms integrate their CSR programs and green management efforts to attain better operational efficiency (Babiak & Trendafilova, 2011; Yu & Huo, 2019).

Based on these assumptions, we argue that engagement in CSR practices enables firms to develop effective green process innovation. The sustained effectiveness in their green process innovation strengthens the ability of the firm to deliver superior performance; hence, we contend that CSR drives MSME performance when channelled via green process innovation and propose the following hypothesis:

Hypothesis 1. Green process innovation mediates the positive relationship between CSR and MSME performance.

2.3 The moderating role of perceived environmental volatility

Previous studies have argued that environmental contingencies condition the deployment of organisational capabilities aimed at environmental strategy and improving firms' performance (Aragón-Correa & Sharma, 2003; Chen *et al.*, 2014; Martinez-del-Rio, Antolin-Lopez, & Cespedes-

Lorente, 2015). Firms are constrained by environmental contingencies that ultimately influence their strategic course of actions (Baum & Wally, 2003; Piening & Salge, 2015). Environmental volatility refers to the rate and number of rapid changes in firms' external environment (Matanda & Freeman, 2009; Wilhelm, Schlömer & Maurer, 2015). These changes can occur in the aggregate market demand and supply, customer preferences, and/or technologies, thereby creating uncertainty, anxiety, and risk for firms operating in such environments (Ensley, Pearce & Hmielieski, 2006; Waldman, Ramirez, House, & Puranam, 2001; Schilke, 2014). These rapid changes make it challenging for firms to make precise projections of their organisational outcomes (Achrol & Stern, 1988; Chen *et al.*, 2014).

Prior research contends that increasing levels of uncertainty in the environment are inversely related to the performance outcomes of firms (Darvishmotevali, Altinay & Köseoglu, 2020; Yu, Wang & Brouthers, 2015). This is because volatile environments make it challenging for firms to evaluate change, develop the proper response to counter its effects and adjust their organisational practices (Azadegan, Patel, Zangouezinezhad & Linderman, 2013; Patel, Azadegan & Ellram, 2013). Many firms in volatile environments become laggards, making it challenging to identify sustainable market opportunities and environmental practices that may not directly determine their short-term organisational success (Martinez-del-Rio *et al.*, 2015).

In recent times, the Nigerian business environment has been perceived to be volatile to firm operations due to insecurity concerns and multiple economic recessions in 2015 and 2020. Many firms have been faced with fluctuating demand, rising cost of supplies, excess inventories, and spikes in risk aversion in domestic and global capital markets (The World Bank, 2019a; 2021). Boso, Donbesuur, Bendega, Annan and Adeola (2017), in their study on whether organisational creativity drives market performance in Nigeria, observed that environmental dynamism is high in the country, and this weakens the ability of firms to develop necessary organisational capabilities. In addition, the uncertainty about the trajectory and duration of the COVID-19 pandemic continues to exert significant influence on firms' activities in the country (The World Bank, 2021). Firms, thus, are often

discouraged to engage in pro-environmental activities, especially when they sense volatility in the environment. They often look inward at their firms and seek ways to boost internal efficiency as an immediate response to any uncertainty in the environment (Tang & Hull, 2012).

Extant literature indicates that environmental volatility can hamper the ability of firms to survive and grow (Wu, 2010), particularly in developing economies, where there are weak market-supporting institutions and poor enforcement of laws (Ghauri, Lutz & Tesform, 2003; Orcos, Pérez-Aradros & Blind, 2018; Schwens, Eiche & Kabst, 2011). Such environments can present obstacles that may obstruct firms from acquiring or enhancing existing necessary resources to build-up their pro-environmental capabilities, such as CSR and green process innovation (Baden & Harwood, 2013). Firms in this environment are compelled to devote little time and effort to these capabilities, which in turn adversely affect the organisational outcomes, over time (Sirmon, Hitt & Ireland, 2007).

We argue, therefore, that highly volatile environments, such as Nigeria, are characterised by frequent changes in market demand or government policies; either of which has the potential to influence firms' capabilities related to CSR activities and green process innovation. Firms, in developing economies have limited access to market information to support decision-making related to their environmental practices (Goll & Rasheed, 2004; Simon, 1955). We expect that in such a volatile environment, the limited access to resources and deployment of capabilities will diminish the assumed benefits of CSR on organisational outcomes, via green process innovation (Schreyogg & Kliesch-Eberl, 2007). This implies that environmental volatility will conditionally moderate the mediated mechanism of green process innovation on the CSR/MSME performance relationship, such that the mediated effect is stronger when perceived environmental volatility is low. Put together; we argue that a pattern of moderated-mediation relationship exists and is formally hypothesised that:

Hypothesis 2. Perceived environmental volatility negatively moderates the mediating effect of CSR on MSME performance through green process innovation, such that the mediated relationship will be stronger under low levels of perceived environmental volatility.

Based on the two hypotheses we have offered in the study; the theorised relationships are conceptualised in Figure 1.

– Insert Figure 1 About Here –

3. Methods

3.1 Sample and procedures

MSMEs operating in Nigeria served as the unit of analysis in this study. Our choice of Nigeria as the research setting was based on three key attributes. First, Nigeria is the most populous Black nation in the world with an estimated population of 202 million people (The World Bank, 2019b) and has the largest economy in sub-Saharan Africa with an estimated gross domestic product (GDP) of 432.30 billion US dollars (Trading Economics, 2021). Following the COVID-19 pandemic's effects on the Nigerian economy in 2020, the economy shrank by -3.0% and is expected to grow by 1.5% in 2021 and 2.9% in 2022 (African Development Bank, 2021). Second, Nigeria, like many other democratic countries, operates an open economy with little to or no barriers to market entry activities. This has resulted in the rising presence of MSMEs in the economy (Boso *et al.*, 2017). Currently, it is estimated that there are over 41.5 million MSME businesses, which makes up 96% of business organisations in the country (PwC Nigeria, 2020). Finally, the Nigerian economy has implemented a range of new development finance initiatives to boost the MSME sector, after the 2020 economic recession exacerbated by the COVID-19 pandemic (The World Bank, 2021). The sector employs an estimated 59.6 million people, which constitutes about 86% of Nigeria's working population and contributes about 50% of the country's GDP (PwC Nigeria, 2020; Small and Medium Enterprises Development Agency of Nigeria, 2017). Based on this economic background of Nigeria, the country presents a rich context to conduct research on how and when CSR influences MSME performance in a large developing economy.

We tested the research hypotheses using a sample of 800 MSMEs drawn from the Nigerian Business Directory. These MSMEs are all privately owned, operate in diverse industries, and each

employ 200 or fewer people (Bank of Industry, 2020). These firms have developed personal closeness to their respective society by engaging in similar responsible practices to address the social and environmental needs of stakeholders e.g., healthcare provision and poverty alleviation schemes (Amaeshi, Adi, Ogbechie, & Amao; 2006; Demuijnck & Ngnodjom, 2013). We used an introductory letter and professional contacts to gain access to these firms. To ensure that participants would understand the survey, we conducted pilot interviews with four MSME owners or managers and asked two business research experts to word-check our survey instrument. Based on their feedback, we modified some of the survey statements to achieve face and content validity.

Data collection began by sending a questionnaire to gather information on CSR, green process innovation, perceived environmental volatility, and control variables to 800 MSMEs CEOs, owners and/or managers. We received 191 complete questionnaires (23.9%) from that first mailing. After a sixteen-week interval, we further approached these 191 MSMEs with another questionnaire to collect information about their performance. After excluding incomplete responses, we identified 176 appropriately completed questionnaires (an overall response rate of 22%) for our analyses. The collected data from the 176 MSMEs showed that 55.1% had been in business for less than 5 years, 27.8% for 6 to 10 years and 17% for more than 10 years.

3.2 Measures

We employed a seven-point Likert scale response (1 = totally disagree to 7 = totally agree) for the survey of this study. The Likert scale response is an established multi-item research tool that gives room for scoring variability.

We measured CSR with five items from Turker (2009) that captured CSR activities focusing on both social and non-social stakeholders; a sample CSR item is: “Our firm contributes to campaigns and projects that promote the well-being of the society”. Green process innovation was measured with four items taken from previous studies (Chen, Lai, & Wen, 2006; Tang *et al.*, 2018). A sample

green process innovation item is: “Our firm process reduces the consumption of water, electricity, coal, or oil”.

Perceived environmental volatility was measured with three items adapted from extant studies (Ganesan, 1994; Matanda & Freeman, 2009). A sample perceived environmental volatility item is: “The demand for our products and/or services is very unpredictable”. To evaluate MSME performance, we used a subjective judgement approach, as suggested by Hernández-Linares *et al.* (2020) and Olavarrieta and Friedmann (2008). MSME performance was measured with four items taken from Morgan, Vorhies and Mason (2009). We asked MSMEs’ owners or managers to compare their performance to similar firms over the past 12 months using a seven-point scale ranging from 1 (well below average) to 7 (well above average). A sample comparison item is: “We have improved our profit rate”.

3.3 Control variables

Previous studies suggest that firms’ and industries’ characteristics affect the relationship between firm performance, CSR, green process innovation, and other environmental practices (Aguilera-Caracuel & Ortiz-de-Mandojana, 2013; Shu *et al.*, 2016). We, thus, controlled for firms’ age, size, industry focus and industry competitiveness. We measured firm age using the natural logarithm of the number of years a firm has been in operation. For firm size, we used the natural logarithm of number of employees in the firm. For industry focus, we created dummy variables for manufacturing, service, and construction industries while choosing ‘others’ as the benchmark group. For industry competitiveness, we adapted a single item scale of Shu *et al.*, (2016) and asked respondents to indicate the most appropriate description of their industry: “not competitive, limited competitive, moderately competitive, very competitive, and extremely competitive”.

3.4 Evaluation of common method bias

Collection of data from a single source can result in common method bias, hence, we employed both procedural and statistical remedies. Procedural remedies included sourcing our data

from the different firms in two waves, at a sixteen-week interval, and we assured the participants of the confidentiality and anonymisation of their responses and that there were no right or wrong answers (Podsakoff, MacKenzie, Lee & Podsakoff, 2003; Tehseen, Ramayah & Sajilan, 2017). Statistical remedies included Harman's single-factor test with the result showing that the first factor was responsible for less than 35% variance in the data. Next, we followed the suggestion of Chang, Van Witteloostuijn, and Eden (2010), and loaded all the questionnaire items for the constructs onto a single factor confirmatory factor analysis (CFA) model, the output showed a poor fit statistic ($\chi^2 = 1083.547$; $df = 104$; $\chi^2/df = 10.419$; TLI = 0.369; IFI = 0.458, CFI = 0.453; RMSEA = 0.232; SRMR = 0.206). Overall, our results indicated that a common method bias was not a threat to the study.

3.5 Validity and reliability

We assessed construct validity through a CFA test to evaluate model fitness, composite reliability, convergent validity, and discriminant validity in the study. Before conducting the validity checks, we assessed the sample fitness of the data. The Kaiser-Meyer-Olkin (KMO) index was 0.817, which is above the suggested minimum threshold of 0.6 for sample adequacy (Hair, Black, Babin & Anderson, 2010). The CFA result suggested that our model has an acceptable fit ($\chi^2 = 187.354$; $df = 98$; $\chi^2/df = 1.912$; TLI = 0.939; IFI = 0.951; CFI = 0.950; RMSEA = 0.072; SRMR = 0.055) with standardized factor loadings for each construct exceeding 0.60 (see Table 1). The composite reliability (CR) and Cronbach's alpha (α) for each construct exceeded the recommended benchmark of 0.70. The average variance extracted (AVE) for each construct was above 0.50, but below the composite reliability values (see Table 1). These confirm the convergent validity and internal consistency of the study variables. Further, the square root of the AVE values of each construct was calculated, and these exceeded the inter-correlations coefficients among the constructs (see Table 2). This confirms the discriminant validity of the constructs (Fornell & Larcker, 1981). We also evaluated the possibility of multicollinearity in the study by calculating the variance inflation factors (VIF) of the main

variables. Results show that all the VIF values were under the threshold of 10, suggesting that multicollinearity is not a threat to the study (Hair, Ringle & Sarstedt, 2011).

– Insert Table 1 About Here –

– Insert Table 2 About here –

4. Results

Table 2 presents the descriptive statistics and inter-correlations among the variables of the study. We performed a hierarchical regression analysis to evaluate our hypotheses. Prior to the analyses, all the continuous variables in the study were mean-centered to minimise multicollinearity (Aiken & West, 1991). Table 3 displays the results of the regression analysis.

In hypothesis 1, we argued that green process innovation mediates the positive relationship between CSR and MSME performance. Before testing this hypothesis, we followed Baron and Kenny's (1986) four conditions for mediation test. For the first condition, we found that CSR is positive and significantly related ($\beta = 0.218, p < 0.01$) to MSME performance as shown in Table 3, Model 5. For the second condition, we discovered that CSR has a positive and significant relationship ($\beta = 0.441, p < 0.001$) with green process innovation as shown in Model 2 of Table 3. For the third condition, the results in Model 4 of Table 3 show that green process innovation has a positive and significant relationship ($\beta = 0.277, p < 0.001$) with MSME performance. For the final condition, we found that the beta coefficients of CSR on MSME performance became non-significant ($\beta = 0.120, p > 0.01$) while green process innovation is significant ($\beta = 0.223, p < 0.01$) when included in the same regression model (see Model 6 in Table 3). This provides support that green process innovation fully mediates the positive effect of CSR on MSME performance. Further, we followed the suggestion of Hayes and Preacher (2010) to test the indirect effect using a bootstrapping analysis. We estimated 95% bias-corrected confidence intervals (CIs) for indirect effects by bootstrapping 5,000 samples. The results show that CSR has a significant indirect positive effect on MSME performance via green

process innovation ($\beta = 0.098$; $SE = 0.043$) with a 95% CI that did not contain zero (CI = 0.020, 0.190). Therefore, this provides evidence for a mediation model, indicating that hypothesis 1 is supported

– Insert Table 3 About Here –

Hypothesis 2 proposed a moderated mediation model whereby perceived environmental volatility negatively moderates the mediating effect of CSR on MSME performance, through green process innovation, such that the mediated relationship will be stronger under low levels of perceived environmental volatility. The results in Table 4 for the Index of Moderated Mediation (see Hayes, 2018) demonstrate that the moderated mediation pattern is supported (with index = -0.083, and 95% CI = -0.171, -0.018), indicating that the indirect effect of CSR on MSME performance, through green process innovation is, indeed, negatively moderated by perceived environmental volatility. In addition, we examined the conditional indirect effects of CSR on MSME performance through green process innovation at low and high levels (that is, one standard deviation below and above the mean) of perceived environmental volatility. Table 4 indicates that the conditional indirect effect of CSR on MSME performance, through green process innovation is significant at low levels of perceived environmental volatility ($\beta = 0.161$, and 95% CI = 0.063, 0.273), however, the relationship is nonsignificant at high levels of perceived environmental volatility ($\beta = -0.005$, 95% CI = -0.123, 0.086). This suggests that the conditional indirect effect of CSR on MSME performance, through green process innovation is strong and exists only at low levels of perceived environmental volatility. Overall, these results indicate that hypothesis 2 is accepted, and the moderated mediation is supported.

– Insert Table 4 About Here –

4.1 Testing for endogeneity

Due to the nature of survey data being liable to endogeneity bias, it is becoming an increasing tradition to address endogeneity in management research (Rutz & Watson, 2019; Zaefarian, Kadile,

Henneberg, & Leischnig, 2017). Endogeneity occurs when an independent variable in a regression model correlates with an error term in model, thereby leading to potential bias in the regression estimates. This bias could be caused by omitted variables, simultaneous causality, and measurement error (Daryanto, 2020; Wooldridge, 2010). We argue, hence, that CSR and green process innovation could be endogenous due to one or more of the reasons highlighted above. If they are endogenous, their established relationship with MSME performance could be inconsistent; consequently, we took steps to eliminate any possible endogeneity bias in our study by utilising a three-stage least squares regression analysis (Hamilton and Nickerson, 2003).

Following the advice of Poppo, Zhou and Li (2016), in the first stage, we regressed CSR and green process innovation, against firms' age, size, industry focus, industry competitiveness and perceived environmental volatility, to obtain residual values for both. In the second stage, we utilised the obtained residual values as estimates of CSR and green process innovation, separately, then regressed them together against MSME performance, perceived environmental volatility and the control variables. The resulting beta coefficient of CSR residual on MSME performance was nonsignificant, while the coefficient of green process innovation residual was significant. In the third stage, we estimated the moderating effects of perceived environmental volatility by regressing MSME performance against CSR residual, green process innovation residual, perceived environmental volatility and the control variables. Having implemented the third stage, the patterns of results obtained were also identical to those presented in the results section of the study. Consequently, we conclude that any presence of endogeneity bias between CSR and green process innovation did not undermine the key findings, reported in our study.

5. Discussion and conclusions

In this study, we empirically evaluated a moderated mediation model that investigated how and when CSR influences MSME performance. Using data collected from MSMEs operating in Nigeria, a major developing economy in sub-Saharan Africa, we found support for an indirect positive

relationship of CSR on MSME performance when channelled through green process innovation. We argued and found support for a moderated mediation model whereby perceived environmental volatility negatively moderated the indirect effect of CSR on MSME performance via green process innovation such that the mediated relationship was strong when the level of perceived environmental volatility was low. Considering this, our study offers several theoretical and practical implications, which are discussed below.

5.1 Theoretical implications

The existing literature often suggests that CSR can favourably drive the performance outcomes of firms, however, empirical evidence is largely conflicting and inconclusive on this relationship (see Aguinis & Glavas, 2012; Surroca *et al.*, 2010; Úbeda-García *et al.*, 2021). Our study contributes to extant studies by accounting for a mechanism under which CSR influences MSME performance by showing that green process innovation mediates the relationship between CSR and MSME performance. In taking a dynamic capabilities approach, our findings suggest that CSR-based firms' capabilities should be employed to develop green process innovation to drive the performance of firms. This can be attained by utilising the capabilities gained from CSR practices to feed into the development and execution of effective green process innovation. Further, to the best of our knowledge, this is the first study to introduce green process innovation as a mediator in the CSR-MSME performance relationship; the results should not only assist in opening the 'black box' about the mechanism behind the effect of CSR on performance outcomes (Ye, Wang & Lu, 2021), but also extend knowledge on the nomological network of green process innovation (Hillestad, Xie & Haugland, 2010; Xie *et al.*, 2019).

Our findings also add to the growing number of studies exploring the necessity of perceived environmental volatility in firms' strategic pro-environmental practices (Chang, Lee & Oh, 2021; Zhang, Hu & Liang, 2021). Our study is novel in showing that perceived environmental volatility acts as a boundary condition between CSR and MSME performance via the mediating mechanism of

green process innovation. Specifically, our findings reveal that perceived environmental volatility negatively affects the indirect positive relationship of CSR on MSME performance, through green process innovation. Our findings show that this indirect relationship is stronger in environments with low volatility. This suggests that the incremental improvements required for enhancing firm performance and addressing the demands of a volatile environment can be implemented through green process innovation at a lower cost. This could be attributed to the nature of developing economies, where firms are far more comfortable when operating in environments with few occurrences of volatility. Particularly, our findings are very relevant for firms in developing economies' societies, as they are often exposed to unprecedented levels of volatility and uncertainty in their market environment. The results uncover new insights into how developing economies' firms can employ green process innovation to attain better performance outcomes from their CSR practices, even when surrounded by varying levels of volatility in the environment. Our study, thus, broadens the understanding of a volatile environment and its implications on the capabilities of firms and their performance outcomes (Girod & Whittington, 2017; Liu & Yang, 2019). Overall, our study extends the CSR and MSME performance debate (Yáñez-Araque *et al.*, 2021) and contributes empirically and contextually to small business literature by investigating the mechanism and prevailing boundary condition through which CSR influences MSME performance, from a developing economy's perspective.

5.2 Managerial implications

Beyond its theoretical implications, our research has several implications for MSME owners and managers. Managers of firms, particularly those who are involved in pro-environmental practices, can benefit by identifying factors found to influence firm performance. Our findings from the study reinforce the notion that CSR practices are essential to the development of green process innovation; consequently, managers should understand that firms need to actively engage and leverage CSR practices to develop and enhance the effectiveness of their green process innovation. A key challenge

facing managers is justifying their investment in green process innovation. Our study, however, shows that a well-designed and effective green process innovation that is built on accumulated CSR-based capabilities can assist firms to ensure their CSR practices translates into better firm performance. To this end, the potentials of aligning and balancing green process innovation to CSR practices is instrumental to delivering superior performance for firms.

Besides, findings with regards to the moderating role of perceived environmental volatility provide additional insights into the complex mechanisms through which CSR contributes to the performance of firms. Specifically, our study demonstrates that perceived environmental volatility negatively moderates the indirect positive relationship of CSR on MSME performance through green process innovation such that the relationship is strong in a low volatile environment. This suggests the need for a proactive managerial approach regarding the extent to which green process innovation is implemented in volatile environments. Based on this account, managers should pay special attention to the conditions of the environment when implementing green process innovation, as they could be crucial during low levels of volatility to ensure stability in performance outcomes of firms.

6. Limitations and future research

The limitations of this study provide an avenue for future research investigations. First, we collected data through a self-report survey designed to measure the degree of agreement to the questions, by firms; this may have presented bias due to the perception of the research participants. It is suggested that future research should make use of data collected from firms' annual reports to examine the relationships among the variables of the study.

Second, we only tested the indirect effect of green process innovation on the CSR–MSME performance nexus. Other constructs that might mediate this relationship should be included in future studies. Also, our study utilised perceived environmental volatility as a conditional moderator in the theoretical model. We argue that perceived environmental volatility highlights one of many possibilities that can explicate the nexus in the indirect relationships between CSR and MSME

performance via green process innovation, as investigated in the study. We suggest that future research examine other moderators to strengthen, clarify, or advance the findings in our research.

Third, the sample for our study was drawn from MSMEs operating in Nigeria. This could limit the ability to generalise our findings beyond this context, although we expect that our findings will hold for other markets of similar contexts. We recommend that future research be conducted on this study in different industries and countries outside sub-Saharan Africa. We collected data from firms with varying industry focus operating in the MSME sector, however, we recognise that firms' environmental activities, such as CSR and green process innovation, are largely context dependent. We, therefore, suggest that future research can focus on a specific industry and use measures that are suitable to that industry's characteristics to investigate how CSR and green process innovation are implemented by different firms within the industry.

Finally, future research might take a qualitative approach to explore the relationships among the variables of our study. This would complement the quantitative nature of this research and provide a deeper understanding of the contingent process of perceived environmental volatility on the CSR and MSME performance relationship when channelled via green process innovation. In conclusion, we encourage future researchers to continue to investigate how different environmental-related drivers can contribute to MSMEs performance.

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TABLES

Table 1. Measurement factor loadings, reliability, and validity

Measurement items	SFL	α	CR	AVE
Corporate social responsibility (CSR)		0.91	0.92	0.70
Our firm participate in the activities which aim to protect and improve the quality of the environment	0.629			
Our firm implement special programs to minimise negative impact on the natural environment	0.850			
Our firm target sustainable growth which considers the future generations	0.930			
Our firm always support the non-governmental organisations working in the problematic areas	0.854			
Our firm contribute to campaigns and projects that promote the well-being of the society	0.847			
Green process innovation		0.87	0.87	0.63
Our firm process reduces the consumption of water, electricity, coal, or oil	0.768			
Our firm recycle and reuse materials or parts	0.839			
Our firm process reduces the use of raw materials	0.791			
Our firm process effectively reduces the emission of hazardous substances or waste	0.767			
Perceived environmental volatility		0.89	0.90	0.76
The demand for our products and/or services is very unpredictable	0.657			
The volume of production in our industry is unstable	0.975			
It is difficult to monitor price changes for our product and/or services in our market	0.949			
MSME performance		0.80	0.81	0.51
Compared to similar MSMEs, we have improved our profit rate	0.697			
....., we have improved our return on sales	0.707			
....., we have improved our return on investment	0.729			
....., we have reached our financial goal	0.734			

Note: SFL = Standardized Factor Loadings. α = Cronbach's alpha. CR = Composite Reliability. AVE = Average Variance Extracted

Table 2. Descriptive statistics and inter-construct correlations

	M	SD	1	2	3	4	5	6	7	8	9	10
1 Firm age ^a	1.619	0.762	--									
2 Firm size ^a	1.409	0.493	-0.171*									
3 Manufacturing industry ^b	0.307	0.462	-0.081	-0.077								
4 Services industry ^b	0.409	0.493	-0.025	0.083	-0.554**							
5 Construction industry ^b	0.239	0.427	0.013	-0.059	-0.372**	-0.466**						
6 Industry competitiveness	3.983	0.947	-0.048	-0.071	0.103	-0.034	-0.103					
7 CSR	4.223	1.337	0.058	-0.085	-0.042	-0.029	0.069	0.038	(0.838)			
8 Green process innovation	3.568	1.388	-0.046	-0.116	-0.053	-0.054	0.081	0.106	0.454**	(0.792)		
9 Perceived environmental volatility	4.669	1.189	0.096	-0.141	0.158*	-0.235**	0.059	0.218**	0.146	0.145	(0.872)	
10 MSME performance	4.732	1.150	0.084	-0.102	0.067	-0.155*	0.119	0.103	0.235**	0.285**	0.440**	(0.717)

Note: N = 176; * p < 0.05; ** p < 0.01

M = Mean. SD = standard deviation. Average Variance Extracted (AVE) square roots are shown in bold on the correlation matrix diagonal.

^a = Natural logarithm transformation of original values. ^b = Dummy variables, we chose “Others” as the benchmark group for industry focus

Table 3. Results of regression analysis

Variables	Green process innovation			MSME performance			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
<i>Controls</i>							
Firm age	-0.091	-0.108	0.088	0.113	0.079	0.103	0.084
Firm size	-0.133 [†]	-0.099	-0.060	-0.023	-0.043	-0.021	0.006
Manufacturing industry	-0.275	-0.245	0.137	0.214	0.152	0.207	0.180
Service industry	-0.258	-0.237	0.018	0.090	0.028	0.081	0.151
Construction industry	-0.139	-0.148	0.185	0.224	0.181	0.214	0.200
Industry competitiveness	0.098	0.079	0.109	0.082	0.100	0.082	0.006
<i>Predictor</i>							
CSR		0.441***			0.218**	0.120	0.067
<i>Mediator</i>							
Green process innovation (GPI)				0.277***		0.223**	0.176*
<i>Moderator</i>							
Perceived environmental volatility (PEV)							0.401***
<i>Interaction effect</i>							
GPI X PEV							-0.188**
<i>Model Statistics</i>							
F Value	1.393	7.534***	1.586	3.476**	2.668*	3.335***	7.074***
R ²	0.047	0.239	0.053	0.127	0.100	0.138	0.300
ΔR ²		0.192		0.073	0.047	0.084	0.162

Note. N = 176. Standardized coefficients are reported

[†] p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 4. Conditional indirect effects of CSR on MSME performance via green process innovation

		Indirect Effect	SE	LLCI	ULCI
<i>Moderator</i>	<i>Level</i>				
Perceived environmental volatility	<i>Low</i>	0.161	0.055	0.063	0.273
	<i>High</i>	-0.005	0.051	-0.123	0.086
		Index	SE	LLCI	ULCI
<i>Index of moderated mediation</i>		-0.083	0.039	-0.171	-0.018

Note. N= 176, Standardized coefficients are reported

Bootstrap sample size = 5000. LL = lower limit; CI = 95% confidence interval; UL = upper limit.

FIGURE

Figure 1. Theoretical model of the study

