Received: 18 March 2020 | Revised: 12 May 2020 | Accepted: 29 May 2020

DOI: 10.1002/bse.2552

RESEARCH ARTICLE

Business Strategy and the Environment

WILEY

Human resource slack, sustainable innovation, and environmental performance of small and medium-sized enterprises in sub-Saharan Africa

Samuel Adomako[1,2] | Nguyen Phong Nguyen[2]

[1]School of Management, University of Bradford, Bradford, UK

[2]School of Accounting, University of Economics Ho Chi Minh City, Vietnam

Correspondence
Samuel Adomako, School of Management, University of Bradford, Bradford, United Kingdom.
Email: s.adomako@bradford.ac.uk

Funding information
University of Economics Ho Chi Minh City, Vietnam

Abstract

Despite the burgeoning interests in the environmental strategy, there is a limited understanding of how human resource slack drives sustainable innovation and environmental performance. This paper contributes to filling this gap by examining the effect of human resource slack on sustainable innovation and its impact on environmental performance. Besides, this paper investigates the contingent effects of intangible resource advantage on this relationship. The hypotheses are tested using data from 301 small and medium-sized enterprises in Ghana. The results suggest that human resource slack positively relates to sustainable innovation and this relationship is moderated by intangible resource advantage. Also, we find that sustainable innovation mediates the relationship between human resource slack and environmental performance. The insights from our paper provide a nuanced understanding of the relationships among human resource lack, sustainable innovation, and environmental performance. Implications for theory and practices are discussed.

KEYWORDS

environmental policy, Ghana, human resource slack, intangible resource advantage, Sub-Saharan Africa, sustainable innovation

1 | INTRODUCTION

Over the past decade, considerable research attention has been devoted to how firms manage and improve their environmental performance. This is not surprising, given that consumer, institutional, and competitive pressures are increasingly forcing firms to be aware of environmentally harmful behaviors (De Marchi, 2012; Spar & La Mure, 2003; Symeou, Zyglidopoulos, & Gardberg, 2019; Wang, Li, & Zhao, 2018; Wu, 2015). For example, the United Kingdom's target for the 25-year environmental plan requires companies to disclose potential environmental risks, while three of the United Nations Global Sustainable Development Goals apply to the environment. Given that environmental management issues have become a crucial concern due to growing stakeholder pressures, firms are expected to adopt and implement environmental management practices to attenuate the negative impact of their activities on the natural environment (Mårtensson & Westerberg, 2016; Wang et al., 2018).

Despite these increasing pressures, researchers have still not been able to reach consensus as to why firms differ in terms of their environmental performance (Hart, 1995; Russo & Fouts, 1997; Symeou et al., 2019). A major explanation in this variation may be due to differences in slack resources, which refer to excess unabsorbed resources that facilitate discretionary environmental activity investments. For example, firms differ substantially in terms of their resource endowments (Shane & Stuart, 2002). However, whether abundance or scarcity of resources influences a firm's

environmental behavior has produced missed results. For example, recent studies conducted in sub-Saharan Africa revealed that financial resource slack negatively relates to sustainability expenditure (Boso et al., 2017; Julian & Ofori-Dankwa, 2013). Conversely, studies conducted in advanced economies proved otherwise (Leyva-de la Hiz, Ferron-Vilchez, & Aragon-Correa, 2019; Shahzad, Mousa, & Sharfman, 2016). These results show that the relationship between slack and environmental performance is more complex than previously understood.

Arguably, resource slack tends to solve problems at the firm level (Greve, 2003) or act as a buffer for resource constraints (Baker & Nelson, 2005). Slack may also help managers to reduce uncertainty and risk by recognizing environmental management as an opportunity. Indeed, extant studies tend to resolve these opposing views by suggesting that several contingencies play significant roles in explaining variations of the effect of resource slack on performance (George, 2005; Tan & Peng, 2003).

Despite this progress, several knowledge voids exist in the environmental management literature. First, our understanding of how human resource (HR) slack influences environmental performance is far from complete. Previous research has mainly focused on understanding financial slack influences environmental performance (Boso et al., 2017; Julian & Ofori-Dankwa, 2013). This provides an incomplete picture of how slack resources drive environmental performance. HR slack refers to specialized and skilled HRs that are rare and absorbed (Mishina, Pollock, & Porac, 2004). The competitive forces brought about by competitive environments require that firms retain and protect skilled labor to create long-term competitive advantage (Barney, 1991). Second, our current understanding of how sustainable innovation mediates the effect of levels of HR slack on environmental performance is lacking. We know that many firms integrate environmental concerns into their strategies while boosting their competitive edge through sustainable innovations. Yet, knowledge is lacking on how HR slack and sustainable innovation work in concert to drive the environmental performance of small and medium-sized enterprises (SMEs). Third, scholarly effort to investigate the boundary conditions of the influence of HR slack on sustainable innovation is underresearched. Accordingly, we adopt the resource-based view (RBV) (Barney, 1991) and investigate one potential moderator of the relationship between HR slack and sustainable innovation—intangible resource advantage.

This paper contributes to the literature in three ways. First, extant studies have failed to examine the underlying mechanism through which HR slack influences environmental performance in SMEs. Our paper, in contrast, sought to obtain evidence relevant to this question by investigating the potential role of sustainable innovation, which is strongly related to environmental performance (Carrión-Flores & Innes, 2010; Khurshid, Park, & Chan, 2019; Long et al., 2017). This is an important line of inquiry because understanding the mechanism through which firm resources influence environmental performance in emerging markets is a crucial task because SMEs often lack resources to undertake environmental activities (Earnhart, Khanna, & Lyon, 2014). Second, following our first contribution, there is a fundamental question: If some HR slack influences sustainable innovation, under what condition will this happen? This is an important question to ask because putting resources in environmental activities in the face of failure would increase the financial costs for the firms. Thus, our second contribution is to identify one such condition. Third, we test our research model on a sample of Ghanaian manufacturing firms. A major contribution here is the external validation theory developed for small manufacturing firms in an emerging economy (Hoskisson, Eden, Lau, & Wright, 2000). This is particularly important considering the growing interest in environmental issues in manufacturing firms in emerging countries in general and Africa in particular.

The rest of the paper proceeds as follows. The next section presents theoretical models and hypotheses. Next, we present the research methods and data collection procedures. Following the research methods, we present the analysis and findings. Discussion of findings, limitations, and direction for future research conclude this paper.

2 | THEORETICAL FRAMEWORK AND HYPOTHESES

Global environmental problems such as climate change have raised societal awareness of the detrimental impact of business activities on the natural environment. Researchers and policymakers have expressed concern about the problem of achieving environmental sustainability if the current business strategies and normative frameworks remain unchanged (Clemens, 2001; Newton & Harte, 1997). Thus, stakeholders have called for a paradigm shift to adopt proactive environmental strategies that go beyond regulatory compliance (Marcus & Geffen, 1998; Hart, 1995). The RBV of the firm suggests that competitive strategies and performance significantly depend on the firm's resources and capabilities (Barney, 1991). The seminal work of Hart (1995) further highlights the adoption of a natural RBV to manage a firm's relationship with the natural environment. The notion of the natural RBV shows that competitive advantage is derived from capabilities that facilitate sustainable environmental activities (Hart, 1995). Based on Hart's (1995) theory, firms stand to gain a competitive advantage if they can deal with stringent natural environmental constraints. The ability to deal with these environmental problems constitutes its valuable, rare, and inimitable firm capabilities. This is likely to lead to superior environmental and economic performance. Arguably, empirical tests of environmental performance support a positive relationship between the proactive environmental practices and firm performance (Manrique & Martí-Ballester, 2017; Russo & Fouts, 1997; Schaltegger & Synnestvedt, 2002). Thus, the adoption of environmental strategies could result in higher corporate financial performance.

Although the outcomes of environmental performance are well understood, we still lack a theoretical understanding of how HR slack drives environmental performance. Human resource slack

represents knowledge and efficiency gains (Goerzen & Beamish, 2007) or the degree of excess employees possessed by a firm over time (Bourgeois, 1981). The current paper followed previous studies and operationalized HR slack as the number of full-time employees relative to sales (e.g., Mishina et al., 2004; Sgourev & Van Lent, 2017). The costs and benefits of holding excess employees in a firm are critical to understanding environmental performance. In this paper, we argue that skill shortage is likely to negatively impact on the reliability of the employees due to inadequate fulfillment of job duties and poor competencies (Sgourev & Van Lent, 2017). However, firms can use their HR slack to help stabilize operations (Cyert & March, 1963). We argue that HR slack is an important factor that can drive a firm to voluntarily comply with environmental regulations. For example, to adopt new technologies, a firm must have a corresponding stock of slack to be able to acquire the requisite technical and economic information (Lan & Munro, 2013). Empirical studies related to green energy adoption found that the greater the HR capability of firms, the higher the chance of new technology adoption and have better environmental performance (Dasgupta, Hettige, & Wheeler, 2000; Pargal & Wheeler, 1996). Besides, holding excess stock of skilled employees may improve environment-related standards through sustainable innovation within the organization. Firms may adopt innovate to adopt voluntary environmental initiatives to improve performance. This can be achieved by facilitating recruitment, increasing employees' morale and motivation, and thereby raising workforce productivity (Halkos & Evangelinos, 2002).

Therefore, in this paper, we argue that HR slack can influence sustainable innovation. Previous research suggests that excess skilled employees enhance the innovation capability of the organization (Heping, Xunmei, & Runsheng, 2009; Nohria & Gulati, 1996). In this way, the firms are more likely to develop a positive innovation culture towards the natural environment. The development of positive environmental calculates stems from skilled HRs, which are potentially fruitful avenues to help instill and enlighten the culture of environmental stewardship as a potent mechanism for mitigating environmental impact. We also argue that sustainable innovation mediates the relationship between HR slack and environmental performance because HR slack may be too distant from the environmental performance. Besides, we contend that the effect of HR slack on sustainable innovation may depend on intangible resource advantage; resource endowment of a firm is crucial for creating, implementing, and reaping the rewards of environmental behaviors (Li, 2014). We summarize the above arguments in the conceptual model (Figure 1) below.

2.1 | HR slack and sustainable innovation

In the strategy literature, some scholars have conceptualized HR slack concerning knowledge and efficiency gains (Goerzen and Beamish, 2007; Lecuona & Reitzig, 2014) or the level of excess employees in a firm (Bourgeois, 1981). In this paper, we operationalize HR slack as the number of excess full-time employees relative to sales. Drawing on the RBV, Mishina et al. (2004) argued that HR slack—as opposed to other financial slack—is best deployed when a firm embraces growth strategies based on its prior knowledge. The current paper contends that employing more skilled workers than needed is crucial for sustainable innovation. Ostensibly, holding excess HR slack is likely to address unforeseen environmental disasters that cannot be hired and trained ad hoc. Thus, retaining excess skilled employees who solely perform codified knowledge should pay-off for addressing sustainable innovation-rated activities by the firm. Mostly, skilled employees hold tacit knowledge. This suggests that when the knowledge required to address the unforeseen environmental event is tacit and difficult to transfer quickly, the firm can deploy HR slack to solve the issue. Therefore, HR slack is an important resource that is likely to drive firms to comply with environmental regulations. Besides, we contend that, as HR slack triggers sustainable innovation, this in turn is likely to influence environmental performance. Arguably, the effect of HR slack on environmental performance through sustainable innovation is justified because excess stock of skilled employees is more likely to be aware of and evaluate environmental issues differently compared with those with the less skilled stock of employees (Fischel, 1979; Nelson & Phelps, 1966).

H1. HR slack is positively related to sustainable innovation.

H2. Sustainable innovation mediates the relationship between HR slack and environmental performance.

2.2 | Moderating role of intangible resource advantage

The effect of HR slack on sustainable innovation may not always produce conclusive findings. A major question is what factors may moderate this linkage? In this paper, we introduce intangible

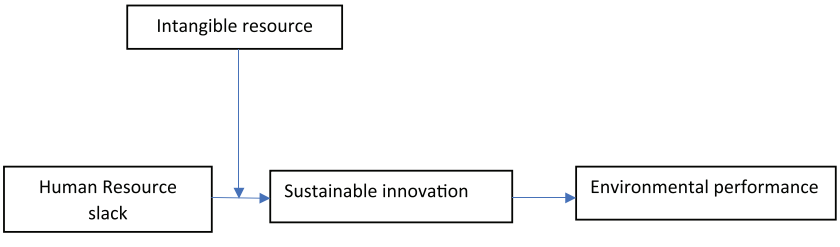

FIGURE 1 The conceptual model of the study [Colour figure can be viewed at wileyonlinelibrary.com]

resources as an advantage as a contingent factor of the relationship between HR slack and sustainable innovation. The strategy literature shows that resources and capabilities possessed by a firm represent an important boundary condition to impact innovation activities (Covin & Slevin, 1991). A firm's resource endowment can be categorized as tangible and intangible resources (Wiklund, Baker, & Shepherd, 2010), as well as the firm's slack (George, 2005). The RBV suggests that when a firm's resources boost its competitive advantage, it leads to innovation (Hunt & Morgan, 1996). However, SMEs in emerging markets are likely to be constrained regarding tangible and unencumbered resources (Thornhill & Amit, 2003). The constraints typically increase the relevance of intangible resources (Anderson & Eshima, 2013; Newbert, 2007). Instructively, intangible resources possess the quality that is critical for achieving competitive advantage. Therefore, when a firm possesses intangible resources, it represents a crucial capability to pursue strategies that can ultimately result in positive firm outcomes. Besides, research suggests that firms with greater resource endowment may not be able to outperform their industry peers who have intangible resource advantage (George, 2005). This is because HR slack is resource consuming, and its pursuit requires a high expenditure on firm resources. Thus, the lower the firm's resource endowment, the lesser the number of environmental initiatives it will be able to pursue. In this paper, we argue that when a firm has intangible resource advantages such as intellectual property, specialized knowledge, reputation, and management control systems such resources, it can boost the effect of HR slack on sustainable innovation practices. Given that intangible resources tend to have strategic significance (Anderson & Eshima, 2013), firms can pursue many opportunities with resources that provide a sustainable competitive advantage.

Therefore, we contend that a firm's intangible resource advantage is crucial for sustainable innovation activities. Accordingly, we hypothesize that

H3. HR slack is more positively related to sustainable innovation among firms with an intangible resource advantage than among firms lacking a resource advantage.

3 | METHOD

3.1 | Study setting—Ghana

The hypotheses of this paper were tested utilizing data collected from chief executive officers (CEOs) and finance directors of SMEs operating in Ghana. Ghana was chosen as the context of the study for many reasons. First, Ghana is considered in many respects as a representative of sub-Saharan African emerging markets (Hoskisson et al., 2000). Second, Ghana has attracted many foreign direct investments notably from Western multinationals due to its friendly open-market economy. Recent market liberalization of industries has helped to attract foreign investors and created conditions for the formation of new ventures in labor-intensive industries such as agriculture, mining, and hospitality. Third, Ghana remains the easiest context for doing business in West Africa (World Bank, 2018). Fourth, resources including access to financing are hard to come by due to underdeveloped formal and informal institutions including capital markets.

Despite these favorable business environment conditions, continued environmental degradation has consequently forced the Ghanaian government to resort to various legislative and administrative measures for rectification. Additionally, the government has strengthened its environmental laws, developed new environment-related tax structures, and has formed a task force to stop environmental degradation. All these actions indicate the significantly increased commitment of Ghana, at least at the national level, to tackle environmental issues. Thus, studying how HR slack impacts the effect of the environmental performance of SMEs in Ghana offers a crucial emerging market perspective on firms' environmental strategy.

3.2 | Sample and data collection

The data used in this paper were collected from CEOs and finance directors of manufacturing firms operating in Ghana. The sample consisted of 700 (SMEs) selected from the Association of Ghana Industries' database (1,500 firms). The selection of the sample met the following criteria: (a) manufacturing ventures with no foreign affiliation, (b) firms employing not more than 250 employees, and (c) firms with direct contact details of the CEO and finance manager. We sent letters to the CEOs of each selected firm to elicit their participation. The letters explain the purpose of the paper and asked their cooperation in completing the questionnaires. To improve the response rate, we asked the CEOs not to identify themselves. We also promised to send them a summary of the results if they included the company's address. Approximately 2 weeks after the letters sent out, we visited the firms and gave the questionnaires to the CEOs and agreed on the date of returning the questionnaires. After several visits to the head offices of the firms, we received 326 responses. We discarded six questionnaires due to missing values. Thus, 320 questionnaires were useable from the CEOs (T1).

In time 2 of the survey, we contacted the 320 finance directors of firms to collect information on environmental performance by vising the head offices of the firms (T2). After several phone calls and visits, the finance directors returned 316 questionnaires. Four firms indicated that the CEO was also the finance director. Of the 316 returned questionnaires, we discarded 15 because of missing values. Thus, we used 301 matched responses from T1 and T2. This represents a 43% response rate.

Our sample contains firms with a mean age of 26.52 (SD = 23.71) years and a mean size of 46.77 (SD = 12.45) full-time employees. To assess nonresponse bias, we compared early respondents with late respondents. Results of *t*-test reveal that early respondents were not

TABLE 1 Multi-item constructs and results of reliability and validity assessment

Constructs and their measures	Factor loadings	CR[a]	AVE[b]	Method[c]	Trait[d]	Error
Sustainable innovation (Li, 2014; Zhu & Sarkis, 2004)		0.88	0.55	0.74	0.02	0.26
We engage in cross-functional cooperation for environmental improvements	0.88 (1.00)					
We do not design of products for reduced consumption of material/energy (r)	0.70 (11.13)					
We design of products for reuse, recycle, recovery of material, component parts	0.79 (13.44)					
We avoid discharging hazardous/harmful/toxic substances	0.88 (15.29)					
Intangible resource (Anderson & Eshima, 2013)		0.90	0.54	0.65	0.03	0.16
Relative to our industry rivals, we possess special skills owned by specific engineers/researchers.	0.70 (1.00)					
Relative to our competitors in the industry, we have special organizational or managerial know-how	0.89 (16.90)					
Relative out to industry competitors, we possess intellectual properties such as patents	0.88 (15.62)					
Relative to our industry competitors, we possess strategic assets such as corporate brand or image	0.94 (22.45)					
Relative to our industry competitors, our firm has network channels of managers or employees	0.80(14.09)					
Environmental performance (Russo & Fouts, 1997)		0.88	0.59	0.60	0.04	0.15
Our company has shown unusually strong support for environmental issues	0.93 (1.00)					
Our company has major environmental controversies pending (r)	0.96 (24.83)					
Our company has an environmental record characterized by no major environmental controversy or litigation (r)	0.85(16.68)					
Our company has a consistent history of pollution control or other environmental problems (r)	0.69(11.23)					
Our company contributes to, or otherwise supports, non-profit environmental protection organizations	0.76 (12.77)					

Note. r = item reverse coded.
[a]Composite reliability.
[b]Average variance extracted.
[c]Variance explained by constructs.
[d]Variance explained by common method factor.
[e]Variance explained by error.

significantly different ($p < 0.05$) from late respondents. This shows that nonresponse bias is not likely to affect our findings.

3.3 | Measure of constructs

All the multi-item constructs were assessed on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). All the measures are shown in Table 1.

3.3.1 | HR slack

We followed previous research and captured HR slack as the number of employees (in full-time equivalent) relative to sales (Voss, Sirdeshmukh, & Voss, 2008). We then adjusted the measure by subtracting the median ratio of employment to sales for all firms in the same subindustry in which the focal firm operates (Mellahi & Wilkinson, 2010).

3.3.2 | Intangible resource

We capture intangible resource with five items from Anderson and Eshima (2013) by asking the CEOs to compare their firm's perception of the extent to which the firm enjoys an intangible resource advantage relative to their industry rivals.

3.3.3 | Sustainable innovation

Five items were taken from previous research (e.g., Li, 2014; Zhu & Sarkis, 2004) to measure sustainable innovation.

3.3.4 | Environmental performance

We measured environmental performance by adapting seven items from Russo and Fouts (1997). These items capture the extent to which the firms take environmental issues seriously.

3.3.5 | Control variables

We controlled for several variables to account for their effects on the dependent variable. These include firm size, firm age, research and development (R&D) expenditure, financial slack, CEO tenure, gender, and education. Firm size was measured by using the number of employees, while the firm age was measured as the number of years since a firm's inception. To measure financial slack, the approach suggested by Voss et al. (2008) was utilized by tapping the ventures' unabsorbed resources available for immediate use for virtually any purpose. Specifically, the ventures' cash reserves at the end of the financial year 2019 were used. To control for firm size, cash reserves were divided by the venture's total expenses in the financial year 2019. CEO tenure was captured by using the years in which the CEO has been employed in his/her current position (see Boling, Pieper, & Covin, 2016). Gender was controlled for as a dummy variable (0 = *male*; 1 = *female*). We controlled for *education* (1 = *high school*, 2 = *higher national diploma*, 3 = bachelor's degree, 4 = *master's degree*, and 5 = *doctoral degree*). R&D expenditure was calculated as a percentage of total sales between 2015 and 2019.

3.4 | Measure validation and reliability assessment

We used two main procedures to assess whether common method variance influenced the findings of the paper. First, we followed Carson's (2007) approach and estimated a measurement that combines all the multi-item scales with a common method factor that was modeled to load on all items. This approach allows for control of any variance and covariance introduced as a result of common method bias. Accordingly, two competing models were estimated: first, a trait-only model was estimated in Model 1, which allowed each indicator load on its respective latent factor. The results from Model 1 show a good model fit: χ^2/d.f = 3.11; root mean square error of approximation (RMSEA) = 0.05; nonnormed fit index (NNFI) = 0.98; comparative fit index (CFI) = 0.95; goodness of fit index (GFI) = 0.96; adjusted GFI = 0.96; and standardized root mean square residual (SRMR) = 0.08. In the model, a trait–method model was estimated, which involved the estimation of a common factor that links all the indicators. Results from Model 2 offer good fit: χ^2/d.f = 2.19; RMSEA = 0.06; CFI = 0.96; NNFI = 0.94; GFI = 0.92; SRMR = 0.07. When the two models are compared, it reveals that Model 2 is differentially better than Model 1. Hence, the confirmatory factor analysis (CFA) results provide support for accepting the fit of the measurement model.

Second, this paper followed Lindell and Whitney's (2001) approach and introduced a marker test and analyzed the correlation between a marker variable and the constructs used in the paper. This paper used "I am creative when asked to work with limited resources" as a marker variable, which is a measure of improvisational behavior. The use of this marker variable stems from the view that a marker variable should be theoretically unrelated to the conceptual model. Nonsignificant relationships were obtained with correlations ranging from −0.01 to 0.03. Overall, the results from the two tests suggest that common method variance does not influence the results of the paper.

Following the tests assessing common method variance, a CFA utilizing the maximum likelihood method in LISREL 8.87 was undertaken to establish the reliability and validity of the multi-item scales

TABLE 2 Descriptive statistics and correlations

	Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10
1.	Firm size (employees)	46.77	12.45										
2.	Firm age (years)	26.52	23.71	−0.04									
3.	R&D expenditure	0.10	2.39	0.11	−0.05								
4.	Financial resource slack[a]	11.68	8.79	0.11	−0.04	0.18**							
5.	CEO tenure	8.78	6.68	0.13*	0.08	0.02	0.01						
6.	Gender	0.61	0.48	0.06	0.00	0.00	0.08	0.05					
7.	Education	2.96	1.18	0.00	0.01	0.00	0.11	0.20**	0.11				
8.	Intangible resources	4.61	1.23	−0.05	−0.07	−0.01	0.19**	−0.16*	0.03	−0.18**			
9.	Human resource slack[a]	14.19	21.94	−0.02	0.03	−0.04	0.23**	0.19**	−0.13*	0.23**	0.35**		
10.	Sustainable innovation	4.60	1.23	0.03	0.05	0.18**	−0.20**	0.11	−0.25**	0.20**	0.24**	0.39**	
11.	Environmental performance	4.11	1.18	0.05	−0.11*	0.30**	−0.15*	0.13*	−0.33**	0.27**	0.18**	0.37**	0.36**

Abbreviations: R&D, research and development; SD, standard deviation.

*$p < 0.05$.

*$p < 0.01$ (two-tailed test).

[a]The mean value for this construct can be interpreted as a percentage.

used in the paper. The traditional chi-square (χ^2) and other fit indices were used to assess the overall model fit. Table 1 reports the reliability and validity of each construct. Results show that the Cronbach α, composite reliability (CR), and average variance extracted 0.70, 0.60, and 0.50, respectively. Additionally, variances explained by trait are larger than variances explained by common method factor and error. The highest shared variances (HSVs) between each pair of multi-item construct and the comparison of the HSV to the AVE indicate that each AVE is greater than each HSV in all cases. This suggests that reliability and convergent and discriminant validities are supported (Fornell & Larcker, 1981).

4 | RESULTS

Table 2 presents the descriptive statistics and correlations among the variables. Hierarchical regression was used to test the hypotheses. All the variables involved in the interaction were mean-centered and the variance inflation factors (VIFs) for all regression models calculated to remedy potential multicollinearity concerns. The largest VIF was 3.27 (see Table 3), which was below the suggested threshold cut-off point of 10. Thus, multicollinearity is not a major problem (Aiken & West, 1991).

We present the results of the hierarchical regression analysis in Table 3. The dependent variable in Models 1–4 is sustainable innovation. Model 1 contains all the control variables. In Model 2, we add HR slack. The results in Model 2 show that HR slack has a significant influence on sustainable innovation (β = 0.25, p < 0.01), thus providing support for Hypothesis 1. In Model 3, we add intangible resources and found that the influence of HR slack on sustainable innovation remains significant (β = 0.23, p < 0.01). Model 4 includes the interaction terms between HR slack and intangible resource. The interaction term was positive and significant (β = 0.56, p < 0.01), indicating that intangible resource advantage positively moderates the relationship between HR slack and sustainable innovation. This result provides support for Hypothesis 3.

To explain the nature of the significant interactions, the effect of HR slack on sustainable innovation was plotted at high and low levels of intangible resources (Aiken & West, 1991). Figure 2 suggests that the effect of HR slack on sustainable innovation is more positive among firms with greater intangible resource advantage than among firms with lower intangible resource advantage.

TABLE 3 Regression results

	Models 1–4: Sustainable innovation				Models 5–8: Environmental performance			
Control variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Firm size (employees)[a]	0.05	0.05	0.06	0.04	0.04	0.04	0.05	0.05
Firm age[a]	0.06	0.06	0.05	0.05	−0.09*	−0.08*	−0.09*	−0.10*
R&D expenditure	0.14*	0.13*	0.14*	0.12*	0.18***	0.18***	0.19***	0.19***
Financial resource slack	−0.19***	−0.19***	−0.20***	−0.20***	−0.14**	−0.14**	−0.16***	−0.16***
CEO tenure	0.03	0.04	0.04	0.05	0.09*	0.09*	0.10*	0.11*
Gender	−0.17***	−0.18***	−0.17***	−0.15***	−0.14**	−0.14**	−0.13*	−0.13*
Education	0.14*	0.14*	0.14*	0.13*	0.14**	0.14**	0.14**	0.15***
Independent variable								
Human resource slack (HRS)		0.25***	0.23***	0.26***		0.26***		0.04
Moderator								
Intangible resource (IR)			0.22***	0.22***	0.23***	0.25***	0.26***	.26***
Interaction								
HRS × IR				0.56***				
Mediator								
Sustainable innovation							.33***	.35***
Model fit statistics								
F	1.66	3.93***	5.19***	8.46***	2.28**	3.89***	4.96***	6.21***
R^2	0.13	0.20	0.23	0.33	0.14	0.21	0.27	0.32
ΔR^2	-	0.07	0.03	0.10	-	0.07	0.06	.05
Largest VIF	2.11	1.69	1.05	3.17	1.55	3.27	2.16	1.63

Note. N = 301; standardized coefficients are shown.
Abbreviation: R&D, research and development; VIF, variance inflation factor.
*p < 0.10.
*p < 0.05.
*p < 0.01.
[a]Logarithm transformation of original values.

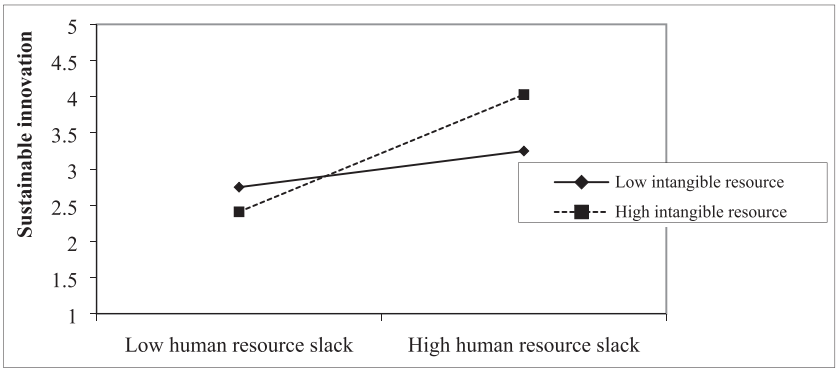

FIGURE 2 Interaction effect of human resource slack with intangible resource on sustainable innovation

TABLE 4 Test of conditional indirect effects at values of intangible resource (moderator)

Mediating variable	Value of intangible resource	Effect	Boost SE	95% Confidence interval	
				Lower	Upper
Sustainable innovation	4.63	0.18	0.07	0.03	0.29
Sustainable innovation	4.04	0.16	0.05	0.09	0.33
Sustainable innovation	5.23	0.25	0.06	0.13	0.37

Note. Results are based on 1,000 bootstrap samples.
Abbreviation: SE, standard error.

The dependent variable in Models 5–8 is environmental performance. The results in Models 4–8 test the mediating hypothesis. We test our mediation hypothesis by following the approach suggested by Zhao, Lynch, and Chen (2010). First, the independent variable and the mediating variable should be significantly related. As shown in Model 2, HR slack (independent variable) positively relates to sustainable innovation (mediator) (β = 0.25, p < 0.01). Second, the mediating variable and the dependent variable should be significantly related to each other. In Model 7, sustainable innovation positively relates to environmental performance (β = 0.33, p < 0.01). Third, the effect of the independent variable on the dependent variable should be eliminated or nonsignificant when the mediating variable is included in the regression equation. In Model 8, when both HR slack and sustainable innovation is included in the regression equation, sustainable innovation has a positive influence on environmental performance (β = 0.35, p < 0.01). However, the effect of HR slack on environmental performance becomes nonsignificant (β = 0.04, ns). These results indicate that sustainable innovation mediates HR slack and environmental performance relationship. Thus, Hypothesis 2 is supported.

To gain additional insights into the mediating effect, we performed a PROCESS analysis (Hayes, 2013). This approach allowed us to establish the mediation effect when the moderating variable (intangible resource) is added. Table 4 presents the conditional indirect effect of sustainable innovation at different values of intangible resources. The results suggest that the mediation effect is significant at all values of the moderator. When intangible resource is high, the bootstrapped confidence interval around the indirect effect contained nonzero values [0.13, 0.37]. In addition, when gender is low, the bootstrapped confidence interval around the indirect effect contained no zero [0.03, 0.29]. This result provides support for Hypothesis 2, which argued that sustainable innovation mediates the relationship between HR slack and environmental performance.

5 | DISCUSSION AND CONCLUSION

Drawing on the RBV (Barney, 1991), the findings of the paper explore how HR slack influences environmental performance through the mediating role of sustainable innovation. Particularly, the first finding of the paper (HR slack positively relates to environmental innovation) shows the relevance of the previously ignored role of HR slack in driving sustainable innovation. By integrating insights from the slack resource perspective and sustainable innovation literature, the paper contends that excess unabsorbed HR is a valuable antecedent of sustainable innovation. The second finding (sustainable innovation mediates the relationship between HR slack and environmental) portrays sustainable innovation as a mechanism that mediates the relationship between HR slack and environmental performance. The third finding (i.e., intangible resource advantages moderates the relationship between HR slack and sustainable innovation) provides a better understanding of the conditions under which HR slack is more effective in driving sustainable innovation. These findings provide several crucial implications for theory and practice.

First, the paper extends our understanding of the role of HR slack in facilitating environmental performance. The slack literature traditionally argued that financial slack is not ideal for environmental performance especially in sub-Saharan Africa (Boso et al., 2017; Julian & Ofori-Dankwa, 2013). In contrast to this position, we find that HR

slack positively relates to sustainable innovation and impacts on environmental performance. These findings extend previous research on environmental performance by proposing that HR slack could help firms increase their environmental performance. Thus, we provide a more nuanced understanding of how HR slack drives environmental activities. Second, our paper enhances our understanding of the conditions under which HR slack is effective in driving sustainable innovation. Specifically, we show that intangible resource advantage positively moderates the relationship between HR slack and sustainable innovation. To the best of our knowledge, this paper is the first to empirically test the boundary conditions of the influence of HR slack. Third, we test our hypotheses using data from a developing country context. This paper argues that context is crucial in management studies (Zahra, 2007). By doing so, we extend the scholarly understanding of HR slack beyond developed country environments.

This paper also has some practical implications. The findings that HR slack improves sustainable innovation and that this relationship is significantly enhanced under greater levels of intangible resource advantage are crucial for managers in a developing country setting such as Ghana. The significance of these findings is that Ghanaian CEOs can be guided to use HR slack for environmental improvement. Second, the findings of the paper have implications for understanding the consequences of HR slack that can guide firms to devise environmental strategies for success. Overall, the importance of the research topic and context suggests that this paper can extend our theoretical understanding and to guide managerial implications as well across other transforming economies.

6 | LIMITATIONS AND DIRECTION FOR FUTURE RESEARCH

Despite our methodological rigor (i.e., we collected data on the dependent and independent variables from separate sources) allowing us to avoid spurious correlations mostly found in single-source data (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), our paper has some limitations that open avenues for future research. First, even though we collected data with a 1-year time lag between the dependent and independent variables, our failure to manipulate variables or use randomly assigned techniques prevented us from making causal claims. Future research could address this limitation by adopting an experimental design or longitudinal approach with a 3-year time lag between the collection of data on the dependent and independent variables. Second, we used subjective measures to capture environmental performance. Because of this, there is a potential that individual finance managers may have been biased in reporting environmental performance within their firms. Although firms tend to treat objective financial data as confidential and therefore are not publicly available (Hoskisson et al., 2000; Li, Zhang, & Chan, 2005), it would be interesting if future studies could use objective data on environmental performance. Besides, we sampled manufacturing SMEs without considering industry classifications for these manufacturing firms. Given that SMEs may be high technology or low technologies, it would be more appropriate to control for these classifications. Thus, we recommend that future studies examine these industry classifications as controls. Finally, as we conducted our paper in a limited empirical setting of new ventures in Ghana, the results should be considered in the context of an emerging economy. Although Ghana shares many characteristics of emerging economies, which makes her an appropriate and a rich environment for studying new ventures, other emerging nations may possess unique and varied contextual elements that could allow for additional insights and inform theory development. Therefore, it would be useful for future research to attest to the proposed model with multi-country data on new ventures in emerging economies to examine the potential influences of unique local contextual factors.

ACKNOWLEDGMENT

This research was funded by the University of Economics Ho Chi Minh City, Vietnam.

ORCID

Samuel Adomako https://orcid.org/0000-0002-7139-0988
Nguyen Phong Nguyen https://orcid.org/0000-0002-9724-8939

REFERENCES

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.

Anderson, B. S., & Eshima, Y. (2013). The influence of firm age and intangible resources on the relationship between entrepreneurial orientation and firm growth among Japanese SMEs. *Journal of Business Venturing*, *28*(3), 413–429. https://doi.org/10.1016/j.jbusvent.2011.10.001

Baker, T., & Nelson, R. E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. *Administrative Science Quarterly*, *50*(3), 329–366. https://doi.org/10.2189/asqu.2005.50.3.329

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*, 771–792.

Boling, J. R., Pieper, T. M., & Covin, J. G. (2016). CEO tenure and entrepreneurial orientation within family and nonfamily firms. *Entrepreneurship Theory and Practice*, *40*(4), 891–913. https://doi.org/10.1111/etap.12150

Boso, N., Danso, A., Leonidou, C., Uddin, M., Adeola, O., & Hultman, M. (2017). Does financial resource slack drive sustainability expenditure in developing economy small and medium-sized enterprises? *Journal of Business Research*, *80*, 247–256. https://doi.org/10.1016/j.jbusres.2017.06.016

Bourgeois, L. (1981). On the measurement of organizational slack. *Academy of Management Review*, *6*(1), 29–39.

Carrión-Flores, C. E., & Innes, R. (2010). Environmental innovation and environmental performance. *Journal of Environmental Economics and Management*, *59*(1), 27–42. https://doi.org/10.1016/j.jeem.2009.05.003

Carson, S. J. (2007). When to give up control of outsourced new product development. *Journal of Marketing*, *71*, 49–66. https://doi.org/10.1509/jmkg.71.1.049

Clemens, B. (2001). Three phases of environmental strategies. *Journal of Environmental Management*, *62*, 221–231. https://doi.org/10.1006/jema.2001.0426

Covin, J. G., & Slevin, D. P. (1991). A conceptual model of entrepreneurship as firm behavior. *Entrepreneurship Theory and Practice*, *16*(1), 7–26. https://doi.org/10.1177/104225879101600102

Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm* (Vol. 2) (pp. 169–187). Englewood Cliffs, NJ.

Dasgupta, S., Hettige, H., & Wheeler, D. (2000). What improves environmental compliance? Evidence from Mexican industry. *Journal of Environmental Economics and Management*, *39*(1), 39–66. https://doi.org/10.1006/jeem.1999.1090

De Marchi, V. (2012). Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms. *Research Policy*, *41*(3), 614–623. https://doi.org/10.1016/j.respol.2011.10.002

Earnhart, D. H., Khanna, M., & Lyon, T. P. (2014). Corporate environmental strategies in emerging economies. *Review of Environmental Economics and Policy*, *8*(2), 164–185. https://doi.org/10.1093/reep/reu001

Fischel, W. A. (1979). Determinants of voting on environmental quality: A study of a New Hampshire pulp mill referendum. *Journal of Environmental Economics and Management*, *6*(2), 107–118. https://doi.org/10.1016/0095-0696(79)90023-8

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, *18*, 362–368.

George, G. (2005). Slack resources and the performance of privately held firms. *Academy of Management Journal*, *48*(4), 661–676. https://doi.org/10.5465/amj.2005.17843944

Goerzen, A., & Beamish, P. W. (2007). The Penrose effect: "Excess" expatriates in multinational enterprises. *Management International Review*, *47*(2), 221–239.

Greve, H. (2003). A behavioral theory of R&D expenditures and innovations: Evidence from shipbuilding. *Academy of Management Journal*, *46*(6), 685–702.

Halkos, G. E., & Evangelinos, K. I. (2002). Determinants of environmental management systems standards implementation: Evidence from Greek industry. *Business Strategy and the Environment*, *11*(6), 360–375.

Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, *20*(4), 986–1014. https://doi.org/10.5465/amr.1995.9512280033

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.

Heping, Z., Xunmei, Z., & Runsheng, F. (2009). The relationship between human resource slack and technological innovation. *Science & Technology Progress and Policy*, *26*(14), 134–137.

Hoskisson, R. E., Eden, L., Lau, C. M., & Wright, M. (2000). Strategy in emerging economies. *Academy of Management Journal*, *43*, 249–267.

Hunt, S. D., & Morgan, R. M. (1996). The resource-advantage theory of competition: dynamics, path dependencies, and evolutionary dimensions. *Journal of Marketing*, *60*(4), 107–114. https://doi.org/10.2307/1251905

Julian, S. D., & Ofori-Dankwa, J. C. (2013). Financial resource availability and corporate social responsibility expenditures in a sub-Saharan economy: The institutional difference hypothesis. *Strategic Management Journal*, *34*(11), 1314–1330. https://doi.org/10.1002/smj.2070

Khurshid, F., Park, W. Y., & Chan, F. T. (2019). Innovation shock, outsourcing strategy, and environmental performance: The roles of prior green innovation experience and knowledge inheritance. *Business Strategy and the Environment*, *28*(8), 1572–1582. https://doi.org/10.1002/bse.2333

Lan, J., & Munro, A. (2013). Environmental compliance and human capital: Evidence from Chinese industrial firms. *Resource and Energy Economics*, *35*(4), 534–557. https://doi.org/10.1016/j.reseneeco.2013.05.003

Lecuona, J. R., & Reitzig, M. (2014). Knowledge worth having in 'excess': The value of tacit and firm-specific human resource slack. *Strategic Management Journal*, *35*(7), 954–973. https://doi.org/10.1002/smj.2143

Leyva-de la Hiz, D. I., Ferron-Vilchez, V., & Aragon-Correa, J. A. (2019). Do firms' slack resources influence the relationship between focused environmental innovations and financial performance? More is not always better. *Journal of Business Ethics*, *159*(4), 1215–1227. https://doi.org/10.1007/s10551-017-3772-3

Li, H., Zhang, Y., & Chan, T. (2005). Entrepreneurial strategy making and performance in China's new technology ventures: The contingency effect of environments and firm competences. *The Journal of High Technology Management Research*, *16*, 37–57. https://doi.org/10.1016/j.hitech.2005.06.003

Li, Y. (2014). Environmental innovation practices and performance: Moderating effect of resource commitment. *Journal of Cleaner Production*, *66*, 450–458. https://doi.org/10.1016/j.jclepro.2013.11.044

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, *86*, 114–121. https://doi.org/10.1037/0021-9010.86.1.114

Long, X., Chen, Y., Du, J., Oh, K., Han, I., & Yan, J. (2017). The effect of environmental innovation behavior on economic and environmental performance of 182 Chinese firms. *Journal of Cleaner Production*, *166*, 1274–1282. https://doi.org/10.1016/j.jclepro.2017.08.070

Manrique, S., & Martí-Ballester, C. P. (2017). Analyzing the effect of corporate environmental performance on corporate financial performance in developed and developing countries. *Sustainability*, *9*(11), 19–57.

Marcus, A., & Geffen, D. (1998). The dialectics of competency acquisition: Pollution prevention in electric generation. *Strategic Management Journal*, *19*(12), 1145–1168.

Mårtensson, K., & Westerberg, K. (2016). Corporate environmental strategies towards sustainable development. *Business Strategy and the Environment*, *25*(1), 1–9. https://doi.org/10.1002/bse.1852

Mellahi, K., & Wilkinson, A. (2010). A study of the association between level of slack reduction following downsizing and innovation output. *Journal of Management Studies*, *47*(3), 483–508. https://doi.org/10.1111/j.1467-6486.2009.00872.x

Mishina, Y., Pollock, T. G., & Porac, J. F. (2004). Are more resources always better for growth? Resource stickiness in market and product expansion. *Strategic Management Journal*, *25*, 1179–1197. https://doi.org/10.1002/smj.424

Nelson, R. R., & Phelps, E. S. (1966). Investment in humans, technological diffusion, and economics growth. *American Economic Review*, *56*(2), 67–75.

Newbert, S. L. (2007). Empirical research on the resource-based view of the firm: An assessment and suggestions for future research. *Strategic Management Journal*, *28*, 121–146. https://doi.org/10.1002/smj.573

Newton, T., & Harte, G. (1997). Green business: Technicist kitsch? *Journal of Management Studies*, *34*, 75–98. https://doi.org/10.1111/1467-6486.00043

Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation? *Academy of Management Journal*, *39*(5), 1245–1264. https://doi.org/10.5465/256998

Pargal, S., & Wheeler, D. (1996). Informal regulation of industrial pollution in developing countries: Evidence from Indonesia. *Journal of Political Economy*, *104*(6), 1314–1327. https://doi.org/10.1086/262061

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879.

Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal*, *40*(3), 534–559.

Schaltegger, S., & Synnestvedt, T. (2002). The link between 'green'and economic success: environmental management as the crucial trigger between environmental and economic performance. *Journal of Environmental Management*, *65*(4), 339–346.

Sgourev, S. V., & Van Lent, W. (2017). When too many are not enough: Human resource slack and performance at the Dutch East India Company (1700–1795). *Human Relations*, *70*(11), 1293–1315. https://doi.org/10.1177/0018726717691340

Shahzad, A. M., Mousa, F. T., & Sharfman, M. P. (2016). The implications of slack heterogeneity for the slack-resources and corporate social performance relationship. *Journal of Business Research*, *69*(12), 5964–5971. https://doi.org/10.1016/j.jbusres.2016.05.010

Shane, S., & Stuart, T. (2002). Organizational endowments and the performance of university start-ups. *Management Science*, *48*(1), 154–170.

Spar, D. L., & La Mure, L. T. (2003). The power of activism: Assessing the impact of NGOs on global business. *California Management Review*, *45*(3), 78–101. https://doi.org/10.2307/41166177

Symeou, P. C., Zyglidopoulos, S., & Gardberg, N. A. (2019). Corporate environmental performance: Revisiting the role of organizational slack. *Journal of Business Research*, *96*, 169–182. https://doi.org/10.1016/j.jbusres.2018.11.019

Tan, J., & Peng, M. W. (2003). Organizational slack and firm performance during economic transitions: Two studies from an emerging economy. *Strategic Management Journal*, *24*(13), 1249–1263. https://doi.org/10.1002/smj.351

Thornhill, S., & Amit, R. (2003). Learning about failure: bankruptcy, firm age, and the resource-based view. *Organization Science*, *14*, 497–509. https://doi.org/10.1287/orsc.14.5.497.16761

Voss, G., Sirdeshmukh, D., & Voss, Z. (2008). The effects of slack resources and environmental threat on product exploration and exploitation. *Academy of Management Journal*, *51*(1), 147–164. https://doi.org/10.5465/amj.2008.30767373

Wang, S., Li, J., & Zhao, D. (2018). Institutional pressures and environmental management practices: The moderating effects of environmental commitment and resource availability. *Business Strategy and the Environment*, *27*(1), 52–69. https://doi.org/10.1002/bse.1983

Wiklund, J., Baker, T., & Shepherd, D. (2010). The age-effect of financial indicators as buffers against the liability of newness. *Journal of Business Venturing*, *25*, 423–437. https://doi.org/10.1016/j.jbusvent.2008.10.011

World Bank. (2018). Doing business report. Available at http://www.doingbusiness.org/rankings?region=sub-saharan-africa Accessed March 5, 2018.

Wu, J. (2015). Differentiated customer pressures and environmental policies in China. *Business Strategy and the Environment*, *24*(3), 175–189. https://doi.org/10.1002/bse.1812

Zahra, S. A. (2007). Contextualizing theory building in entrepreneurship research. *Journal of Business Venturing*, *22*, 443–452. https://doi.org/10.1016/j.jbusvent.2006.04.007

Zhao, X., Lynch, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, *37*(2), 197–206. https://doi.org/10.1086/651257

Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of Operations Management*, *22*(3), 265–289. https://doi.org/10.1016/j.jom.2004.01.005

How to cite this article: Adomako S, Nguyen NP. Human resource slack, sustainable innovation, and environmental performance of small and medium-sized enterprises in sub-Saharan Africa. *Bus Strat Env*. 2020;29:2984–2994. https://doi.org/10.1002/bse.2552