Environmental Strategy and Competitive Advantage: The Role of Small- And Medium-Sized Enterprises' Dynamic Capabilities

Abstract

Drawing on the resource-based theory and institutional theory, we develop a framework to explain the processes by which the environmental strategy of small- and medium-sized enterprises (SMEs) contributes to their competitive advantage. We test our assumption using data collected from 214 UK-based SMEs in the technology sector. We find that the effects of environmental strategy can lead to the development of their marketing competence, as well as research and development (R&D) competence, which ultimately contributes to superior financial performance. We also find that a reciprocal causal relationship exists between SMEs' marketing and R&D competences. Combined, we reveal that the presence of a serial multiple mediation relationship between SMEs' environmental strategy and financial performance mediates through marketing competence and then R&D competence, or vice versa. Our study offers important academic and managerial implications, and also points out future research directions.

INTRODUCTION

Environmental strategy constitutes firms' attempt to integrate environmental considerations within their strategic plans and operational routines (Aragón-Correa, Hurtado-Torres, Sharma & García-Morales, 2008, Bansal, 2005). Scholars display a paradoxical point of view regarding the engagement of environmental strategy in the context of small and medium-sized firms (SMEs). On the one hand, research shows that SMEs are less keen to embrace an environmental strategy (Brammer, Hoejmose & Marchant, 2012, Eng Ann, Zailani & Abd Wahid, 2006), because the pursuit of such a strategy often requires them to divert their already limited resources away from their main business activities (Brammer et al., 2012, Hillary, 2004). Furthermore, it is more difficult for SMEs to realize the potential benefits of engaging in environmental initiatives, as most customers are unwilling to purchase environmentally-friendly products[1] and SMEs often cannot afford to advertise their good deeds (Bianchi & Noci, 1998, Brammer et al., 2012). Both explanations implicitly suggest that the implementation of an environmental strategy is more likely to limit SMEs' strategic options to exploit business opportunities. On the other hand, there is a general consensus among scholars that SMEs can often benefit significantly from pursuing an environmental strategy (e.g. Aragón-Correa et al., 2008, Eng Ann et al., 2006).

Building on the convergence of institutional theory (IT) and resource-based theory (RBT) (Bansal, 2005, Oliver, 1997), we develop three specific ideas to connect these two perspectives of SME environmental strategy. First, when SMEs comply with external social pressure to implement an environmental strategy, they simultaneously limit their strategic options (Bianchi & Noci, 1998, Brammer et al., 2012). We argue that such constraints can also force SMEs to develop an ability to create new competences, in order to overcome the strategic constraints. Scholars refer to this higher level form of organizational capability as

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[1] We define an 'environmentally-friendly' product as one that has no harmful impact on the environment where it is made or when the customers use it (Arend, 2014, Bianchi & Noci, 1998, del Brío & Junquera, 2003)

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dynamic capabilities, that entail firms' ability to add, reconfigure and delete organizational competences (Danneels, 2012). In this research, we focus on the first type of dynamic capability, which Danneels (2008) describes as "second-order competences," that reflect firms' ability to create new competences. Second, when SMEs possess the second-order competences, they are able continually to build new strategies faster and cheaper than others to exploit business opportunities and achieve superior financial performance (Danneels, 2008, 2012). Combining our first and second ideas, we argue that SMEs' second-order competences mediate the relationship between SMEs' environmental strategy and financial performance. Third, we distinguish between two types of second-order competences: marketing competence − the ability to explore new markets, and research − and development (R&D) competence − the ability to explore new technologies. We argue that a reciprocal causal relationship exists between SMEs' marketing and R&D competence. Together, we propose a serial multiple mediation relationship, where the influence of SMEs' environmental strategy on financial performance mediates through marketing competence and then R&D competence, or vice versa.

We test our model using data collected from 214 UK-based technology SMEs. Our efforts may contribute to the extant literature in several ways. First, our study adds new insights into the SME environmental strategy literature (del Brío & Junquera, 2003, Martín-Tapia, Aragón-Correa & Rueda-Manzanares, 2010) by examining the role of second-order competences in an SME environmental strategy-financial performance relationship. Second, by differentiating between different types of second-order competences and considering their connections, our model and findings therefore reveal more precisely how SMEs' environmental strategy contributes to financial performance. Finally, drawing on IT and RBT, our study offers a fresh theoretical angle to connect the paradoxical point of view regarding SMEs' engagement in environmental strategy (Bianchi & Noci, 1998, Brammer et al., 2012,

Hayes, 2013). Overall, our study informs SME owners/managers that the pursuit of an environmental strategy may appear to be limiting SMEs' strategic choices. However, SMEs can gain competitive advantage from these endeavors because this kind of "limitation" often forces SMEs to develop an ability to create new competences. Ultimately, SMEs will not only gain this type of new ability which they can use to realize other business opportunities, but also become more environmentally responsible.

THEORIES AND HYPOTHESES

Literature Review: SMEs' Environmental Strategy

Researchers have devoted increasing attention to exploring SMEs' environmental strategy. One stream focusses on studying the adoption and certification of the environmental management system/program – a regulatory structure that arises from within a firm by complying with the international standards related to the environment – and investigating the factors that influence its implementation (e.g. Darnall & Edwards, 2006, Hillary, 2004). A second stream of scholarship explores how SMEs manage their commitment to environmental practices (e.g. Roberts, Lawson & Nicholls, 2006). For example, Petts (1998) suggests that what is needed is an appreciation of the relevance of the attitudes to behavior and actual work tasks, a supportive and reinforcing organizational context, and a capacity to reflect upon practice related to the concerns expressed by individual employees about their employers' environmental issues with regard to firms' environmental practices. More recently, Brammer et al. (2012) find significant differences between firm size in terms of incentive, pressure, and perceived benefits. Consequently, firms should adopt different environmental management approaches. A third stream consists of work linked to SMEs' environmental strategy and innovation, which explains the key factors for improving environmental-oriented innovation (e.g. del Brío & Junquera, 2003). Fourthly, several

academic studies have assessed the development of an environmental strategy within the SME context. This stream seeks to explore how SMEs' environmental strategy should be developed to achieve competitive advantage (e.g. Arend, 2014, Martín-Tapia et al., 2010). The central goal of this study is to contribute to this fourth steam of literature by developing a more comprehensive theoretical model of the processes by which SMEs' environmental strategy affects their financial performance.

Conceptual Development

IT posits that firms are conscious of operating within institutional constraints in order to survive and succeed in the institutional environment (Bansal, 2005, Oliver, 1997). In the context of this study, the environmental strategies adopted by SMEs reflect their compliance with institutional constraints by integrating environmental considerations into their business operations (Brammer et al., 2012, Hamann, Smith, Tashman & Marshall, 2015). By doing so, SMEs establish legitimacy for their business operations in the institutional environment (Luken & Stares, 2005, Tilley, 1999). RBT, on the other hand, predicts a firm's competitive advantage based on its resources that are rare and valuable, and inimitable by other firms (Alvarez & Busenitz, 2001). SMEs' marketing competence and R&D competence can be viewed as important resources for firms. Danneels (2008) identifies these resources as second-order competences. According to Danneels (2008), second-order competences are high-level competences. More specifically, first-order (lower-level) competences are firms' ordinary competences in organizing resources that enable firms to accomplish a particular task, while second-order competences are the ability to create ordinary competences, which represent a type of firm's dynamic capabilities (Danneels, 2008, 2012). In this research, we focus on two specific types of second-order competence. Marketing competence refers to firms' ability to create new competences in exploring new markets, while R&D competence

refers to firms' ability to create new competences in the exploration of new technologies (Danneels, 2008, 2012).

Oliver (1997) proposes that a combination of IT and RBT can explain how firms' institutional context can influence their resource decisions. More specifically, firms' conformity to institutional constraints will affect the ways in which they allocate and manage their resources, which influence the firms' potential to earn economic rent (i.e. financial performance) (Oliver, 1997). Following this logic, we explain the processes by which SMEs' environmental strategy affects financial performance. Our overarching theoretical idea is that, when firms implement an environmental strategy to conform to social expectations, such movement also reduces the range of strategic choices available to them. This is because, once firms decide to embrace environmentally responsible business practices (i.e. pollution prevention), they will be less likely to implement strategies that oppose these (i.e. product design using materials that have an environmentally harmful impact) (Bansal, 2005, Bianchi & Noci, 1998, Hamann et al., 2015). To overcome this strategic limitation, prior studies suggest that firms' ability to reconfigure their existing resources and capabilities (dynamic capabilities) can play a role in determining their success (Aragón-Correa et al., 2008, Arend, 2014). However, we suggest that there exists another way to overcome this strategic limitation, which is to create new competences that enable firms to increase the variation in their strategic choices. This argument is also in line with SME strategy development, that suggests that firms often respond to institutional constraints by pursuing innovative strategies to overcome these constraints (Naudé, Szirmai & Goedhuys, 2011, Welter & Smallbone, 2011). Thus, we propose that marketing and R&D competences (another type of dynamic capability) play an important role in facilitating the environmental strategy-financial performance relationship. The overall theoretical model is shown in Figure 1.

"Insert Figure 1"

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Hypotheses Development

We expect positive associations between environmental strategy and marketing competence, as well as R&D competence. The pursuit of environmental strategy means that firms must focus on carrying out business activities (i.e. operation, product development and introduction) that have a less negative impact on the natural environment (Aragón-Correa et al., 2008, Darnall, Henriques & Sadorsky, 2008). IT suggests that such practices enable firms to demonstrate acceptable economic behavior by conforming to social expectations related to environmental integrity (Bansal, 2005). We argue that the need to conform to environmental expectations also acts as an institutional constraint that may limit the range and type of products (or services) that firms can introduce and sell to their customers. For example, instead of using every kind of available material to design a new product, firms might consider using only material that is recyclable and less toxic (Bansal, 2005). In other words, firms can only embrace product strategies that reflect their environmentally responsible positon. This may lead to sub-optimal financial performance. To maintain or surpass their financial performance standard prior to the adoption of an environmental strategy, we argue that firms can adopt either of the two following approaches: 1) to expand their customer base, or 2) to develop more environmentally-friendly products that are consistent with the firms' stated environmental standards.

The first approach requires firms to find new customers. One way for firms to achieve this is by developing their marketing competence. The possession of marketing competence enables firms to develop a new competence to explore fresh markets with the aim of expanding their customer base (Danneels, 2008, 2012). When firms commit to implementing an environmental strategy, they will tend to discontinue certain products that fail to comply with their new environmental standards (Hillary, 2004). In these circumstances, firms stand to lose some of their existing customers, who would prefer to continue purchasing these

discontinued products and are unwilling to switch to more environmentally-friendly ones (Bianchi & Noci, 1998, Brammer et al., 2012). This results in a loss of the revenue generated by the discontinued product line. We argue that, when firms face such circumstances, they will become more motivated to develop marketing competence. This is because firms with a strong marketing competence are able to create a new competence in identifying and accessing fresh markets (Danneels, 2008, 2012). This new competence, in turn, enables firms to reach out to more customers, so they can sell the remaining environmentally-friendly range of products to these new customers and make up for any lost revenue.

The second approach requires firms to develop new environmentally-friendly products. We postulate that firms can accomplish this by developing an R&D competence Specifically, firms tend to eliminate certain product lines that are not environmentally-friendly when implementing an environmental strategy (Darnall & Edwards, 2006, Hillary, 2004). To recoup the revenue lost due to their discontinued products, firms will tend to be motivated to develop an R&D competence, which allows them to build new technological competences (Danneels, 2008, 2012). The possession of such competence often enables firms to identify and integrate new, green-based technology into their product development and develop environmentally-friendly products to replace the discontinued ones. Therefore, firms can maintain the scale and scope of their product offers at a similar level to that that existed prior to the implementation of their environmental strategy. Consequently, firms will be more likely to maintain or achieve superior financial performance by selling a similar range of (but more environmentally-friendly) products to their existing customer base.

We also acknowledge that our arguments regarding environmental strategy – marketing competence, and environmental strategy – and R&D competence may conflict with certain predictions when applying them to the IT perspective. In particular, firms may pay more attention to complying with social expectations and be unwilling to take further

action because they place greater weight on conforming to their social obligations than on economic optimization (Bianchi & Noci, 1998, Oliver, 1997). However, the empirical evidence suggests that many SMEs indeed pursue innovative strategies to counter the institutional constraints related to higher environmental standards (Brammer et al., 2012, del Brío & Junquera, 2003). More specifically, large companies, such as oil companies that have a resource abundance, may use their resources for political lobbying to seek to change the rules of the system (institutional constraints) (Hond, Rehbein, Bakker & Lankveld, 2014). SMEs, in contrast, are more likely to respond to the requirement to conform to social expectations by finding new ways to address these due to their lack of resource abundance. For example, small firms may design environmentally-friendly products to achieve higher environmental standards (del Brío & Junquera, 2003, Luken & Stares, 2005). Nevertheless, we acknowledge that there are many ways of overcoming the institutional constraints (i.e. those posed by the implementation of an environmental strategy). However, we focus on the development of marketing and R&D competence in our study.

We also expect that both marketing competence and R&D competence may influence SMEs' financial performance in a positive way. From the RBT perspective, a firm's competitive advantage is driven by its heterogeneous resources and the ways in which it is able to organize these (Alvarez & Barney, 2002, Aragón-Correa et al., 2008). Experts argue that SMEs' competitive advantage can be based on two types of competence that are hard for competitors to imitate: the ability to recognize business opportunities, and the ability to combine resources in a new way (Alvarez & Barney, 2002, Alvarez & Busenitz, 2001). Danneels (2012) suggests that firms' marketing competence allows them to create a new competence to explore new markets. The possession of marketing competence means that SMEs can create new strategic assets to identify and access new customers who are environmentally-conscious and willing to buy environmentally-friendly products. R&D

competence enables firms to create a new competence to use technological or technically related resources to develop new products (Danneels (2012). Thus, we argue that SMEs with greater R&D competence are more likely to create capabilities that enable SMEs to combine resources in new ways (involving the use of new technology). This means that SMEs are able to identify and incorporate new green technologies into their new product development processes. According to prior studies (e.g. Danneels, 2008, 2012), both types of competence can be considered valuable and hard for competitors to imitate. Thus, we can expect that the possession of such competences will tend to lead SMEs to outperform their competitors. Combining the preceding arguments, we hypothesize two mediating effects as follows:

> H1: Marketing competence mediates the relationship between SMEs' environmental strategy and financial performance.

> H2: R&D competence mediates the relationship between SMEs' environmental strategy and financial performance.

Furthermore, we propose that a reciprocal causal relationship exists between SMEs' marketing and R&D competence. We first expect that strong marketing competence can lead to the development of R&D competence. This is because, when SMEs become more capable to explore new markets, they often need to deal with the challenges that their new customers bring. This new group of customers that SMEs have identified may impose other new demands on the product design and functions, which may produce new unexploited business opportunities for SMEs (Alvarez & Barney, 2002, Arend, 2014). To exploit such business opportunities, SMEs will become more motivated to develop and improve their R&D competence that enables them to identify and incorporate green-related technology into their product development process (Hamann et al., 2015, Luken & Stares, 2005, Petts, 1998). Thus, SMEs' marketing competence should be positively associated with their R&D competence. Combining this argument with our prior discussion, we can expect a serial multiple mediation

relationship which leads to the influence of SMEs' environmental strategy on financial performance through marketing competence and then R&D competence. Thus, we propose:

> H3: The influence of SMEs' environmental strategy on financial performance is mediated through marketing competence, and then, combined with R&D competence, forms a serial multiple mediation relationship.

An alternative view is whether R&D competence supports the development of marketing competence[i]. As discussed, R&D competence reflects SMEs' ability to create new competences to identify and incorporate new technology into their products (Danneels, 2008). In the context of our study, this competence enables SMEs to organize and use their technology-related resources to develop environmentally-friendly products that comply with the institutional constraints and also please their existing customers. What's more, the new environmentally-friendly products that SMEs have developed may open up new business opportunities for SMEs to explore (Brammer et al., 2012). In addition to SMEs' existing customers, it is now possible to sell this new type of product to new customers who are conscious of the environmental impacts of firms and their products (Arend, 2014, Hamann et al., 2015, Petts, 1998). To capture this potential business opportunity, there is a high likelihood that SMEs will develop marketing competence, as this will enable them to identify and engage with new customers who prefer environmentally-friendly products. Combining this argument with our prior discussion, we can also expect a serial multiple mediation relationship which leads to the influence of SMEs' environmental strategy on financial performance through R&D competence and then marketing competence. Thus, we propose:

> H4: The influence of SMEs' environmental strategy on financial performance is mediated through R&D competence and then, combined with marketing competence, forms a serial multiple mediation relationship.

Research Method

To test our hypotheses, we collected data from UK-based SMEs in the technology sector. In particular, we choose SMEs with a main business focus on the design and manufacture of products that involve the use of advanced technology. The reason for choosing this particular sector is that SMEs in the technology industry often actively engage in sustainable development and have the capacity to reach new customers and develop new environmentally-friendly products in response to social expectations related to environmental standards (e.g. Lee, Kang, Hsu & Hung, 2009).

"Insert Table 1 here"

Regarding environmental strategy, we adapt and modify the measurement scale from prior studies to assess firms' commitment to environmental integrity (Bansal, 2005, Lee & Rhee, 2007). For dynamic capabilities, we adapt and modify the measurement scale of Danneels (2008, 2012) to assess firms' competence to create new abilities to explore new markets (marketing competence), as well as firms' competence to create new abilities to identify and incorporate new technology (R&D competence). According to Danneels (2012), we use a comparison format (i.e. asking respondents to compare their firms' actions with their competitors' actions) to assess the dynamic capabilities. This leaves open the possibility of the respondents' lack of knowledge regarding their competitors' actions. However, we believe that this is unlikely, as we target the CEO (or general manager) of the firm, who should possess sufficient knowledge about a firm's position in the marketplace relative to that of the competition. Regarding financial performance, we adapt and modify the measurement scale of Fang, Palmatier & Grewal (2011) to assess the degree to which managers perceive the organization's financial performance such as profit margin growth, return on assets growth and return on equity growth during the previous five years.

We carried out a pilot study by conducting informal discussions with several academic colleagues and representatives from SMEs in the technology sector. They provided

feedback about the clarity of the survey questions and instructions as well as the aptness of the terminology used. We refined the questionnaire and finalized the survey. Primary data were collected via an email survey. We contacted a marketing company and searched for contact information for UK-based SMEs whose business activities involve the design and manufacture of products that involve the use of advanced technology. We then sent a cover letter to the CEO of the firm to ask him/her to complete the questionnaire on behalf of that firm. Due to the anonymity and confidentiality of the responses, we cannot eliminate the possibility that the respondent is not the CEO of the firm. We recognize that this can be viewed as one of the limitations of this study. Future researchers should consider using telephone or in-person surveys to address this research limitation. We obtained 214 (out of 1500) usable questionnaires from firms with an average of £5.202 million in annual revenue, 33.691 employees, and 16.009 years of business establishment. This relatively low response rate (14.267%) was not ideal and we acknowledge that it might be considered as one of the limitations of this study. Nevertheless, low survey response rates are typical when conducting an organization-based survey that directs the questionnaire to executive-level respondents, and non-response does not necessarily suggest the presence of sampling bias (Baruch & Holtom, 2008). We compared the answers between the early and late respondents and found that there were no significant difference between the two groups (Armstrong & Overton, 1977). Therefore, the probability of non-response bias is minimal.

We also include several control variables. First, firms' business focus (i.e. product type) may affect the development of their business strategy (Alvarez & Barney, 2002, Danneels, 2008). We assess the firms' business focus offer using dummy variables: engineering, information system and others. We choose "others" as the benchmark group when assigning the dummies. Second, the size of the firm has been shown to influence its competence and competitive advantage (Danneels, 2008, 2012). We use two standard

measurements to assess the size of the firm for robustness: annual revenue and total number of employees. Second, the age of the firm appears to have an impact on strategy development due to its evolving life cycle (e.g. Thornhill & Amit, 2003). We assess the age of the firm by asking its representatives about how long it has been in existence. Finally, we control for environmental effects which represent the degree of uncertainty within the business environment (such as customers, competitors and technological turbulence) that appear to affect a firm's strategy (Arend, 2014, Danneels, 2012).

"Insert Table 2 Here"

Validation and Reliability

First, we calculated the variance inflation factors (VIFs) to assess the possibility of multicollinearity. We found that all of the VIF values in our study are below 10, which indicates that multicollinearity does not pose a serious problem (Hair, Black, Babin & Anderson, 2010). Second, we assessed potential common method variances (CMV), given that we assessed all of the variables using a single source. We followed Podsakoff, MacKenzie & Podsakoff (2012)'s suggestions regarding the organization of the data collection process. For statistical remedies, we conducted multiple diagnostic analyses to rule out CMV. We performed Harman's single factor test by subjecting all of the items in our study to exploratory factor analysis (EFA). Second, we used confirmatory factor analysis (CFA) marker variable techniques (Williams, Hartman & Cavazotte, 2010), with government support (five items) adapted from a review by Business Link (2012) to assess UK government support for finance, trade and innovation as our marker variable. The results of both tests suggest that CMV is not a concern for this study.

Finally, we assessed the validity and reliability of the construct. Initially, we compared the fit among a series of CFA models to determine the best-fit model. According to

the thresholds value guidelines of Hair et al. (2010), we selected one fit index from different classes to assess our model fit. This includes the chi-square – X^2, degree of freedom – df), comparative fit index – CFI, normed fit index – NFI, goodness of fit index – GFI), and root mean square error of approximation – RMSEA. Our hypothesized model exhibited the best fit (X^2 = 165.507; df = 84; X^2/df = 2.018; p = .000, CFI = .950; GFI = .908; NFI = .907; RMSEA = .069). We then calculated the value of the composite reliability (CR) and average variance extracted (AVE). As shown in Table 2, the value of the CR is greater than .700 and the value of the AVE exceeds the .500 benchmark for all constructs (Hair et al., 2010). Furthermore, we calculated the square root value of the AVE of each construct and found that the resulting value for each construct is greater than all of its correlations with other constructs. Overall, the results suggest that the measurement scales are reliable and valid.

RESULTS

Before discussing the results of our hypothesis testing, we comment on the correlation matrix and descriptive statistics. First, comparatively high standard deviations in financial performance may reflect the high business volatility among SMEs in the technology industry (e.g. Lee et al., 2009). Second, a high correlation between two firm-size indicators – annual revenue and number of employees – is expected, as larger firms tend to have relatively high annual revenue figures and numbers of employees.

"Insert Table 3 Here"

To test our hypotheses, we used SPSS with PROCESS Macro, developed by Hayes (2013). Table 3 indicates the results of the tests. Hypotheses 1 and 2 predict that marketing competence and R&D competence mediated the relationship between environmental strategy and financial performance, respectively. According to Hayes (2013), the mediation effect occurs when three conditions are met: 1) the effect of the predictor variable on the mediator is

significant, 2) the effect of the mediator on the outcome variable is significant when accounting for the effect of the predictor variable, and 3) the indirect effect in mediation is significant. As shown in Model 1 and 3, environmental strategy has a positive and significant effect on marketing competence (Model 1: β = .383, p < .001), as well as R&D competence (Model 3: β = .283, p < .001). Thus, condition 1 is supported. To satisfy condition 2, we found that the effects of both marketing competence (Model 5: β = .269, p < .100) and R&D competence (Model 5: β = .253, p < .100) on financial performance are positive and significant when accounting for the effect of environmental strategy. Finally, we calculated the indirect effects using a bootstrap analysis with 10,000 samples using SPSS with PROCESS (Hayes, 2013). Our results suggest that the indirect effects from environmental strategy on financial performance through either marketing competence (β = .103) or R&D competence (β = .072) through management innovation are all positive and significant, with a 95% confidence interval which does not include zero. Therefore, Hypotheses 1 and 2 are supported.

We also investigated the serial multiple mediation relationship predicted in hypotheses 3 and 4. We adopted the method suggested by Hayes (2013) to examine the serial multiple mediation relationship by 1) estimating serial regression models that control for the predictor and mediators in each proceeding model, and 2) calculating the indirect effect. To examine hypothesis 3, we estimated the serial regression models: Model 1, 4 and 5. In Model 1, we found a positively significant effect of environmental strategy on marketing competence (β = .383, p < .001). In Model 4, we found a positively significant effect of marketing competence on R&D competence (β = .550, p < .001), when controlling for the effect of environmental strategy. Finally, in Model 5, we found a positively significant effect of R&D competence on financial performance (β = .253, p < .100), when accounting for the effect of environmental strategy and marketing competence. Furthermore, we calculated the

indirect effects employing a bootstrap analysis of 10,000 samples using SPSS with PROCESS (Hayes, 2013). The indirect effect (environmental strategy → marketing competence → R&D competence → financial performance) is positive and significant (β = .053), with a 95% confidence interval which does not include zero. Hypothesis 3 is thus confirmed.

To examine hypothesis 4, we follow the same procedure to estimate Model 3, 2 and 5. We found a positively significant relationship between environmental strategy and R&D competence (Model 3: β = .283, p < .001), a positive relationship between R&D competence and marketing competence (Model 2: β = .550, p < .001), when controlling for the effect of environmental strategy, and a positively significant relationship between marketing competence and financial performance (β = .269, p < .100), when accounting for the effect of environmental strategy and R&D competence. Finally, we calculated the indirect effects employing a bootstrap analysis of 10,000 samples using SPSS with PROCESS (Hayes, 2013). The indirect effect (environmental strategy → R&D competence → marketing competence → financial performance) is positive and significant (β = .042), with a 95% confidence interval which does not include zero. Hypothesis 4 is thus confirmed.

DISCUSSION AND CONCLUDING REMARKS

Theoretical Implications

Our findings make several contributions to the extent literature. First, we find that marketing and R&D competences mediate the environmental strategy-financial performance relationship. The findings not only increase our understanding of how SMEs' environmental strategy affects financial performance, but also shed new light on the role of dynamic capabilities in SMEs' environmental strategy development. Our results enrich the line of enquiry that SMEs' engagement in environmental strategy may not automatically lead to

superior financial performance (e.g. Jorge, Madueño, Martínez-Martínez & Sancho, 2015, Lee, Tae Kim & Choi, 2012). Instead, we reason that the superior financial performance arises from SMEs' ability to explore new markets (marketing competence) and explore new technologies (R&D competence). The motive for SMEs to develop these second-order competences is to overcome the institutional constraints (i.e. using recycled materials for product development) created when SMEs embrace environmental strategy. Furthermore, we examine second-order competences, a relatively unexplored type of dynamic capability in the SME environmental strategy literature. Prior research focuses mainly on studying one type of dynamic capability – competence in reconfiguring the existing competences to deploy resources in SMEs' environmental strategy development (e.g. Aragón-Correa et al., 2008, Arend, 2014, Martín-Tapia et al., 2010), and tends to neglect the other type of dynamic capability – competence in creating new competences to deploy untapped resources (Danneels, 2008, 2012) – unexplored in this kind of strategy development. In doing so, we contribute to the further integration of dynamic capabilities with the social responsibility-sustainable development strategy literature in the SME context (e.g. Arend, 2014, Martín-Tapia et al., 2010).

Second, we find a serial multiple mediation relationship that further explains the underlying process by which environmental strategy affects financial performance. An important question that arises when considering the mediating effects of marketing and R&D competence on the environmental strategy-financial performance association is the potential connection between these two second-order competences. In this research, we confirmed that a reciprocal causal relationship exists between SMEs' marketing and R&D competences. Together, they act as serial multiple mediators in sequence between environmental strategy and financial performance. Combining this with earlier findings, we can conclude that, when SMEs implement an environmental strategy, it will probably lead to the development of

marketing and R&D competences, either simultaneously or sequentially. This means that SMEs may not develop both marketing and R&D competences simultaneously when embracing an environmental strategy, as suggested by the earlier findings. Instead, SMEs may develop one type of second-order competence (either marketing or R&D competence), which will eventually lead to the development of another type. Nevertheless, our findings suggest that, in both cases, SMEs' implementation of environmental strategy will lead indirectly to superior financial performance. In doing so, we provide deeper insights into the contingencies through which the environmental strategy-financial performance association might be shaped and contribute to the responsibility-sustainable development strategy literature regarding the impact of SMEs' environmental strategy (e.g. Aragón-Correa et al., 2008, Eng Ann et al., 2006, Jorge et al., 2015, Lee et al., 2012).

Finally, we contribute to the ongoing efforts to develop and refine the convergence of IT and RBT in relation to environmental strategy development. Prior approaches to IT and RBT integration focus on explaining that the intentions of firms to conform to social expectations and achieve heterogeneity influence their environmental strategy development in different ways. For example, Bansal (2005) reveals how these two theoretical perspectives explain the internal (i.e. international experience – from the resource-based perspective) and external (i.e. media attention – from the institutional perspective) factors that influence firms' sustainable development (including environmental strategy). Darnall et al. (2008) argued for, and found, that both institutional pressure and resource position promote a firm's intention to adopt an environmental management system, which results in superior financial performance. We propose a theoretical rationale that represents a greater convergence between IT and RBT to explain the processes by which SMEs' environmental strategy acts as antecedent conditions that enhance the potential for SMEs to organize their resources in order to achieve superior financial performance.

Our work also helps to bring together a paradoxical point of view on SMEs' environmental strategy development (Brammer et al., 2012, del Brío & Junquera, 2003, Hillary, 2004). On the one hand, the implementation of environmental strategy limits SMEs' strategic choice to exploit business opportunities. As the findings of this research suggest, SMEs that embrace environmental strategy are likely to enjoy superior financial performance. Building on the insights from the integration of IT and RBT, we argue that the limitations arising from being environmentally responsible appear to stimulate SMEs to develop an ability to build new competences, which ultimately affects financial performance. In doing so, we offer a fresh theoretical angle for examining the environmental strategy-financial performance relationship in the SME context.

Managerial Implications

The adoption of an environmental strategy is an important decision for SME owners/managers. Prior research has pointed out the SMEs often show less interest in pursuing an environmental strategy because, on the one hand, such movements may further restrict their strategic choices while, on the other hand, SMEs experience less social pressure from stakeholders to comply with environmental standards (Brammer et al., 2012, del Brío & Junquera, 2003). Nevertheless, as climate change has become more visible in recent years, SME owners/managers are starting to feel greater social pressure to adopt environmental strategies (Aragón-Correa et al., 2008, Arend, 2014). Our findings emphasize that SMEs' engagement in environment strategy does not necessarily translate into poor financial performance due to a limitation of strategic choices. In fact, we suggest that the adoption of an environmental strategy actually forces SMEs to develop an ability to create new competences, which often leads to superior financial performance. In accordance with our findings, SME owners/managers should welcome the opportunity to engage in environmental

strategy. To facilitate the development of marketing and R&D capabilities, SME owners/managers should challenge their employees to find ways to identify and access environmentally conscious consumers, as well as to identify and incorporate technologies to develop environmentally-friendly products. This insight is important because the strength of the SME depends on finding innovative ways to solve challenges (Naudé et al., 2011, Welter & Smallbone, 2011). SME owners/managers should use this tendency to their advantage when dealing with environmental strategy-related issues.

Limitations and Future Research

As with all research, the limitations of this study reveal promising potential approaches to future research. First, our use of a single response, cross-sectional design survey does not allow definite conclusions to be drawn about the causal processes over time. In particular, a reciprocal causal relationship exists between SMEs' marketing and R&D competences. Future researchers might employ a longitudinal research design in order to confirm the causality empirically and so make a further contribution to our existing knowledge on this subject. Second, we did not control the influence of firms' stakeholders in our model when studying firms' environmental strategy because 1) we focus on a single sector − firms within the same sector usually face similar stakeholder demands, and 2) we mainly investigate the consequences (rather than the antecedents) of firms' environmental strategy. Nevertheless, we recognize that stakeholders' actions are still relevant for firms' environmental strategy. Future researchers might identify certain stakeholders' actions (i.e. NGOs, the media, the public sector) as control variables to improve the generalizability of our model further. Finally, we focus on SMEs' developing marketing and R&D competences to overcome the institutional constraints posed by the adoption of environmental strategy. In doing so, our study explains the processes by which the environmental strategy of SMEs

contributes to their competitive advantage. As climate change becomes more visible, stakeholders are beginning to place greater pressure on companies (including SMEs) to integrate environmental considerations into their business operation (Bianchi & Noci, 1998, Brammer et al., 2012, del Brío & Junquera, 2003). We hope that further research will continue to explore and document how the pursuit of an environmental strategy affects firms' financial performance.

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Figure 1: Conceptual Model

Dynamic Capabilities
(Second-order Competences)

Marketing Competence

Environmental
Strategy

R&D Competence

Financial
Performance

Control Variables
Business Focus
Firm Size (Revenue)
Firm Employee
Firm Age
Customer Turbulence
Competitive Turbulence
Technological Turbulence
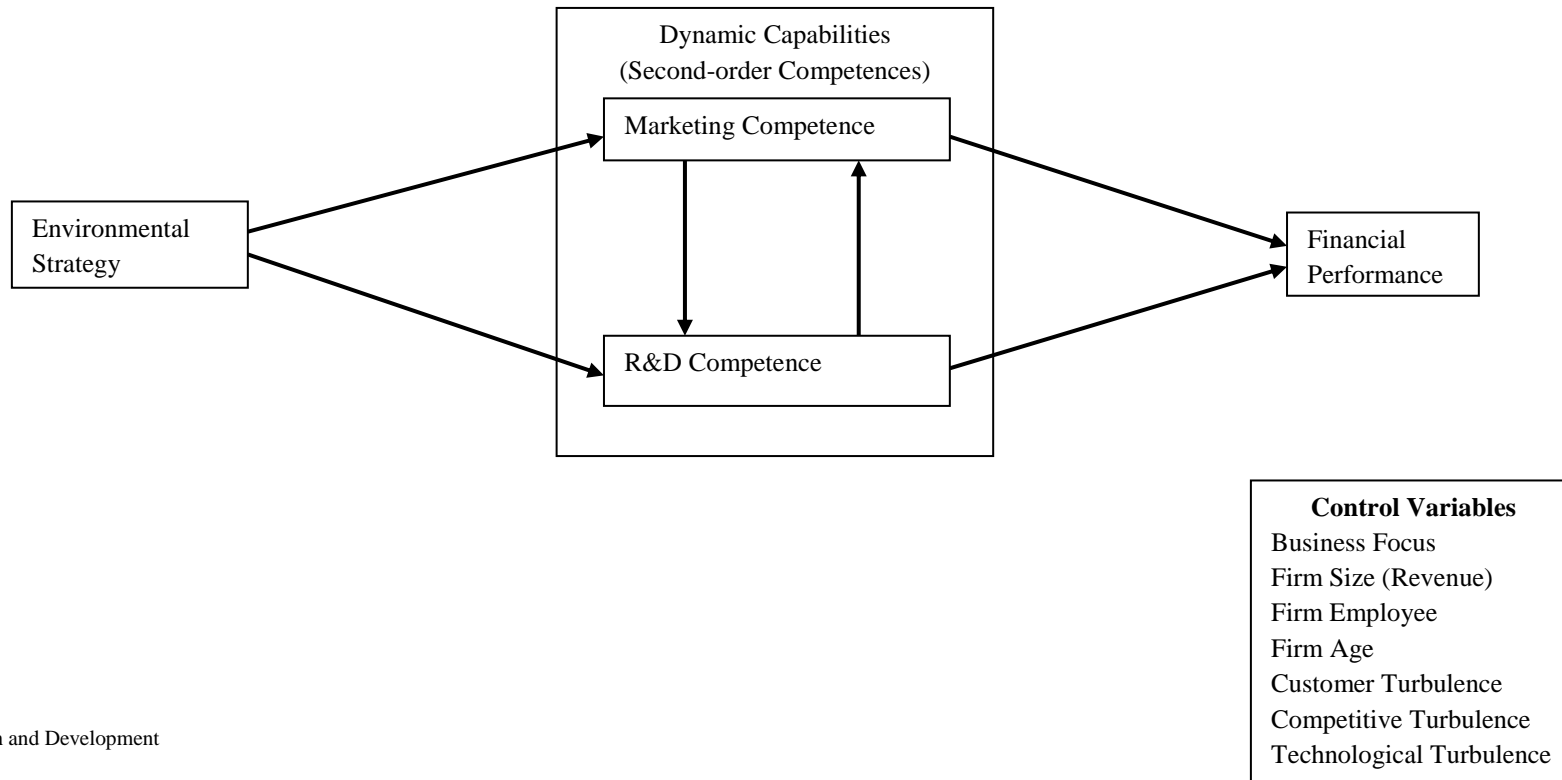
Notes:
R&D = Research and Development

Table 1: Measurement and Factor Loading

Measurement	Loading*
Environmental Strategy	
Our products and services have a less environmentally harmful impact than those of our competitors	.679
We always try to reduce environmental impacts of our products or services	.806
We attempt to reduce likelihood of environmental accidents through process improvements	.788
Marketing Competence (Second-order Competences)**	
Assessing the potential of new markets	.693
Building relationships in new markets	.725
Setting up new distribution channels and a new sales force	.719
Leveraging its brand reputation or company image in new markets (via advertising or promotion strategies)	.721
Researching new competitors and new customers	.790
Developing new pricing strategies	.733
R&D Competences (Second-order Competences)**	
Setting up new types of manufacturing facilities and operations	---
Assessing the feasibility of new technologies and learning about them	.823
Recruiting engineers in technical areas with which it is unfamiliar	---
Identifying promising new technologies	.821
Implementing new types of production processes	.510
Financial Performance***	
Profit margin	.850
Return on assets	.955
Return on equity	.944

* Factor loadings are standardized

** These items are preceded by the statement: "Relative to our competitors, my company is good at …"

*** These items are preceded by the statement: "During the last five year, we experience high growth in terms of our …"

Table 2: Descriptive Statistics

	1	2	3	4	5	6	7	8	9	10	11	12
1. Engineering	---											
2. Information System	-.502*	---										
3. Firm Size (Annual Revenue)	.377*	-.445*	---									
4. Firm Employee	.364*	-.452*	.864*	---								
5. Firm Age	-.056	.041	-.009	-.032	---							
6. Customer Turbulence	.140*	.010	-.073	.050	.047	---						
7. Competitive Turbulence	.061	.021	-.217*	-.164*	-.030	.344*	---					
8. Technological Turbulence	-.123	.179*	-.215*	-.132	-.030	.403*	.372*	---				
9. Environmental Strategy	.135*	-.169*	.053	.166*	-.075	.242*	.071	.091	**.760**			
10. Marketing Competence	-.014	-.037	.085	.156*	.118	.181*	.072	.118	.406*	**.731**		
11. R&D Competence	-.057	.153*	-.161*	-.091	.009	.217*	.116	.250*	.301*	.584*	**.733**	
12. Financial Performance	-.074	.167*	-.005	.026	.098	-.030	-.101	.090	.103	.272*	.274*	**.916**
Mean	---	---	13.588	2.382	2.584	3.417	3.220	3.741	3.424	3.357	3.478	2.470
Standard Deviation	---	---	2.063	1.557	.742	.872	.931	.759	.717	.701	.684	1.107
Composite Reliability	---	---	---	---	---	---	---	---	.803	.873	.770	.940
Average Variance Extracted	---	---	---	---	---	---	---	---	.577	.534	.537	.839

Notes:
N = 214; *p < .05
Average Variance Extracted (AVE) square root are shown in bold on the correlation matrix diagonal
Business Focus dummies: we choose "Others" as the benchmark group
Firm size is measured as the natural log of annual revenue
Firm employee is measured as the natural log of number of employees
Firm age is measured as the natural log of number of years elapsed since firm established.

Table 3: Data Analysis

Outcome Variable:	Model 1	Model 2	Model 3	Model 4	Model 5
	Marketing Competence		R&D Competence		Financial Performance
Control Variables:					
Engineering	-.213(-1.388)	-.233(-1.812)†	.036(.234)	.153(1.186)	.049(.426)
Information System	.048(.435)	-.066(-.706)	.209(1.874)†	.182(1.952)†	.147(.576)
Firm Size (Annual Revenue)	.009(.200)	.027(.727)	-.033(-.744)	-.038(-1.020)	.443(2.393)*
Firm Employee	.062(1.062)	.057(1.158)	.010(.168)	-.024(-.496)	-.022(-.304)
Firm Age	.137(2.319)*	.123(2.496)*	.025(.415)	-.051(-1.015)	.084(.871)
Customer Turbulence	.041(.696)	.010(.207)	.056(.950)	.034(.676)	.123(1.243)
Competitive Turbulence	.033(.625)	.037(.831)	-.007(-.130)	-.025(-.565)	-.156(-1.592)
Technological Turbulence	.051(.753)	-.027(-.470)	.140(2.092)*	.112(2.002)*	-.146(-1.675)†
Predictor:		.			
Environmental Strategy	.383(5.932)***	228(4.023)***	.283(4.379)***	.072(1.231)	.149(1.338)
Mediator:					
Marketing Competence				.550(9.385)***	.269(1.946)†
R&D Competence		.550(9.385)***			.253(1.834)†
Constant	.986(1.451)	-.138(-.237)	2.044(3.006)**	1.501(2.623)**	.457(.399)
Model Statistics					
F-Value	6.347	16.959	4.931	15.141	3.458
Degree of Freedom	(9, 204)	(10, 203)	(9, 204)	(10, 203)	(11, 202)
P-Value	.000	.000	.000	.000	.000
R-Square	.219	.455	.179	.427	.158

Statistical Inference

Indirect Effect = Environmental Strategy → Marketing Competence → Financial Performance = .103* BLLCI (.002) ~ BULCI (.236)

Indirect Effect = Environmental Strategy → R&D Competence → Financial Performance = .072* BLLCI (.007) ~ BULCI (.189)

Indirect Effect = Environmental Strategy → Marketing Competence → R&D Competence → Financial Performance = .053* BLLCI (.005) ~ BULCI (.137)

Indirect Effect = Environmental Strategy → R&D Competence →Marketing Competence → Financial Performance = .042* BLLCI (.004) ~ BULCI (.114)

Notes:
N = 214; *** p < 0.001; ** p < 0.010; * p < 0.050; † p < 0.100
Standardized Coefficients are reported with t-value in parathions
Bootstrap N = 10000; 95% Confidence intervals; BLLCI = bootstrap lower-level confidence interval; BULCI = bootstrap upper-level confidence interval
R&D = Research and Development

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[i] This critical insight was provided by an anonymous reviewer.