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# Integrating sustainability into new product development: The role of organizational leadership and culture

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ABSTRACT

While corporate sustainability research continues to grow, we contend that key organizational factors influence the ability of firms to strategically integrate sustainability orientation to the performance of new products. Using data from 349 product developers, this paper examines organizational factors that instill a sustainability orientation leading to market performance of new products. Specifically, we construct a model where organizational leadership (i.e., leadership practices, employee incentives, and a focus on patents), and culture (i.e., innovation culture and geocentricity) lead to sustainability orientation that results in the translation of firm resources into improved new product development outcomes. Our results support our contention; sustainability orientated firms are likely to realize improved market performance of new products as these firms benefit from an innovative organizational culture exposed to the global environment with complementary leadership that provides focus and reward mechanisms for employees.

## Introduction

The concept of Corporate Social Responsibility (CSR) has witnessed a shifting landscape in the past few decades, emerging from the Friedman era where "the social responsibility of business is to increase its profits," to a greater realization that the corporation is accountable to society for their actions and that capital markets and profits do not solve social and economic problems that emerge from unfettered capitalism (Hunt, 2003). In this transition from a profit-centered approach to being more socially responsible, corporations are increasingly called upon to play a role in sustainable development, resulting in a wider acceptance of sustainability by firms (Kiron, Kruschwitz, Haanaes, & von Streng Velken, 2012). Sustainability, a more specific concept than CSR, includes the consideration of and reporting on social, environmental, and economic aspects impacted by firms when pursuing organizational goals (Epstein & Buhovac, 2014; Shields & Shelleman, 2015). According to Hult (2011), the primary difference between CSR and sustainability relates to how market-focused sustainability can be a strategic resource that leads to competitive advantage for the organization, particularly where such efforts engage the organization and enter into its cultural fabric.

Recent research depicts such a link between sustainability orientation and new product development (NPD) performance (Du, Yalcinkaya, & Bstieler, 2016; Nidumolu, Prahald, & Rangaswami, 2009). This link has led to more useful insights during the NPD process and consequently more customer-focused products (Pujari, 2006). Firms with a sustainability orientation are likely to view the customer centered value creation for new product development from the social and sustainability perspectives that may be increasingly important to customers (Handelman & Arnold, 1999; Luo & Bhattacharya, 2006). Hence, sustainability orientation has some overlapping - although not synonymous - characteristics with customer orientation, which has been shown to positively influence new product performance (Crittenden, Crittenden, Ferrell, Ferrell, & Pinney, 2011). This orientation is further reinforced through organizational learning (Slater & Narver, 1995). Sustainability initiatives by new product developers have also been influenced by the

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interpersonal factors of a firm's leadership (Bettiga, Lamberti, & Noci, 2018). Given the increasing importance of sustainability within NPD, this study extends this research stream to investigate the drivers of a sustainability orientation, specifically factors involved in the coordination of market information and customer orientation into subsequent impact on new product performance (Du et al., 2016; Nidumolu et al., 2009).

Prior literature has noted that a firm's market orientation to sustainability is driven by both firm strategy (Van Egeren & O'Connor, 1998) and factors in the organizational environment (Wei & Morgan, 2004). For example, sustainability issues have resulted in firms developing such strategies that address the need to reduce risk and strengthen competitiveness (Birnik, 2013). Strategies integrating sustainability orientation focuses on optimal use of resources through resource alignment across the value chain and new product development, leading to a firm-wide change in thinking and learning (Hurley & Hult, 1998; Sharma & Vredenburg, 1998). However, we assert that organizational characteristics of leadership and a culture of innovation are necessary to bring about the "social cohesion" that supports integration of sustainability orientation to market expansion through new product development (Shaner, Beeler, & Noble, 2016). In this context, leadership attributes that include a global outlook paired with an innovation culture leads to employee solidarity around long-term themes, such as a sustainability orientation. Further, drawing from the resource-based view (RBV), this orientation harnesses and aligns firm resources to bring internal change from somewhat static resource configurations to a greater focus on action orientation (Berger, Cunningham, & Drumwright, 2007; Dunphy, Griffiths, & Benn, 2003).

To illustrate this inter-relationship between the resources highlighted above, we first develop a framework highlighting the dual organizational characteristics of leadership and culture as they impact sustainability orientation and new product market performance. We test our hypotheses using data from 349 product developers from varying regions and industries. Specifically, we focus on organizational leadership, through project leadership practices, incentives for NPD teams, and a focus on obtaining patents, and organizational culture, through innovation culture and geocentricity, as they influence a sustainability orientation in NPD. Further we measure the impact of a sustainability orientation on new product market performance. The results of the analysis support our hypotheses, indicating how internal organizational leadership and culture lead to greater sustainability orientation and in turn positively impacting the market performance of new products.

The manuscript continues in the following manner. In the next section, we describe the relevant literature and develop a theoretical framework that leads to the formal hypotheses. In the third section, we describe the data set and collection process, data analysis, and relevant results. Finally, we end with a discussion on the practical implications and limitations.

## Literature Review and Hypotheses Development

There is a rapidly growing interest in the topic of sustainability as it relates to long-term business performance that optimizes the "triple bottom line": economic, environmental, and social outcomes. While sustainability is usually associated with ethics and corporate social responsibility, the managerial approach to sustainability has also been widely developed and discussed. This managerial approach or strategic approach to CSR emphasized the opportunity to enhance competitive advantage through a CSR strategy that improves the quality of the business environment where corporations locate, bringing social and economic goals into alignment and improving a company's long-term business prospects (Porter & Kramer, 2002). Nevertheless, according to Porter and Kramer (2002), the context-focused approach to philanthropy was not simple. One size did not fit all, companies differed in their comfort levels and time horizons for philanthropic activity, and individual firms would need to make different choices about how to implement such socially responsible actions. As Van Egeren and O'Connor (1998) contend, a firm's orientation is driven by their strategic decisions, including the goals they aim to accomplish, and the means that facilitate the achievement of such goals (i.e., drivers). Such a strategic approach fosters integrating innovation with sustainability (Du et al., 2016) as opposed to viewing sustainability as separate from everyday strategies (Sharma & Vredenburg, 1998). Further, according to Lloret (2016), sustainability expectations may form "restrictions" imposed by economic, social, and environmental systems that sustainable companies overcome by developing a strategy that sustainably generates and captures value into the future leading to successful long-term performance. Studies have also considered specific sustainability issues as climate change and firm adaptation of business strategy to meet such challenges, for example through the design and implementation of human resource management practices (Buller & McEvoy. 2016). Overall, strategic sustainability has been viewed as a challenge and opportunity to value creation, with the overall goal to reduce risk

and strengthen the competitiveness of their organizations (Birnik, 2013).

Fundamental to value creating strategy is customer value. Sustainability encompasses multifaceted environmental, social, and economic aspects that have broad implications in a globalized marketplace. Market-focused sustainability can be a strategic resource that leads to competitive advantages and, ultimately, to superior performance for an organization, becoming ingrained in its cultural fabric (e.g., values, beliefs, norms, artifacts) (Hult, 2011). Ramirez (2013), for example, assert that consumers view sustainably-oriented firms as maintaining procedures and developing products, and portraying themselves accordingly. Further, sustainability also involves integration of stakeholder theory with RBV, in that they both involve supporting firm goals within the context of aligning resources to a wider context (Kull et al., 2016) that includes, for example, community in addition to customers. While stakeholder theory holds that firms that develop a mutually trusting relationship with their stakeholders will have a competitive advantage over firms that do not (e.g., Jones, 1995), similarly, RBV maintains a consistency between social welfare concerns, the firm reputation and strategies leading to long-term competitive advantage (e.g., Barney, 1991).

To deliver value in this multi-stakeholder environment requires organizational capabilities of coordination and integration of management strategy that could integrate sustainability orientation (Melnyk, Davis, Spekman, & Sandor, 2010). Sustainability is a global phenomenon and sustainability-orientation can be related to all forms of firms, including smaller ones (Nadim, Abbas, & Lussier, 2010). Sustainable oriented firms would also be likely to translate such views into sustainability efforts that are salient to the consumer, with the stakeholder support necessary to maintain firm reputation, leading to the joint maximization of social and economic objectives (Porter & Kramer, 2002; Shields & Shelleman, 2015). Further, entrepreneurial ventures rather than established firms are more likely to pursue sustainability as a strategy for creating private and social value and durable competitive advantage (Parhankangas, McWilliams, & Shrader, 2014). Following Epstein, Buhovac, and Yuthas (2010), we combine organizational leadership and culture, and assert that these dual elements lead to a cohesive social environment conducive to harnessing resources for innovative value-adding strategies (Shaner et al., 2016). Specifically, organizational leadership presents a type of dynamism that helps the firm adjust to the changing environment and harness resources over a range of functions and processes. Further, organizational cultures emerge from a global outlook and a culture of innovation, where employees are incentivized to experiment, take risks, and even fail on occasion. Such firm competencies enable them to develop strategic value through "their ability to manipulate resources into value-creating strategies" (Eisenhardt & Martin, 2000, p. 1118), and to "integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece, Pisano, & Shuen, 1997, p. 516). Thus, organizational culture and leadership can bring together resources and assets (Day, 1994; Hunt & Morgan, 1995) and enable firms to deploy them advantageously for increasing competitive strengths (Zhou, Yim & Tse, 2005).

Drawing from the discussion above, this paper proposes a framework, consistent with Galpin, Whitttington, and Bell (2015) that demonstrates how a sustainability culture can be developed through leadership practices that reinforce corporate missions, incentivizing employees through pay and employment rewards, and harnessing strengths emerging from a global presence. The framework for this study, depicted in Figure 1, connects organizational leadership and culture and their internal (leadership) and external (geocentricity) facets, with the incentive systems that integrate these elements to deliver outputs (sustainability based) and outcomes (performance) (Hurley & Hult, 1998; Shaner et al. 2016). Specifically, a culture of innovation (Du et al., 2016; Linnenluecke & Griffiths, 2010), with related outcomes (i.e., patents) and a global focus (Bansal, 2005; Gualandris, Golini, & Kalchschmidt, 2014), combined with multi-faceted incentives to allow risk-taking, the framework reflects capabilities integrated in a sustainability-oriented environment (Epstein et al. 2010) that leads to market performance and the creation of stakeholder value (Epstein & Buhovac, 2014).

**Leadership**

A key to market-focused sustainability is good management and relationship building with stakeholders. Most organizations today recognize the need to provide the diverse leadership skills to manage a larger set of stakeholders rather than attending to the needs of owners as perhaps their sole responsibility (Freeman 1984; Freeman, Harrison, Wicks, Parmar, & de Colle, 2010). The move towards a sustainability orientation has the potential to face pushback from employees who either do not see the value or are hesitant to accept changes to their work processes (Daly & Geyer, 1994).

Prior research has shown that the existence of project leadership can make process change easier to accept and

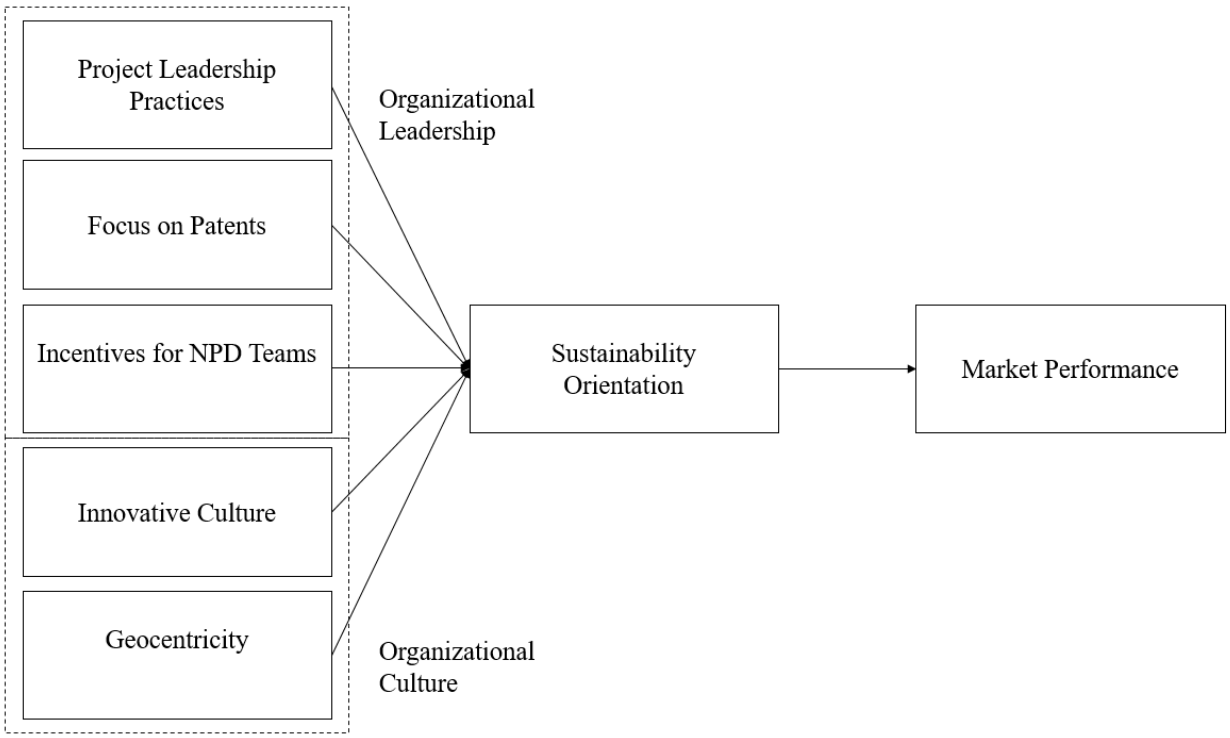


*Figure 1.* Organizational framework for sustainability orientated new product development

make the transition more seamless (Chang, Bai, & Li., 2015). After the initial sustainability goals are set within an organization, it is often up to leadership to reinforce these goals and standards through regular dialogue, thorough reviews, and training for employees (Galpin et al., 2015). Unless the CEO needs to lead this charge, change efforts fail or happen only halfheartedly when the development of the sustainable business model is delegated to the corporate social responsibility office or another task force (Bhattacharya & Polman, 2017, p. 72). Further, leadership is critical in both managing board member involvement and expectations as well as ensuring sustainability as a part of every employee's job. Sustainability involves creating value for all stakeholders in the ecosystem and viewing profits from the perspective of such value creation (Han, Kim, & Srivastava, 1998; Hurley & Hult, 1998). Implementing a sustainable business model requires executives to engage with the entire organization as well as multiple external stakeholders (such as nongovernmental organizations, shareholders, suppliers, regulators, and competitors), and to balance multiple goals that are sometimes in conflict (Bhattacharya & Polman, 2017). Sustainability efforts, as encouraged by strong leadership, engage the organization and become ingrained in the cultural fabric of an organization in order to effectively add value (e.g., Crittenden et al. 2011). Thus, we hypothesize:

**Hypothesis 1.** Project leadership practices will positively impact the firm's sustainability orientation.

**Geocentricity**

Geocentricity in this instance refers to the number of countries a firm currently operates in and standardization practiced across those countries (Markham & Lee, 2013). Firms that operate in more nations are more likely to be exposed to a greater variety of external stakeholders and sustainability orientations. Hence, such internationalization from expansion into global environment leads to a culture that is external oriented, and would be able to perceive the risks and opportunities (for example, reputational and legal) from integrating the sustainability issues they would encounter in the global arena, which would be more significant, given their global exposure. Additionally, firms exposed to varied cultures and external resources are more attuned to opportunities and empathetic to the needs of their external stakeholders, thereby making the firm more likely to adopt a sustainability approach (Du et al., 2016). Global firms are more likely to encounter a wide variety of sustainability issues and thus be forced to address these varying issues, thereby developing a global culture in the process (Gualandris et al., 2014). Additionally, firms oper-

ating in numerous global markets have the ability to leverage knowledge acquired in these various markets to develop best practices that adhere to varying global standards (Bansal, 2005). Teece et al. (1997) that stress in globalized markets, the ability to orchestrate internal and external co-specialized assets and build valuable intangible ones, such as reputational assets, is another key firm feature to create and sustain competitive advantage.

If sustainability orientation is believed to reflect a firm's culture, it would therefore follow those factors influencing firm culture, such as geocentricity, which would positively impact a firm's sustainability orientation. Barkemeyer & Figge (2014) argue that the increasing professionalization and dissemination of mainstream CSR approaches among MNCs lead to an influence of cohesion in strategic decision-making that increasingly centers to the companies' headquarters, while the scope of action within the subsidiaries and the supply chain of MNCs becomes increasingly restricted over time. While this might favor some regions over others, this orientation to consider external influences in strategy furthers the idea that globalization leads to wider scope of sustainability issues. Similarly, Perez-Batres, Miller, Pisani, Henriques, & Renau-Sepulveda (2012) acknowledge that while firms may be tempted to embrace host-country orientation – for better or worse – most firms will ultimately embrace a global best practice that elevates their sustainability orientation and corresponding initiatives to the highest standard amongst the countries they operate in. Further, they argue that firms that adopt a supranational approach are likely to have already met their own national standards and embrace a higher standard in their global sustainability practices. In a similar vein, Chan (2005) found that foreign invested enterprises (FIEs) in China integrate sustainability issues into strategy to enhance corporate environmental and financial performance. Nishant, Goh, and Kitchen (2016) also found that differences in regional factors influence strategy, and therefore, such factors, when considering global MNEs become important ways to influence the global culture of innovation, given that it is not static but rather dynamic nature pertaining to the differences between the regions. Consistent with these arguments, we hypothesize:

**Hypothesis 2.** A firm's geocentricity will positively impact the firm's sustainability orientation.

**Incentives**

It has been argued that capable organizational leadership can only occur when employees are motivated and involved in integrating, coordinating, and operationalizing changes in the different areas of value-creation (Galpin et al., 2015). Such capabilities may be necessary at different levels, but they have the potential to create an environment for innovation and dynamism, such incentives need to be coordinated and integrated with project goals. Thus, incentivizing employees demonstrates a desire by a firm to stimulate and give back to employees in order to improve firm performance.

However, as noted by Thomé, Scavarda, Ceryno, and Remmen (2016), achieving sustainability objectives in NPD can be uniquely challenging. The authors note that sustainability objectives can be fuzzy and naturally difficult to define. Furthermore, moving to a sustainability orientation may require employees to change their regular work processes, thus resulting in potential pushback from employees (Daly & Geyer, 1994). Prior literature has noted that employee incentives, both formal and informal, can be helpful in the face of organizational change (Kaplan & Henderson, 2005). Galpin et al. (2015) noted that employee incentives, such as pay, empowerment, and skill development can increase the likelihood of establishing a workplace that values sustainability. In addition, given the nature of sustainability, intangible incentives - such as recognition for service to the community- may have an important role in motivating employees. In sum, incentives are crucial to harness employee actions to sustainability goals, particularly where such incentives form a broad range that can directly benefit a variety of stakeholders. Thus, we hypothesize:

**Hypothesis 3.** Incentives for NPD teams will positively impact the firm's sustainability orientation.

**Innovation Culture**

We next contend that firm innovation, described as "from doing things differently to doing entirely different things" (Kruschwitz, 2013, p. 1), also impacts a firm's culture and sustainability orientation. A firm with an innovation culture creates an environment in which individuals and teams can pursue risky or uncertain projects supported by the overall organizational culture (Hurley & Hult, 1998; Stock & Zacharias, 2011). Extant research has identified a broad set of antecedents of innovativeness, with the assumption that maximizing as many of them as possible leads to an innovative capability for sustained innovativeness. Given organizational constraints, firms would need to identify and combine those factors that could positive-

ly drive innovativeness in their firms (Stock & Zacharias, 2011). Such elements as vision and strategy to harness the competency base and an organizational innovation culture leads to innovation outcomes and efficient business performance (Lawson & Samson, 2001). Organizations possessing this innovation capability have the ability to integrate key capabilities and resources of their firm to successfully stimulate innovation.

For innovation to become embedded into firm culture, it must have a variety of facets. Managers are involved with the process, providing encouragement across a firm's functional boundaries in the pursuit of innovation, and enabling a learning atmosphere through failure and conflict. Such an environment leads to a higher frequency of interactions, higher amounts of shared information, and higher likelihood of shared goals, naturally building social cohesion as a by-product of the process (Naveh & Erez, 2004). Dunphy et al. (2003) noted that firms must be flexible in both their services and their business models in order to encourage the development of innovative products. These truly innovative firms must be willing to overlook traditional success metrics in the short-term in order to achieve long-term innovative success. Further, Berger et al. (2007) argues that firms lacking the necessary flexibility to encourage innovation are also unlikely to embrace sustainability initiatives unless they help to meet short-term, bottom-line success metrics. Likewise, Linnenluecke and Griffiths (2010) note the link between firms that pursue innovative initiatives have a greater likelihood of embracing sustainable initiatives. Hence, we argue that sustainability orientation results when stakeholder perspective integrates their concerns within sustainability goals. Thus, we hypothesize:

**Hypothesis 4.** An innovative culture will positively impact the firm's sustainability orientation.

**Patents**

Innovation that is effective needs barriers for protection, such as patents. As Bhattacharya and Pollman (2017) point out, for sustainability to be an integral part of business strategy and not just a cost-cutting exercise, the case for sustainable innovation needs to be made. Further, companies such as Unilever encourage managers to look at consumers' environmental and social needs during product development. For example, when developing products for markets that tend to be water-stressed, managers not only worry about reducing water footprint in their own manufacturing but also think about ways to reduce water usage at the consumer end (Bhattacharya & Pollman, 2017). These innovative approaches necessitate practical outcomes, therefore combining innovation with patents.

As previously mentioned, a firm's strategic decisions can impact their subsequent level of sustainability orientation (Sharma& Vredenburg, 1998), specifically, a firm's focus on patents, the incentives offered to NPD team members, and project leadership practices. Acquiring patents is an important goal for most product developers as patents provide a firm with a competitive advantage, protection from imitators, and a legal asset that can influence product performance (Meso & Smith, 2000). This aligns with the RBV, which contends that firms can realize success in the market by taking advantage of their unique assets, such as patents (Barney, 1986; Henard & McFadyen, 2012). A sustainability orientation that presents an organizational learning environment has the potential to be deemed a beneficial asset under the RBV (Hart, 1997; Surroca, Tribo, & Waddock, 2010). Specifically, dynamic innovation and the learning that accompanies it (Olmo-García, Crecente-Romero, & Val-Núñez. 2019) presents opportunities for firms to focus on obtaining patents aiming to acquire beneficial, unique assets. Furthermore, focusing on sustainability may provide new avenues for firms to innovate, thereby creating more opportunities to obtain patents. Therefore, we argue there is a link between a focus on obtaining patents and developing a sustainability orientation. Thus, we hypothesize:

**Hypothesis 5.** A firm's focus on patents will positively impact the firm's sustainability orientation.

**Sustainability-Orientation and NPD Performance**

Embracing sustainability can be viewed as the result of both a firm's culture and their strategic management decisions. A sustainability orientation occurs when a firm already has an innovative, outward-looking culture (Linnenluecke & Griffiths, 2010), consciously integrates sustainability goals into their strategies, reinforces and rewards employees, and demonstrates the connection to firm performance (Galpin et al., 2015). Prior researchers have viewed sustainability orientation as an offshoot of firm innovativeness and market orientation, where the firm is motivated to continuously search for unique and novel ways in which to meet and exceed customer needs (Han, Kim, & Srivastava, 1998; Hurley & Hult, 1998). This drive to innovate for the end consumer necessitates that the firm embraces organi-

zational learning and develops strong social relationships from new product performance (Hynds et al., 2014; Sen, Bhattacharya, & Korschun, 2006).

The dual organizational leadership and culture framework presents an environment for cohesive response to the changing environment with greater sustainability emphasis, for example, between different elements of sustainability such as environmental and social, as well as between partners, suppliers and the firm. In such an environment, social cohesion is higher as individuals and teams operate in a climate where taking calculated risks is desired rather than punished, where organizational goals are more likely to be aligned, and where free exchange of ideas and knowledge is encouraged rather than silenced (Hurley & Hult, 1998; Shaner et al., 2016). Consistent with Galpin et al. (2015) and Shaner et al. (2016), cohesion between organizational leadership and culture could help form a sustainability orientation in such a manner that motivates positive actions. In the case of new product development, employees may be less likely to build sustainability orientation unless there are appropriate ways by which risks are addressed and the incentives seem likely to be attained. For firms focused on sustainability-based outcomes, the positive and significant effects of innovation culture on sustainability orientation and the positive and significant effects of sustainability orientation on value creation leads to market share from new product performance as they address concerns more important to some customers (Luo & Bhattacharya, 2006.)

Given the strong indicators that consumer interest in sustainable products has increased in recent years (Kiron et al., 2012), stakeholder- and sustainability-oriented marketing that also integrates the fiduciary responsibilities to the shareholder may not only be increasingly necessary, but also presents new opportunities for the product developer. Therefore, we complete our proposed model by analyzing the impact of a sustainability orientation onto new product market performance. Like market orientation, sustainability orientation has a positive impact on new product performance as it encourages organizational learning and an organization-wide emphasis on searching for the best solution (Han et al., 1998; Hurley & Hult, 1998). Furthermore, firms that embrace a sustainability orientation tend to have stronger external partnerships (Du et al., 2011; Sen et al., 2006). These external relationships work as an asset, benefitting the development firm by enabling them to better identify and solve customer needs and work with strategic partners. In fact, a sustainability orientation has a better chance of surviving and thriving within a firm if a connection to firm performance is clear (Galpin et al., 2015). Thus, we build off of prior literature and hypothesize a relationship between sustainability orientation and new product market performance.

**Hypothesis 6.** Sustainability orientation will positively impact market performance.

## Method

### Data

The data utilized for this study comes from the 2012 Product Development Management Association (PDMA) Comparative Performance Assessment Study (CPAS). There are 453 business units of PDMA members and non-members that participated in the study across 24 countries. One hundred ninety-seven usable responses come from North America, 149 from Asia, 61 from Europe, and 44 from "others". Firms in 31 industry categories participated in the study that are grouped into meta-categories (e.g. health care) and there was a similar distribution between large firms and SMEs (47.7% vs. 52.3% respectively). The data has been utilized in previous research studies and provided a strong basis for NPD research (Lee & Markham, 2016; Markham & Lee, 2013, 2016). After careful inspection of the data, several cases had missing data for the variables of interest in this study. A Little's Missing Completely at Random (MCAR) test was run and the results of the test suggest that the missing cases are random and therefore deleted from the study. After deletion of the cases, the sample size used in this study is 349 product developers.

### Dependent Variables

**Sustainability orientation**. This was measured using a 10-item scale established by Du et al. (2016). Prior research has noted the importance of capturing both the stated importance of overall firm sustainability goals as well as capturing the actions firms have actually undertaken to encourage and measure sustainability (Hart, 1997; Waddock, 2008). Thus, these items capture various aspects of a firm's integration of sustainability criteria into general management as well as activities specific to the NPD process.

**Market performance.** This was measured using a 2-item scale capturing the outcomes of new product performance: (1) Our new product program meets the performance objectives set out for it and (2) Overall, our new product program is a success.

**Independent Variables**

**Geocentricity**. This was measured as the number of countries the focal firm operates in.

**Innovative culture of the firm**. This was measured on a six-item scale that assesses the internal environment of the firm in regard to innovation focus, objectives, and accepting failure in NPD.

**Focus on patents**. This was measured on a two-item scale that assesses the focal firm's focus on generating patents and effectiveness of patents.

**NPD team incentives**. This was measured on an eight-item scale that assesses the incentives and rewards provided to NPD teams for radical innovations, more innovative projects, and incremental innovations.

**Project leadership practices**. This is assessed using a three-item scale measuring the duties and focus of leadership on NPD projects.

**Control Variables**

Needless to say, to make the inferences claimed in this study, we sought to control for additional variables that may explain variance in our dependent variables. As such, we controlled for IT capabilities, firm size 1 using approximate annual sales, and firm size 2 using approximate number of employees. These control variables were selected based on similar, prior literature, and the availability of completed responses (Du et al., 2016; Shaner et al., 2016). The correlations and descriptive statistics of the study can be found in Table 1. The list of variables and the scales utilized for this study can be found in Table 2.

**Validity, Reliability, and Common Method Variance**

A confirmatory factor analysis was run via AMOS 22.0 to confirm the validity and reliability of the data and the measures used. The results of this analysis can be seen in Table 2. Model fit metrics all met appropriate levels. In support of convergence validity and reliability, the construct reliability (CR) exceeded appropriate thresholds for all items, average variance extracted (AVE) exceeded 0.50, and factor loadings all above acceptable thresholds. Inter-item correlations are higher within factors, thus satisfying criteria for discriminant validity. Furthermore, the AVE values are all higher than the shared variance values (squared correlations) between constructs, thus supporting discriminant validity between constructs (Fornell & Larcker, 1981). To assess common method variance, two methods were utilized. First, we employed the Harmon One-Factor method and found the first factor to account for approximately 27.35% of the variance, well below the suggested 0.50. Second, we assessed a common latent factor in the SEM process and did not find any items that were impacted beyond appropriate levels for common method variance. As such, it is not a concern in this study.

The results are consistent with the hypothesis and suggest that adapting these leadership and organizational

Table 1
*Descriptive statistics and correlations*

| | Mean | St. Dev. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Performance | 4.48 | 1.51 | | | | | | | | | |
| Sustainability Orientation | 2.68 | 1.11 | .026 | | | | | | | | |
| Geocentricity | 31.64 | 46.54 | -0.06 | 0.26 | | | | | | | |
| Innovative Culture | 2.79 | 0.09 | 0.30 | 0.43 | -0.00 | | | | | | |
| Patent Focus | 2.19 | 1.29 | 0.24 | 0.34 | 0.09 | 0.27 | | | | | |
| NPD Team Incentives | 2.18 | 0.78 | 0.14 | 0.41 | 0.22 | 0.23 | 0.26 | | | | |
| Project Leadership Practices | 2.25 | 0.92 | 0.26 | 0.26 | -0.01 | 0.13 | 0.23 | 0.26 | | | |
| IT Capabilities | 2.98 | 1.23 | -0.10 | -0.09 | -0.03 | -0.06 | -0.23 | -0.25 | -0.20 | | |
| Sales* | 6712.32 | 36797.16 | 0.08 | 0.10 | 0.09 | 0.02 | 0.05 | 0.02 | 0.02 | -0.10 | |
| Employees | 3552.40 | 3517.86 | 0.06 | 0.04 | 0.01 | -0.02 | 0.01 | -0.02 | -0.02 | -0.13 | 0.90 |

All correlations with absolute value above 0.13 significant at $p < .05$
*In thousands

Table 2
*Reliability and validity*

| Construct and Items | Factor Loadings | AVE | MSV | CR |
|---|---|---|---|---|
| **Market Performance (Likert 1-7 scale, 1=disagree, 7=agree)** | | 0.59 | 0.30 | 0.74 |
| 1. Our new product program meets the performance objectives set out for it. | 0.86 | | | |
| 2. Overall, our new product program is a success. | 0.70 | | | |
| **Sustainability Orientation (Likert 1-5 scale, 1=not at all, 5=extremely)** | | 0.65 | 0.30 | 0.95 |
| How important are the following to your company? | | | | |
| 1. Environmental sustainability | 0.81 | | | |
| 2. Social sustainability | 0.79 | | | |
| 3. Sustainability criteria for new product development | 0.88 | | | |
| 4. Measuring new product progress on sustainability | 0.90 | | | |
| 5. Future importance of sustainability-type criteria | 0.87 | | | |
| To what degree does your company do the following? | | | | |
| 6. Develop sustainability practices | 0.78 | | | |
| 7. Manage your product's carbon foot print | 0.74 | | | |
| 8. Use Triple Bottom Line for product planning | 0.73 | | | |
| 9. Include sustainability in your product development budget | 0.83 | | | |
| 10. Select suppliers and partners based on sustainability criteria | 0.76 | | | |
| **NPD Incentives (Likert 1-5 scale, 1=never, 5=virtually always)** | | 0.54 | 0.22 | 0.82 |
| How often are the following incentives and awards are provided to NPD teams? | | | | |
| 1. Project-based profit-sharing | 0.65 | | | |
| 2. Project-based stock or stock options | 0.77 | | | |
| 3. Compensation time | 0.80 | | | |
| 4. Recognition in organization newsletters | 0.70 | | | |
| 5. Recognition at award dinners* | | | | |
| 6. Plaques, pins, project photographs* | | | | |
| 7. Non-financial rewards chosen by team (e.g. trips)* | | | | |
| 8. The opportunity to work on a bigger project next | 0.77 | | | |
| **Innovative Culture (Likert 1-5 scale, 1=never, 5=virtually always)** | | 0.53 | 0.30 | 0.87 |
| How often does your organization reflect these values? | | | | |
| 1. Open to the constructive conflict that occurs within the innovation process | 0.70 | | | |
| 2. Failure is understood to be a natural part of the innovation process | 0.80 | | | |
| 3. Both innovation and risk taking are valued for career development | 0.76 | | | |
| 4. Recruitment parameters include consideration for innovation potential | 0.80 | | | |
| 5. Managers establish objectives in the areas of innovation including training, measures and results | 0.65 | | | |
| 6. These established objectives are used in the performance review process | 0.62 | | | |
| **Patent Focus (Likert 1-5 scale, 1=not at all important, 5=extremely important)** | | 0.68 | 0.26 | 0.86 |
| Which indicators are most important to your business unit to measure results from NPD efforts? | | | | |
| 1. Number of new patents generated | 0.84 | | | |
| 2. Focus on effective patents | 0.85 | | | |
| **Project Leadership Practices (Likert 1-5 scale, 1=never, 5=virtually always)** | | 0.52 | 0.15 | 0.76 |
| What percent of the time are the following project leadership practices used? | | | | |
| 1. A project leader who has many duties | 0.67 | | | |
| 2. A full time project leader borrowed from a full time position for a single project | 0.83 | | | |
| 3. A process owner serves as leader | 0.73 | | | |
| Model Fit | Chi-square = 1005.11; df = 335; $\chi 2/df = 3.00$; RMSEA = .07; SRMR = .05; CFI = .90; TLI = .90; IFI = .90 | | | |

Average variance extracted (AVE) score is calculated according to Fornell and Larcker (1981) and should be greater than .5.
$AVE = \Sigma(\lambda yi)2/[\Sigma(\lambda yi)2 + \Sigma Var(\varepsilon i)]$, where $\lambda$ is the loading of each item.

N=349 respondents.

df, degrees of freedom; RMSEA, root mean square error of approximation; SRMR, standardized root mean residual; CFI, comparative fit index; IFI, incremental fit index; NNFI, Tucker Lewis index

*Item deleted due to reliability concerns

resources in a sustainability oriented dynamic setting enables NPD project members to implement improved, holistic product development processes leading to more customer-focused products. Thus, the results extend the body of literature on factors impacting the centrality of sustainability orientation that leads to market performance of new products (Du et al. 2016; Hynds et al. 2014; Shaner et al. 2016, among others).

## Analysis and Results

This research involves studying associations among latent and directly observed constructs. As such, we utilized structural equation modeling (SEM) to test the hypotheses in AMOS 22.0. SEM allows the simultaneous estimation of both the measurement and structural models in order to test the hypotheses. A major advantage of SEM is the ability to incorporate confirmatory factor analysis with path analysis. The model showed good convergent validity, discriminant validity and reliability of the items as shown in Table 2.

Hypothesis 1 states that project leadership practices will positively impact the firm's sustainability orientation. The model results show that the relationship is indeed positive and significant ($\beta = 0.17$, $p < 0.01$). Hypothesis 2 suggests that a firm's geocentricity will positively impact the firm's sustainability orientation. The model indicated that the relationship is positive and significant, as expected ($\beta = 0.12$, $p < 0.01$). Hypothesis 3 claims that incentives for NPD teams will positively impact the firm's sustainability orientation. As our model results indicate, the relationship is positive and significant as predicted ($\beta = 0.21$, $p < 0.001$). Hypothesis 4 argues that an innovative culture will positively impact the firm's sustainability orientation; the model indicated that the relationship is positive and significant, as expected ($\beta = 0.37$, $p < 0.001$). Hypotheses 5 claims that a firm's focus on patents will positively impact the firm's sustainability orientation; the model indicated that the relationship is indeed positive and significant ($\beta = 0.10$, $p < 0.001$). Hypothesis 6 states that sustainability orientation positively impacts market performance. The model results show that the relationship is indeed positive and significant ($\beta = 0.55$, $p < 0.001$). The results of the analysis can be seen in Table 3.

Previous research has suggested that there may be country-level effects occurring for NPD. As such, we conducted a post hoc analysis to assess the impact of the region

Table 3
*Model results*

| | Sustainability | | | Market Performance | | |
|---|---|---|---|---|---|---|
| | B | *p*-value | Standard Error | B | *p*-value | Standard Error |
| Sustainability Orientation | | | | 0.55 | *** | 0.06 |
| Geocentricity | 0.12 | ** | 0.01 | | | |
| Innovative Culture | 0.37 | *** | 0.07 | | | |
| Patent Focus | 0.10 | *** | 0.13 | | | |
| NPD Team Incentives | 0.21 | *** | 0.06 | | | |
| Project Leadership Practices | 0.17 | ** | 0.05 | | | |
| IT Capabilities | -0.08 | NS | 0.03 | 0.07 | *** | 0.07 |
| Sales[a] | 0.31 | *** | 0.04 | 0.79 | *** | 0.04 |
| Employees | -0.21 | *** | 0.04 | -0.71 | *** | 0.04 |

$^{\dagger}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < .001$
NS = not significant

that the firm is headquartered in plays a role in sustainability orientation and market performance. While the results suggest that all regions do have a significant impact on the dependent variables in the study, the significance and sign of the coefficients of the main independent variables remain the same. The results of the region analysis show that the North and South America regions have a negative impact on sustainability orientation whereas the other regions in consideration have a positive impact. Additionally, North America was the only region to show a positive impact on performance.

## Theoretical Implications

This paper highlights the role of cohesive organizational leadership combined with firm culture characteristics in creating a sustainability-oriented environment that encourages successful new product development. The integration of stakeholder relationships with firm resources involves the recognition of the need for understanding implications of strategy in a dynamic environment where resource usage is aligned with the changing nature of the external environment (Eisenhardt & Martin 2000; Strønen, Hoholm, Kværner, & Støme, 2017). Sustainability orientation, increasingly accepted in corporate communities, becomes embedded within corporate planning and outcomes through an innovative focus, strong NPD leadership, incentives, focus on patents, and geocentricity. The nature of such organizational characteristics was to broaden, expand and widen the approach to firm governance, perhaps by exploring innovative manners of developing products or new global options, as opposed to a more parochial approach. Leadership, for example, expanded to multiple tasks, with incentives to include an array of options that allowed a range of risk-taking opportunities and incentivized different strengths and personalities. Further, the resulting innovation and focus on generating new patents leads to a sustainability orientation that results in a focused approach to product development and market performance. These findings demonstrate that short-term motives, such as incentives and a focus on patents can be positively aligned with a long-term, sustainability orientation, thereby overcoming the "fuzzy" nature of promoting a sustainability orientation amongst employees (Thomé et al., 2016).

Perhaps not surprisingly, having an innovative culture appears to have the strongest influence on the development of a sustainability orientation, which aligns well with prior findings (Nidumolu et al., 2009). However, the development of a sustainability orientation is vastly improved when a firm is able to combine a variety of factors, including a focus on innovation, strong leadership, and an outward looking approach through geocentricity. Importantly, our findings support the contention that sustainability orientation is an offshoot of an innovative culture and thus leads to improved market performance of new products (Han, Kim, & Srivastava, 1998; Hurley & Hult, 1998). This is critical as it demonstrates that sustainability goals and initiatives are more than simply altruistic efforts as has been cited in prior literature (Bettiga, Lamberti, & Noci, 2018). Thus, the paper enables a better understanding of what leads firms to become more sustainable and provides further support of how sustainability impacts market performance.

Overall, the paper extends the sustainability research, expanding our understanding of sustainability orientation and its integration into strategy. As previously noted, sustainability orientation requires long-term commitment and buy-in from employees; in essence, sustainability orientation should be viewed as firm resource that requires nurturing (Berger et al., 2007; Dunphy et al., 2003). Interestingly, short-term goals and incentives can be utilized in concert with a shift in culture to encourage the development of the sustainability resource.

## Practical Implications

For practitioners, this study highlights the need for firms to build an innovative, outward-looking culture while also making the correct strategic decisions in regard to seeking patents, offering employee incentives, and project leadership. While factors such as firm size and IT capabilities do not impact sustainability, firms that are operating in more countries and embrace innovation are more likely to embrace sustainability. Thus, smaller and less technologically advanced firms can successfully embrace a sustainability orientation that benefits their market performance. Instead, we recommend the following: firms should focus their new product efforts on obtaining new patents; they should look for opportunities to enter new international markets when those opportunities align with their organizational strategy, and they should offer incentives to NPD employees, such as project-based profit sharing and compensation time. Leadership within NPD also plays an important role. We recommend that firms dedicate a full time project for new product initiatives, which may mean pulling that leader from their regular roles. Furthermore, that leader should encourage a culture in which risks are encouraged, educational opportunities exist, and failure is not punished. A sustainability orientation may not naturally occur on its own, even for in-

novative, international firms. As sustainability requires employee buy-in and learning, these firms must be proactive in their strategic decisions.

Our study connects sustainability orientation to the performance of a firm's new product program. For example, a product development firm should feel comfortable that their efforts to manage the carbon foot print of their new products will be well received by customers and play a role in increased sales. As such, we recommend that product development firms not only embrace sustainability, but also include their sustainability initiatives in their advertising and promotions. We believe this recommendation especially carries weight as it connects academic research to recent popular press articles (Houlihan & Harvey, 2018). Managers should consider this study as another piece of evidence that taking a holistic, sustainable approach can actually lead to increased product performance.

Overall, we contend that corporations must make a concerted effort to develop sustainability capabilities in their regular goals and objectives to realize the benefits towards market performance. Our findings have implications for how firms promote leadership development through incentives that encourage innovation and risk-taking and forms a strong basis to address challenges in the growing area of sustainability. Importantly, we demonstrate that relatively short-term, incentive driven initiatives can be linked to longer-term, sustainability orientation. Thus, long-term, sustainability goals and short-term, performance goals do not need to be considered mutually exclusive; in this study, we argue that they can be complementary. From the practitioner perspective, this study highlights the fact that intervention strategies have benefits in relation to sustainability that could lead to long-term benefits for firms, but are contingent on the capabilities of leadership and innovation culture development.

## Limitations and Future Research

Limitations of the study are as follows. First, due to the length of the survey, fatigue may have set in for respondents. PDMA reduced the total surveys based on noticeable responses that were affected. This was also reduced by allowing respondents to log in and out of the survey without losing data. However, we had to reduce our sample size due to this issue. Furthermore, we did not have the ability to include some desired control variables due to incomplete responses, as noted in our methods section. Second, a single respondent from each business unit was used. This could affect accuracy. In 32 cases there were multiple responses from one business unit and a difference test concluded no issues. Third, it is likely that sustainability orientation and performance could both be driven by variables we had not considered in this study. The data set utilized in this study allowed us unique access to a diverse set of product developers, yet limited our ability to gather all potentially relevant data. Thus, we view this study as an extension to existing literature and as such, we believe this basic framework could be built upon in future studies. Additionally, not all variables were measured using multi-item scales. For example, geocentricity was measured on a single item. This construct is likely to contain more dimensions that could be analyzed in more depth.

Moving forward, we believe there are a few directions respondents could take in this line of literature. First, we believe national culture and political standards have an impact on a firm's likelihood of developing a sustainability orientation. As such, researchers should consider this model within the context of national culture (e.g. collectivist vs. individualist) and political structure (e.g. more vs. less democratic). We also believe that certain leadership practices could actually harm a firm's likelihood of moving towards a sustainable model. This data set consisted entirely of product developers, a group that is inherently innovative and forward thinking. However, respondents who are less forward thinking (e.g. focused on efficiency) may have a different impact on the development of a sustainable orientation. Thus, an interesting area of research would be to investigate how different leadership styles impact this model. Another possible shortcoming of the paper is that we do not measure the motivations of manager's as to why they seek to engage in sustainability. In addition, the hierarchy levels of reward systems (i.e. incentives) is not measured. Different hierarchy levels may receive different rewards to engage in sustainable behavior. In sum, we hope this study advances the literature on sustainability orientation with the NPD context.

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