HARVARD | BUSINESS | SCHOOL

Corporate Sustainability: A Strategy?

Ioannis Ioannou
George Serafeim

Working Paper 19-065

Corporate Sustainability: A Strategy?

Ioannis Ioannou
London Business School

George Serafeim
Harvard Business School

Working Paper 19-065

Funding for this research was provided in part by Harvard Business School.

Corporate Sustainability: A Strategy?

Ioannis Ioannou and George Serafeim[*]

First Draft: October 29th, 2018

This Draft: April 20th, 2021

Abstract: We explore the conditions under which firms maintain their competitive advantage through sustainability-based differentiation when faced with imitation pressures by industry peers. We document growing intraindustry convergence on sustainability actions over time for almost all industries in our sample and show that interindustry heterogeneity in the rates of intraindustry convergence is associated with (a) the importance of environmental and social issues relative to governance issues, and (b) the tone and volume of feedback received from stakeholders. Further, we find that actions characterized by low regulatory uncertainty are more likely to be imitated whereas those characterized by high novelty are less likely to be imitated. We then distinguish between *common* (i.e., imitated) and *unique* sustainability actions and evidence that the adoption of *unique* actions is significantly and positively associated with multiple measures of performance, whereas the adoption of *common* actions is not. Overall, we explore the role of sustainability as a long-term strategy under conditions of strong imitative forces, contributing to both the sustainability and the imitation literatures.

Keywords: sustainability, corporate social responsibility, strategy, differentiation, imitation, common actions, unique actions, industry convergence

[*] Ioannis Ioannou is an Associate Professor of Strategy and Entrepreneurship at London Business School. George Serafeim is a Professor of Business Administration at Harvard Business School. George Serafeim is grateful for financial support from the Division of Faculty and Research Development at Harvard Business School. Contact details for Ioannis Ioannou: London Business School, Sussex Place, Regent’s Park, London, NW1 4SA, United Kingdom, Tel: +44 (0) 20 7000 8748, e-mail: iioannou@london.edu. Contact details for George Serafeim: Harvard Business School, 381 Morgan Hall, Boston, MA, 02163, United States, Tel: +1 (617) 495 6548, e-mail: gserafeim@hbs.edu.

1 INTRODUCTION

Sustainability is becoming a central issue for the practice of strategic management globally (Ioannou & Hawn, 2019).[1] A growing number of companies voluntarily undertake a wide range of sustainability actions[2] to address growing stakeholder expectations across the environmental, social, and governance (ESG) domains and to build a differentiation advantage by integrating sustainability into their strategy, and their organizational processes and structures (Eccles, Ioannou, & Serafeim, 2014; Khan, Serafeim, & Yoon, 2016). How sustainable could such an advantage be though over the long(er) term, given that profitable strategies are more likely to attract the attention of industry peers and to be imitated (e.g., Barney, 1991; Schmalensee, 1985) and that, if successful, the wider diffusion of these strategies will erode the profits of firms that are being imitated (Posen, Lee, & Yi, 2013)?

The literature finds that value creation can materialize through a number of channels associated with sustainability-based differentiation including superior access to finance (e.g., Cheng, Ioannou, & Serafeim, 2014; Ioannou & Serafeim, 2015), more and better innovation outcomes (e.g., Flammer & Kacperczyk, 2016), enhanced access to human capital and employee engagement (e.g., Dutton, Dukerich, & Harquail, 1994; Edmans, 2011; Flammer & Luo, 2017), improved reputation and increased sales (e.g., Luo & Bhattacharya, 2006; Du, Bhattacharya, & Sen, 2011), favorable access to international markets (Hawn, 2020), enhanced employee and customer satisfaction resulting from an improved environmental footprint (e.g., Bansal & Roth, 2000; Delmas & Pekovic, 2013; Hart, 1995; Russo & Fouts,

[1] Indicatively, we note that 93% of the largest 250 companies in the world issue a corporate sustainability report, and that, even more crucially, 78% already include and/or integrate sustainability information in their annual financial reports (KPMG, 2017), which implies that financial and ESG considerations are seen as the two sides of the same (strategic) coin.

[2] For the purposes of this study, we define sustainability actions as the set of actions that a company undertakes, in the form of adoption of policies, practices, management, and governance systems or investments, with the aim of improving its environmental, social, and governance performance.

1997), and the pre-emption of regulatory intervention (e.g., Baron, 2001; Maxwell, Lyon, & Hackett, 2000).

Even though this large body of work provides evidence that companies can establish a competitive advantage through sustainability, the literature has not yet sufficiently explored the conditions under which companies are able to *maintain* such an advantage, especially when faced with imitation pressures. Moreover, we still lack an understanding of which actions are more likely to diffuse via imitation, and why, and which are more likely to remain unique and therefore, potentially valuable in the long term. From a strategic management point of view, addressing this gap is important because it would allow us to better understand heterogeneity across and within industries in terms of how companies decide which sustainability actions to pursue, and would also allow us to develop a more nuanced understanding of potentially persistent performance heterogeneity across firms associated with a commitment to sustainability.

Anecdotal evidence suggests that sustainability actions may merely become a cost of doing business because of imitation. For example, adopting a carbon emissions reduction target of 20% in the early 2000s could have resulted in a differentiation advantage (e.g., due to better environmental management); yet, by 2021 such targets have become commonplace, even in hard to decarbonize industries like the oil and gas industry.[3] This could arguably be why in an attempt to differentiate themselves, companies like Microsoft have more recently moved beyond net-zero commitments and instead, committed to being carbon *negative* by 2030.[4]

Currently, there are two useful approaches for understanding the adoption of sustainability actions. On the one hand, one could argue that sustainability is rapidly

---

[3] See BP's recent announcement here: https://www.bloomberg.com/news/articles/2020-02-12/new-bp-ceo-sets-out-plan-to-eliminate-its-co2-emissions-by-2050?sref=hZPO2dEb (accessed September 10, 2020).
[4] See Microsoft's announcement here: https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/ (accessed September 10, 2020).

becoming a “common practice,” i.e., a necessary cost of doing business, yet it remains insufficient for strategic differentiation. For example, in some industries, the adoption of eco-efficiency systems such as an energy or a waste management system is necessary for reducing costs and achieving cost parity with industry peers who may have already adopted them. In fact, the literature finds that when an imitator copies a firm’s actions, these actions make the imitator and the firm more similar, and, as a result, their profitability is likely to converge (Posen & Martignoni, 2018), unless market leaders establish effective isolating mechanisms that undermine imitation (e.g., Lippman & Rumelt, 1982; Posen et al., 2013; Reed & DeFillippi, 1990).

On the other hand, companies may commit to sustainability to exploit a valuable but unexploited or underexploited industry position (i.e., by addressing stakeholder needs in a superior or unique manner). For example, companies that adopt innovative circular-economy business models or that embrace a unique corporate purpose that enhances employee recruitment, engagement, and retention (Gartenberg, Prat, & Serafeim, 2019) are arguably adopting a unique and difficult-to-imitate strategy that is “rooted in systems of activities that are much more difficult to match” (Porter, 1996, p. 64). If successful, these efforts could even result in persistently superior performance given that a successful differentiation strategy could remain unmatched even when it is open to public scrutiny, and it can be slow to diffuse even when it leads to superior profits (Porter, 1991; Rivkin, 2000).

Sustainability, we suggest, is a unique context in which to study the dynamics of imitation and the apparent tension between the two approaches. Sustainability conceptually encapsulates a wide range of actions across the environmental, social, and governance domains, generating high levels of variation across industries given that the same action may be associated with differentiation advantage in some industries but not others. Accordingly, there are valid reasons to expect that the rate of imitation will likely differ across industries due to important differences in industries' structural and competitive features (e.g., Romeo, 1975). Furthermore, variation in the characteristics of sustainability actions themselves is likely to determine how easy or how difficult they are to be imitated, especially when such actions turn out to also be valuable.

In this study, we use data from MSCI ESG Ratings, the largest provider of ESG data globally, and find that for most industries, intraindustry convergence increases over time, implying that, on average, companies are undertaking an increasingly similar set of sustainability actions during the sample period. Moreover, we find that interindustry variation in the rate of convergence is significantly associated with (a) the relative importance of environmental and social issues relative to governance issues and (b) the level of stakeholder scrutiny that the industry is facing, as measured by the tone and volume of media coverage. Because of the granular nature of the MSCI ESG dataset, we also show that sustainability practices are more likely to be imitated under conditions of low regulatory uncertainty, i.e., when policies and regulations are identified as the main drivers of the focal action. And we find that actions with a high degree of novelty are less likely to be imitated, because they require superior firm capabilities in the use of novel knowledge and technologies.

Within industries, we identify the set of sustainability actions that have been imitated over the sample period—which we term "common practices"—and those that have not—which we term "unique practices." Unique actions, we argue, are not necessarily valuable; it could be that managers are making an error in diverging from common industry practices. Our findings show though that unique sustainability actions are significantly and positively associated with both accounting measures of performance and market valuations, even after controlling for past performance. Consequently, our work provides evidence that unique sustainability actions become and remain strategic even when companies are faced with strong imitation pressures. In contrast, common sustainability actions are not significantly associated with any measures of performance.

We make three novel contributions to the literature. First, to the best of our knowledge, ours is the first study to adopt a dynamic approach towards understanding how companies make strategic choices in the sustainability context to maintain a differentiation advantage when faced with imitation pressures. We offer empirical evidence characterizing the convergence of sustainability actions within industries, the factors associated with interindustry variation in the convergence rates, and the characteristics of actions associated with the rate of imitation. We therefore contribute to the voluminous literature that explores the link between sustainability and financial performance (see Aguinis and Glavas, 2012 for a review). Second, we contribute to the stream of work that distinguishes between different types of sustainability actions (e.g., Hawn & Ioannou, 2016; Durand, Hawn, & Ioannou, 2019) by not only proposing a new typology that links the dynamics of imitation with firm-level decision-making but also, by identifying action-level characteristics that explain why some actions are more likely to remain hard to imitate and thus, potentially valuable, forming the basis of a competitive advantage in the long-run.

Third, although several studies have explored the dynamics of imitation within a particular industry, we make a novel contribution to the imitation literature by exploring the factors that affect heterogeneity in the rate of imitation *across* industries, an issue that has not been sufficiently explored to date. We also contribute to this literature by identifying action-level characteristics associated with the rate of imitation. We are able to do so precisely because the sustainability context enables us to explore an entire set of corporate actions that, in recent years, is strategically relevant for all industries globally (Ioannou & Hawn, 2019).

2 DATA AND SAMPLE CONSTRUCTION

We obtain data on sustainability actions from MSCI ESG Ratings as a proxy for the capital market's view on sustainability, given that these ratings are the ones most widely used by the investment community.[5] Of the 50 largest asset managers in the world ranked by assets under management, 46 are clients of MSCI ESG ratings according to MSCI, with the total number of clients reaching more than 1,200 investment firms globally. MSCI defines the purpose of their ratings as "to help investors to understand ESG risks and opportunities and integrate these factors into their portfolio construction and management process." MSCI's coverage universe is based on major MSCI indices (e.g., MSCI World Index, MSCI Emerging Markets Index, MSCI country-specific Investible Market Indices) that include the world's largest and most liquid stocks.

MSCI ESG ratings are based on 37 "Key Issues," each of which corresponds to one of 10 macro themes that MSCI identifies as being of concern to investors: climate change, natural capital, pollution and waste, environmental opportunities, human capital, product liability, stakeholder opposition, social opportunities, corporate governance, and corporate behavior. Key issues are annually selected for each of the 156 GICS subindustries and weighted according to MSCI's materiality mapping framework. Each Key Issue score consists of a risk exposure component—a company's exposure to a Key Issue—and a risk management component—a company's management and undertaking of actions related to each material issue. For a given Key Issue score, the required risk management component score is conditional on the risk exposure faced by the company; that is, a company with a greater risk exposure to an issue would be required to have stronger risk management practices in place. Conversely, a company with minimal actions on a low exposure risk issue

[5] The full methodology for MSCI ESG ratings is here: https://www.msci.com/documents/10199/123a2b2b-1395-4aa2-a121-ea14de6d708a (last accessed April 12, 2021).

would not be penalized. For Key Issues that measure opportunity (e.g., Opportunities in Green Building, Opportunities in Renewable Energy, Opportunities in Nutrition and Health, Access to Health Care), the exposure signifies the relevance of this opportunity to the company based on its current business model and geographic segments.

MSCI measures a company's risk and opportunity exposure by combining information about company-specific actions with Key Issue–relevant macro-level data related to a company's geographies of operations and business segments. Company operations data are sourced from corporate reporting, such as annual reports, investor presentations, and financial and regulatory filings, and macro-level data are sourced from a wide variety of academic, government, and NGO databases. Similarly, risk- and opportunity-management-related data come from corporate documents, government data, news media, relevant organizations and professionals, and an assortment of popular, trade, and academic journals. As part of their data verification process, MSCI communicates with companies directly and invites them to participate in a data review process, which includes commenting on the accuracy of company data for all MSCI ESG Research reports. MSCI aggregates corporate actions to an overall score (*Susty*) whereby each Key Issue is weighted according to its assessed materiality for each industry. The score ranges from 0 to 10, with 0 (10) being the worst (best) possible performance.

Because we are interested in understanding how the adoption of sustainability actions evolves over time, we first restrict our sample to companies that appear in the MSCI dataset consistently across all years[6] and obtain a final sample comprising 2,095 firms for the period 2012–2019. We choose 2012 as the starting period of our sample for multiple reasons. First,

[6] We use a firm's ISIN as the indicator to track presence over time. If a firm's ISIN changes over time, then we drop that firm from the sample even though it is covered by MSCI. However, in most cases these are firms that have undergone significant corporate restructuring, such as a merger, and therefore their sustainability actions might be changing because of that restructuring. Therefore, we would drop these firms from the sample either way, as the change in sustainability actions might be driven by changes in their business operations, industrial membership, and so on.

to avoid any influence from entry and exit of firms on the convergence measures, we require them to appear consistently over the years covered in our sample. Starting in 2012, MSCI coverage includes more than 6,000 companies; yet, for 2011, the database covers only about 1,200 firms, while for earlier years the coverage is merely 1,000 firms. Hence, imposing the requirement of a stable sample of firms while including years before 2012 would have left us with a very limited sample of about 200 to 300 firms. Nevertheless, we also report results using an unbalanced panel of firms and expand our sample to cover the period 2006–2019.[7]

3 INTRAINDUSTRY CONVERGENCE OF SUSTAINABILITY ACTIONS

Imitation is a central concept in strategic management (e.g., Casadesus-Masanell & Zhu, 2013; Csaszar & Siggelkow, 2010; Ethiraj & Zhu, 2008; Nelson & Winter, 1982; Rivkin, 2000). A number of theoretical traditions have suggested different processes to describe what underpins imitation, including observational learning (Banerjee, 1992; Bikhchandani, Hirshleifer, & Welch, 1992) and mimetic isomorphism (DiMaggio & Powell, 1983). Indeed, companies imitate the practices of others within the same social reference group,[8] including social responsibility practices (e.g., Briscoe & Safford, 2008).

In this study, we predict a high degree of imitation of sustainability actions over time and, hence, an increase in intraindustry convergence, for several reasons. First, existing work finds that suppliers, customers, alliance partners, and the public collectively exert pressures on companies to undertake more sustainability-oriented actions (e.g., Durand et al., 2019; Husted, Jamali, & Saffar, 2016). Relatedly, a recent stream of research has produced evidence for the “business case for sustainability” (e.g., Eccles et al., 2014; Flammer, 2015), while other studies have shown that, at the very least, sustainability actions can mitigate risk

[7] We note that for the financial performance analysis, including years before 2012 is not possible because 2012 is the earliest year for which MSCI provides historical data at the action level, which is required for the construction of our key independent variables. Before 2012, MSCI provides historical data for an overall ESG score and for separate environmental, social, and governance scores.
[8] For a comprehensive review, see Lieberman and Asaba (2006).

by acting as an insurance-like protection for the relationship-based intangible assets of a company (Godfrey, 2005; Ioannou & Serafeim, 2015). As a result, we argue that companies are more likely to imitate peers' sustainability actions because they perceive them to be performance enhancing.

This argument is consistent with the information economics literature (e.g., Banerjee, 1992) that conceptualizes imitation as herding resulting from observational learning, which in turn is defined as "the influence resulting from rational processing of information gained by observing others" (Bikhchandani et al., 1998, p. 153). Imitation occurs because economic actors place more weight on the information that others (e.g., industry peers) have gathered and subsequently revealed through the actions they chose to undertake. To the extent that industry peers are perceived to have better information (e.g., as revealed through superior performance), companies will opt to imitate them rather than make their choices based exclusively on their own, limited information (Gaba & Terlaak, 2013; Wu & Salomon, 2016).

Relatedly, institutional theorists define imitation as the outcome of a process through which companies seek to acquire legitimacy by conforming to regulative, normative, and cultural-cognitive pressures (i.e., isomorphism; Meyer & Rowan, 1977; Oliver, 1991, 1997). The main idea here is that companies face coercive, normative, and mimetic pressures to engage in isomorphism (DiMaggio & Powell, 1983). We suggest that all three types of pressures exist in the sustainability domain. First, as discussed just above, the emergence of the business case generates mimetic pressures on companies to undertake more sustainability actions. Second, the literature shows that sustainability is associated with the emergence of a new institutional logic that has gradually weakened the dominant agency logic in public equity markets, impacting analysts' recommendations (Ioannou & Serafeim, 2015) and even lowering capital constraints for sustainable companies (Cheng et al., 2014). These normative pressures are also reinforced by the broader momentum within capital markets toward integrating sustainability data in investment decisions, in combination with the emergence of numerous information intermediaries (MSCI, among others) that rate and rank companies based on their sustainability actions.

Third, companies face coercive pressures given that powerful social actors, including governments, global organizations, and activist investors, are pushing companies to take more actions to address sustainability challenges (e.g., via laws, regulations, and/or listing requirements). For example, the number of environmental and social issues that are the subject of shareholder resolutions in the United States has been significantly increasing (Carroll, Lipartito, Post, & Werhane, 2012; Glac, 2010), and these resolutions have become increasingly more successful (Mathiasen, Mell, & Gallimore, 2012).[9]

Sustainability is a useful context in which to study these processes of imitation given the wide range of environmental and social actions that companies adopt across industries. Thus, unlike prior studies that focused on the diffusion of specific innovations (e.g., particular product or process innovations) in one industry, our focus on sustainability not only allows us to study imitation at the industry-action level but also, to explore *interindustry* variation in the rate of imitation; two questions that have not been sufficiently addressed to date. In sum, for all the above reasons, we predict a high degree of imitation of sustainability actions and, therefore, a high degree of intraindustry convergence over time.

3.1 Empirical Evidence on Intraindustry Convergence of Sustainability Actions

We follow prior literature (e.g., Cheng, Ioannou and Serafeim, 2014; Hawn and Ioannou, 2016; Hawn, Chatterji and Mitchell, 2018) and identify the industry as the relevant social

[9] Furthermore, the signing of the Paris Agreement, in 2015, in combination with the adoption of the UN Sustainable Development Goals have resulted in a powerful message and a renewed momentum toward the adoption of socially and environmentally oriented laws and regulations by a large number of countries around the world. A number of national governments (e.g., South Africa, Malaysia, China, EU, Brazil) have already mandated that large companies disclose not only financial data but also data on their sustainability actions (i.e., ESG/nonfinancial data).

reference group because (a) companies typically benchmark their sustainability actions and performance against competitors in the same industry, (b) accounting standard setters such as the Sustainability Accounting Standards Board (SASB) create industry-specific sustainability standards, (c) investors use “best-in-class” approaches, whereby they seek to understand a firm’s portfolio of sustainability actions relative to the industry’s practices, and (d) practically all ESG data providers produce industry-adjusted sustainability scores (Amel-Zadeh & Serafeim, 2018; Khan et al., 2016). This is also consistent with existing literature that has used the same product market or industry as the relevant reference group (e.g., Lieberman & Asaba, 2006; Marquis & Tilcsik, 2016; Sharkey & Bromley, 2015).

To capture the intraindustry degree of convergence of sustainability actions, we construct the coefficient of variation. Specifically, for each industry *j* in year *t*, we calculate the coefficient of variation as $CV_{jt} = \sigma_{jt} / \mu_{jt}$, where σ_{jt} is the standard deviation of *Susty* across all firms in year *t* and industry *j* and μ_{jt} is the average of *Susty* across all firms in year *t* and industry *j*.[10] To formally test whether there has been convergence over time, we estimate the following model using panel data at the industry-year level:

$$CV_{it} = a_i + b * Timetrend_{it} + e_{it} \quad (1)$$

where *Timetrend* is a variable that increases by 1 for each year after the first year in the sample. The estimated coefficient *b* is our estimate of convergence whereby the more negative *b* is, the faster the CV is declining over time. We include industry fixed effects to allow the intercept to vary by industry, and, as a result, we effectively estimate *b* using only within-industry variation. Standard errors are robust to heteroscedasticity and clustered at the industry level.

[10] As a reminder, *Susty* is the overall sustainability actions score generated by MSCI, as described in the Data and Sample Construction section.

Table 1, Panel A presents the results obtained through five different models. In Models 1 and 2, CV is constructed using a *balanced* set of firms across all years, thereby mitigating any changes in CV over time that may be caused by changes in the underlying sample. In Model 1, both the independent and the dependent variables are log-transformed; thus, the estimated coefficient *b* is interpreted as the elasticity of CV with respect to time. In Model 2, both the dependent and the independent variables are linear; therefore, the estimated coefficient *b* is the change in CV for a one-year change. Models 3, 4, and 5 are variations of Model 1 using an *unbalanced* sample of firms and extending the starting year of our sample from 2012 back to 2009 and then even further back to 2006. We present these results to complement the findings of the main Model 1, as they include more firms and more years. This is why the sample size increases from 509 industry-year observations to 523, 685, and 826 in Models 3, 4, and 5 respectively. However, these models also have weaknesses in that they allow changes in CV to be driven, to some extent, by changes in the underlying sample.[11] Also, we note that before 2012, the sample of firms with available data declines fast. Whereas in 2012 we have data on 6,085 firms, in 2009 we have data on 1,049 firms, and in 2006, 956 firms.

****** Insert Table 1 about here ******

The estimated coefficient *b* is negative and significant across all models. This suggests that, on average, the CV has systematically declined across most industries. The estimates in Models 1 and 3 suggest that the elasticity is close to -0.3. In Model 2 the coefficient can be interpreted as a decline by 1.72 in the CV for every additional year that passes. The coefficient is still negative and significant but reduced in magnitude in Models 4 and 5, either because adding earlier years to the sample is essentially adding noise to the

[11] To mitigate this effect, we require a firm in our unbalanced sample to be covered by MSCI for more than four years during the sample period.

estimation (given that the sample declines significantly), and/or because most of the observed convergence occurred after 2012. In untabulated analysis, we split the sample to roughly three equal subsamples to better understand the role of home country characteristics: US firms, firms from other developed markets, and firms from emerging markets. We find significant convergence in all three subsamples with the US being the highest, followed by emerging markets and then other developed markets. Moreover, we confirm that the decline is driven by a decrease in the standard deviation rather than an increase in the mean (i.e., the distribution of sustainability actions becomes more concentrated over the sample period).

3.2 Antecedents to Interindustry Variation in Convergence of Sustainability Actions

Despite this remarkable convergence in sustainability actions within industries, Table 1 Panel B also shows that there is significant variation in *the rate* of convergence across them. This observation resonates with early studies in the diffusion of innovation literature (e.g., Romeo, 1975) that document interindustry differences in the rate of diffusion of innovation. We propose that such variation is associated with structural and competitive features of industries considering that different industries also face different sustainability pressures. Accordingly, in this section, we explore the industry-level factors associated with interindustry variation in the level of convergence. Specifically, we investigate three potential factors: (a) the adoption of sustainability actions by an industry's market leaders, (b) the importance of the underlying environmental and social issues relative to governance issues, and (c) the degree of stakeholder pressure and scrutiny that an industry faces.

3.2.1 Sustainability Actions by the Industry's Market Leaders

Companies are more likely to imitate the actions of industry peers when they perceive such actions to enhance performance (e.g., Banerjee, 1992; Bikhchandani et al., 1992; DiMaggio & Powell, 1983; Oliver, 1991). When firms observe their peers achieving superior performance, they assume that they have an informational advantage regarding the profitability of a given strategy. Given that gathering information through observing peers' actions may be relatively more cost effective than deploying limited organizational resources to evaluate the strategy itself (e.g., Conlisk, 1980; Lieberman & Asaba, 2006), companies are more likely to imitate the actions of the most successful companies in their industry (e.g., Burns & Wholey, 1993; Haunschild & Miner, 1997).

We therefore expect a higher rate of convergence for industries in which a higher proportion of market leaders choose to adopt sustainability actions because the undertaking of these actions is likely to be perceived by peers as performance-enhancing, thus diminishing any uncertainty around whether sustainability is a legitimate strategy (Moon, Crane, & Matten, 2005) or whether sustainability can enhance performance.

Empirically, the variable *Leader* captures the percentage of large firms in an industry (i.e., top quartile in market capitalization) that are also sustainability leaders (i.e., top decile in terms of *Susty* in each industry).[12] The variable ranges from 0 to 1 and has a mean of 30% and a standard deviation of 27% (Table 2 Panel A), indicating that across all industries, on average, 30% of large companies are also leaders in undertaking sustainability actions.

****** Insert Table 2 about here ******

3.2.2 The Type of Sustainability Issues That Are Material in an Industry

The type of underlying environmental and social issues that an industry faces could also explain part of the interindustry variation in the convergence rate given that different sustainability issues may be relatively more or less important as a function of the resources and the impact of an industry on society at large. For example, while climate change is a universal societal challenge, scope 1 carbon emissions in particular are a key issue for

[12] Defining *Leader* using a quartile or quintile threshold for both market capitalization and *Susty* yields qualitatively similar results.

companies in the electric utilities industry but relatively less important for companies in the financial industry. Through such an approach, SASB has classified sustainability issues as "material" by applying the SEC definition of materiality as interpreted by the U.S. Supreme Court, whereby the standard for materiality reflects "a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the 'total mix' of information made available."[13] In line with this definition of materiality, data and rating providers, including MSCI, estimate and apply different weights on environmental, social, and governance issues for different industries.

We predict higher level of intraindustry convergence for industries in which environmental and social issues are assessed as more material and thus, are assigned greater weight relative to governance issues in the construction of aggregate measures of sustainability. We use governance issues as the relative benchmark of materiality because a long stream of work documents that throughout most of the 1990s and 2000s, investors, regulators, and stock exchanges strongly pressured companies to adopt a wide range of best governance practices (Bebchuk, Cohen, & Ferrell, 2009; Gompers, Ishii, & Metrick, 2003) as defined by corporate governance codes (Aguilera & Cuervo-Cazurra, 2004). Thus, convergence on governance actions has likely occurred prior to the sample period.

On the other hand, institutional pressures associated with environmental and social issues, and the resulting demands for the adoption of environmentally and socially responsible actions, are a more recent phenomenon (Amel-Zadeh & Serafeim, 2018). Similarly, while investor activism on governance issues through private dialogues and shareholder proposals has been a frequent phenomenon for decades—and a long literature establishes its consequences (Bebchuk & Weisbach, 2010)—investor activism on

[13] *TSC Industries v. Northway, Inc.,* 426 U.S. 438, 449 (1976). See also *Basic, Inc. v. Levinson*, 485 U.S. 224 (1988).

environmental and social issues is also a more recent phenomenon (e.g., Dimson, Karakaş, & Li, 2015; Flammer, 2015; Flammer, Toffel, and Viswanathan, *forthcoming*).[14]

The *Environmental Materiality, Social Materiality,* and *Governance Materiality* scores are taken directly from MSCI and they are the weights placed annually on environmental, social, and governance issues respectively, for each industry. The sum of the three weights is always 100%; therefore, including all three in the models generates perfect multicollinearity. For this reason, and to be consistent with our theoretical expectations, the *Governance Materiality* score is the omitted category. These weights vary little over time within the period of our study therefore, we calculate the average weight across the sample period. *Environmental Materiality* has a mean of 35.60% and a standard deviation of 18.12%, and *Social Materiality* has a mean of 40.84% and a standard deviation of 14.07% (Table 2 Panel A). This suggests that the omitted category, *Governance Materiality,* would have a mean of approximately 24% given that the three categories always add up to 100%.

3.2.3 Stakeholder Scrutiny of an Industry

Not only are companies more likely to respond to sustainability issues of greater salience (e.g., Bundy, Shropshire, & Buchholtz, 2013; Darnall, Henriques, & Sadorsky, 2010; Kassinis & Vafeas, 2006) but they are also more likely to do so under conditions of increased scrutiny by the media and other important stakeholders (e.g., Bartley, 2007; King, 2008; Luo, Zhang, & Marquis, 2016). However, whether companies will converge or diverge on the actions they decide to take arguably remains an open question. On the one hand, if companies explicitly seek to establish self-regulation to avoid potential sanctions (see Aragòn-Correa, Marcus & Vogel, 2020 for a review) and in so doing, to promote the adoption of the same

[14] Meanwhile, institutional dependencies will likely restrict further intraindustry convergence on governance issues—provided that governance is a cultural as well as a legal construct (Aggarwal, Erel, Ferreira, & Matos, 2011).

practices throughout the industry, and *if* these self-regulation efforts are effective, then sustainability actions will likely converge.

In contrast, if stakeholder scrutiny triggers companies to act but their practices develop according to firms' idiosyncratic strategies, capabilities, market positioning, cognitive assessments, and stakeholder relationships and reputations, then their actions are likely to converge by less (or even diverge) (e.g., Durand et al., 2019; Lee, 2011). Further, inconsistent pressures *within* stakeholder groups could have an impact on organizational responses to environmental and social issues and could also generate divergent responses (Pedersen & Gwozdz, 2014). Meanwhile, perceived pressures by primary versus secondary stakeholders could also differentially influence firms' responses (Buysse & Verbeke, 2003).

Another key dimension that is relevant to consider is the tone of such coverage of the industry. We expect that external reinforcement in the form of positive coverage will likely be associated with higher levels of intraindustry convergence. We conjecture that this is because sustainability actions are more likely to be legitimized through positive (stakeholder) feedback (e.g., Marquis, Glynn, & Davis, 2007; Sharma & Vredenburg, 1998) thus encouraging imitation. In contrast, negative stakeholder attention is likely to trigger the adoption of divergent sustainability actions—equivalently, it would discourage imitation—because companies will pursue distinctive practices in an attempt to differentiate and/or distance themselves from the criticism that the industry, and their peers, are facing (Hawn, Durand, & Ioannou, 2020).

To measure stakeholder attention and the tone of media coverage, we use data from TruValue Labs which is used by some of the largest financial institutions (e.g., Citi) and asset owners (e.g., Global Pension Investment Fund of Japan) around the world (Serafeim, 2020). TruValue Labs employs big data and artificial intelligence approaches to capture and analyze unstructured data. On a daily basis, TruValue Labs identifies sustainability-relevant articles for each company, from a wide variety of sources, including reports by analysts, various media outlets, advocacy groups, and government regulators.[15] Using natural language processing, TruValue Labs interpret semantic content and generate analytics scoring data points using a 0–100 scale. A score of 50 represents a neutral impact. Scores above 50 indicate positive sentiment, and scores below 50 reflect negative sentiment.[16] The sentiment analysis is capable of codifying not only positive versus negative sentiment in a binary way but also, degrees of positivity or negativity. For example, the algorithms assign a relatively more negative score to an accident affecting several workers and communities and a less negative score to a workplace incident that leads to an injury for one worker (Serafeim, 2020). We construct the variable *Attention* as the average number of ESG-related articles across all companies within the same industry, and we construct the variable *Tone* as the average tone of ESG-related articles across all companies within the same industry, whereby higher values represent a more positive tone.[17]

3.2.4 Empirical Evidence for the Antecedents to Variation in Intraindustry Convergence

We estimate the following cross-sectional model using ordinary least squares (OLS):

$$\text{Convergence}_i = f\ (\text{Industry Characteristic}_i) \qquad (2)$$

where *Convergence* is the estimated coefficient *b* on the *Timetrend* variable from equation (1), but model (2) is run separately, for each industry, allowing us to estimate an industry-

[15] TruValue Labs emphasizes that its measures focus on vetted, reputable, and credible sources that are likely to generate new information and therefore insights for investors. To increase transparency and to validate the data, the TruValue Labs platform allows a user to track the original source of the articles and events that inform the sentiment analysis for each specific issue (Serafeim, 2020). The platform aggregates unstructured data from over 100,000 sources for monitored companies.

[16] For example, Ingersoll Rand had positive sentiment following news on the firm's investments to improve waste and hazardous materials management, materials sourcing, and product safety. In contrast, Facebook had negative sentiment following news on the firm's data privacy issues, concerns about regulatory pressure, and user rights.

[17] To be consistent with our sample composition we use data for all firms that have coverage in MSCI from the unbalanced sample and TruValue Labs.

specific coefficient *b* as tabulated in Table 1 Panel B. We include all the industry characteristics that we are interested in—and discussed above—as explanatory variables and we use industry-level data, thus generating a total of 64 observations. As controls, we include industry characteristics that might be correlated both with the rate of *Convergence* and with the variables of interest.[18]

Table 2 Panel A presents summary statistics, and Panel B presents the correlation matrix for all the variables we use in the specifications. *Convergence %* (estimated from the log-log timetrend model) and *Convergence Linear* (estimated from the linear timetrend model) exhibit a high positive correlation of 0.76, as expected. We report the main results based on *Convergence %* and present results using *Convergence Linear* as a robustness check. We include variables controlling for average size, profitability, and valuation multiples across firms within each industry and we control for the level of competition using the Herfindahl index. We also control for the geographic composition of all the firms within each industry. *Convergence %* has an average of −0.28 and a standard deviation of 0.15. Average return-on-capital (ROC) is 8.21%, and price-to-earnings multiple (PTE) is 16.42. Panel A includes the geographic composition of firm-level home-country membership that we use to construct our industry-level variables. As expected, most firms originate from the U.S., Japan, EU excluding UK, and the UK. In Panel B, we observe *Convergence %* exhibiting a negative correlation with both *Environmental* and *Social Weight*, *Leader*, and *Tone.* The correlation with *Attention* is positive.

Table 3 Panel A presents OLS models where the dependent variable is *Convergence %* (Models 1–4 and 6) or *Convergence Linear* (Model 4). In models 1-6 the coefficient of variation is constructed from a *balanced* sample over the years between 2012 and 2019. Model 1 does not include any control variables to assess their influence on the estimated

[18] These control variables are constructed using the unbalanced sample of MSCI coverage.

coefficients of interest given the small number of observations in the model. Models 4 through 6 also include the geographic composition variables tabulated in Table 2 as control variables. These variables collectively cover approximately 93% of the sample and we include them to account for the possibility that different industries might be composed of companies from different home countries. Furthermore, in all the models of Table 3 Panel B, the coefficient of variation is constructed from an *unbalanced* sample of firms with MSCI coverage that varies across years. Specifically, Models 1-2, 3-4 and 5-6 estimate the coefficient on the timetrend variable based on the periods 2012 to 2019, 2009 to 2019 and 2006 to 2019, respectively. Models 2, 4 and 6 include the geographic composition controls.

****** Insert Table 3 about here ******

The results based on the balanced sample regressions can be summarized as follows. The rate of convergence is higher in industries in which environmental and social issues are more material, consistent with our theoretical predictions. The rate of intraindustry convergence is also higher for industries that receive *less* attention from stakeholders. We conjecture that this could be because industries that receive more stakeholder attention are less effective at enforcing self-regulation across member companies and thus, are less likely to adopt similar sustainability actions. For example, more stakeholder attention may come with increased complexity as well as conflicts within and across stakeholders, impeding attempts at industry-level coordination which is typically needed to establish self-regulation and for actions to be adopted by all companies.

The estimated coefficient on *Tone* and *Leader* do not achieve significance in Model 1 whereas *Tone* obtains significance in Model 2. An interesting question arises about the interaction between these two variables. It could be that the effect of more positive tone on convergence is conditional on the sustainability actions of industry market leaders. In fact, we do obtain a significant coefficient on an interaction term between *Leader* and *Tone*.[19] This result implies that an industry experiences a higher rate of convergence when more of its market leaders become sustainability leaders *and* they are externally supported by positive media coverage. We cautiously interpret this finding as follows: sustainability actions are characterized by higher levels of uncertainty and can sometimes even be seen as contested practices (Moon et al., 2005). Therefore, observing the most successful industry peers performing well may be insufficient for companies to infer that sustainability actions are performance-enhancing and thus, on their own, they are insufficient to trigger imitation. On the other hand, when they are further legitimized by stakeholder endorsement in the form of positive media coverage, then companies could make more reliable inferences about the link between sustainability actions and the performance of the leaders, making it more likely that imitation will be triggered.[20]

We interpret the results of Table 3 Panel B with increased caution because they are based on *unbalanced* panel data and consequently, the convergence measure could be biased due to entry and exit of firms over time. Broadly speaking, the models confirm the findings of Table 3 Panel A, and this is particularly true for Models 1 and 2, which are the most comparable to the models of Panel A given that they are based on the same 2012-2019 time period. We also note that as we add more years (and arguably more noise to the data),

---

[19] We thank an anonymous reviewer for this suggestion. Relatedly, we note that we empirically explored other interaction terms, none of which achieved significance.

[20] In untabulated analysis we examined whether the stringency of the institutional environment of a *Leader*'s home country yields different insights. For example, if leaders are coming from an industry from a stringent environment, other firms might not be influenced as they might perceive the leader's actions arising from coercion rather than value creation. We reached out to the United Nations Principles for Responsible Investment (PRI) and obtained access to their Global Regulation Database, which allowed us to construct a measure that captures institutional variation across countries. Thus, countries were classified as *Most Stringent* if, during the sample period, they had in place more than 4 regulations (top quartile) that were imposed by the government (as opposed to being a listing requirement), that had been issued (i.e., not planned) and that refer to mandatory (as opposed to voluntary) ESG provisions. The estimated coefficients on the main effect of *Leader* from stringent or non-stringent institutional environments were both insignificant. The estimated coefficients on the interaction effects with *Tone* for both *Leader* variables were negative and significant.

moving through Models 3 to 6, the sign of the estimated coefficients of interest remains consistent even though, as expected, the significance drops.

4 CONVERGENCE AND FINANCIAL PERFORMANCE

To explore how the higher levels of intraindustry convergence may be associated with performance outcomes, we first focus on the industry-action level and investigate why is it the case that some sustainability actions are less likely to be imitated than others over time. The literature finds that when strategies are complex (Ethiraj & Levinthal, 2004; Levinthal, 1997; Rivkin, 2000), when knowledge is tacit (Zander & Kogut, 1995), when evaluation is uncertain (Ethiraj & Zhu 2008; Greve, 2009), or when causal ambiguity exists (Lippman & Rumelt, 1982; Ryall, 2009), imitation may be partial or prone to errors. As a result, sustainability actions can remain hard to imitate, even when valuable.

Based on this literature, we identify three characteristics that capture action-level heterogeneity in the underlying complexity and uncertainty of an industry-action pair. Specifically, we posit that when market uncertainty and regulatory uncertainty surrounding a sustainability action is low, then companies are more likely to adopt them (i.e., a higher degree of convergence). Importantly, we posit that actions with a high degree of novelty are less likely to be imitated because they require superior firm capabilities in the use of novel knowledge and technologies, which in turn, strengthen the isolating mechanisms through which leading companies prevent imitation (e.g., Lippman & Rumelt, 1982; Posen, Lee, & Yi, 2013; Reed & DeFillippi, 1990).

To capture empirically these mechanisms, we use MSCI’s descriptions at the industry-action level to construct three indicator variables: (a) *Low Market Uncertainty* takes the value of one if the across firm and years average of the weight on an action for all firms in the industry is above the median;[21] (b) *Low Regulatory Uncertainty* takes the value of 1 for actions where policies and regulations are identified as drivers of the practice (e.g. anti-competitive practices, toxic emissions, chemical safety, corruption, financial stability, financial product safety, employee health and safety, product safety and supply chain labor); (c) *High Practice Novelty* takes the value of one for practices which require the use of novel knowledge and technologies (e.g. access to finance, access to communications, financing of environmental impact, data privacy, product carbon footprint, responsible investing).

Accordingly, for each industry–action pair, we also calculate *Convergence %*. The total number of pairs is 846, given that not all sustainability actions are applicable to every industry according to the MSCI data. Table 4 Panel A presents summary statistics for *Convergence %* across all actions and for each action individually. Within our sample, we observe very low frequency of convergence on actions oriented toward data privacy, water stress, human capital development, and product carbon footprint issues. In contrast, we observe high frequency of convergence in green building opportunities, clean tech opportunities, labor-related supply chain, and employee health and safety issues.

Table 4 Panel B presents the results of models with and without industry fixed effects in which the dependent variable is *Convergence %*. Consistent with our predictions, we find that sustainability actions characterized by low regulatory uncertainty are more likely to be imitated yet those characterized by a high degree of novelty are less likely to be imitated. The coefficient on market uncertainty obtains a negative coefficient, which is consistent with our expectations, but it fails to achieve significance.[22] Taken together, these estimates suggest interesting action-level heterogeneity, but they are also pointing towards the possibility that

[21] Defining market uncertainty as a continuous measure yields similarly insignificant results.
[22] Clustering standard errors at the industry rather than at the practice level makes the coefficient on *Low Market Uncertainty* significant at the 10% level.

actions that are less likely to be imitated, even if valuable, may be the reason why companies are able to maintain a sustainability-based differentiation advantage in the longer term.

**** Insert Table 4 Panels A and B about here ****

To directly explore the link to performance, we develop a typology of sustainability actions: specifically, we define *common* sustainability actions as those actions that were imitated over time at the industry level—that is, the set of actions on which an industry has converged—and we define as *unique* those on which the industry has not converged. We conjecture that common (i.e., imitated) actions will not be associated with superior performance because, more generally, when actions diffuse via imitation then performance heterogeneity within an industry diminishes (Dierickx & Cool, 1989; Lippman & Rumelt, 1982), narrowing the performance gap between market leaders and their imitators (Shenkar, 2010; Knott, Posen, & Wu, 2009) by eroding the profits of firms that are being imitated (Posen et al., 2013). For example, a commitment to reduce carbon emissions at the beginning of our sample could have translated into eco-efficiency initiatives that reduced cost for companies *and* allowed them to maintain a cost advantage for as long as industry peers remained unable or unwilling to adopt a similar commitment. Over time, however, peers may have observed or inferred that such initiatives have a positive impact on the bottom line, triggering a process of imitation. As the industry converged on these actions, companies that failed to undertake them would be faced with a cost disadvantage. It is precisely because of such a process, then, that we argue that common actions are not likely to be associated with outperformance.

In fact, we expect that the mere adoption of common actions will likely *not* be associated with a range of potential benefits: for example, imitated actions are unlikely to generate product market benefits because customer loyalty and satisfaction are typically based on differentiating practices (Bhattacharya & Sen, 2003; Luo & Bhattacharya, 2006).

Similarly, labor market benefits derived from employee satisfaction, recruitment, and engagement (Bode et al., 2015; Burbano, 2016) and capital market benefits in the form of cost of capital effects (Cheng et al., 2014) are also based on the adoption of differentiating actions. In other words, common sustainability actions will likely fail to lead to differentiation and therefore, decision-makers (e.g., labor, product or capital market actors) will be unable to confer the corresponding benefits to companies.

On the other hand, we maintain stronger priors that unique actions can be associated with superior performance. This is because a unique strategy may be based on the *ex-ante* selection of a position that is perceived to be unexploited or underexploited (Porter, 1991) and which, in turn, is protected via actions that are distinct, enabling a firm to enjoy superior performance due to lower levels of competition or even a local monopoly (Baum & Mezias, 1992; Baum & Singh, 1994; Porter, 1980, 1991). In our setting, however, it is an open question whether companies choose their unique sustainability actions so as to occupy a position with superior profitability potential. It may well be the case that such actions do not correspond to valuable underlying positions; they might even be strategic errors. Yet the findings in Table 4 Panel B do imply that it is novel sustainability actions that remain hard to imitate over time and therefore, to the extent that the use of novel knowledge and technologies is more likely to be performance-enhancing, then unique actions could plausibly be associated with superior performance.

In what follows, we offer an empirical investigation of whether common and unique sustainability actions are associated with a number of alternative measures of performance starting with our primary metric, a frequently used performance metric in strategic management (e.g., Obloj and Sengul 2020), i.e., return-on-capital (ROC). We also use return-on-assets (ROA) and its decomposition to return-on-sales (ROS) and asset turnover and we run our models using a market valuation-based value creation metric, that is also frequently used in strategic management research (e.g., Hawn and Ioannou, 2016), i.e., Tobin's Q.[23]

4.1 Variable Measurement and Research Design

The two independent variables of interest are measures of firm-level common and unique sustainability actions. We classify an industry–action pair as a *common* if *Convergence %* is more negative than −5%, which is the elasticity of change in the coefficient of variation for a percentage change in years. Therefore, we classify them as *common* if they have converged by at least 5% each year; else we classify them as *unique.* The last column of Table 4 Panel A shows the number of industries for which the focal action is classified as *unique* using this classification threshold. We require −5% instead of 0% to increase confidence that there is indeed a significant extent of convergence during the sample period rather than a small, and potentially, random decline. We also increase and reduce the threshold to −10% or 0%. We note that a sustainability action, for example human capital management, may be classified as common in one industry and as unique in another, given that the way we construct the variable allows for an industry-varying classification of actions.

We then create indicator variables that take the value of one or zero based on whether sustainability action *m* for industry *k* is common (C_{km}) or unique (U_{km}). We measure the undertaking of common sustainability actions for firm *i* as the weighted[24] score of common actions in year *t:*

Common Actions_{it} =

$$\sum_m Score_{ikmt} \; x \; Weight_{ikmt} \; x \; C_{km} \qquad (3)$$

[23] To eliminate the influence of large outliers we windsorize the dependent variables at the 1 and 99% level or at the closest level in the presence of extreme outliers. In our sample, those values are for ROC at 50% and -30%, ROS at 50% and -40%, asset turnover at 3 and 0, and Tobin's Q at 9 and 0.5.

[24] We weigh each practice using the MSCI weights given to each practice for each firm-year. To preserve the relative scaling of both variables from 0 to 10 consistent with the MSCI scores, we rescale the weights based on the total weight allocated to the common or unique actions. Therefore, the total weights within the set of common actions sums up to 100%, and the same is the case for unique actions.

Equivalently, for unique actions the variable is calculated as:

Unique $Actions_{it}$ =

$$\sum_m Score_{ikmt}\ x\ Weight_{ikmt}\ x\ U_{km} \quad (4)$$

Both variables range between zero and ten (Table 5 Panel A) and interestingly, there is very little correlation between the two (0.045) (Table 5 Panel B). Our final estimation model is:

Financial $Performance_{it}$ = a + d * Unique $Actions_{it}$ + e * Common $Actions_{it}$ + Controls + Fixed Effects (5)

****** Insert Table 5 about here ******

We include year, country, and industry fixed effects as well as the lagged level of the dependent variable, measured as the average between 2010 and 2011. Doing so allows us to control for a firm's financial performance prior to the period for which we measure the dependent variables and to control for a set of stable factors that may impact a firm's financial performance. In other specifications, instead of the lagged dependent variable, we also include firm fixed effects, by demeaning all variables using the average of each variable at the firm-level, in addition to country and industry fixed effects, to assess the robustness of our main results. We further include a set of time-varying firm characteristics as controls, as they might be correlated with either sustainability actions or financial performance. This includes research and development expenditures scaled by sales, capital expenditures scaled by assets, firm size measured as log-transformed market capitalization, and leverage, measured as total debt over total assets.[25] If some of these control variables are themselves affected by the adoption of sustainability actions, we would essentially be controlling for the effect we seek to document, thereby biasing the estimated coefficients on sustainability actions towards zero. The coefficients of interest in equation (5) are *d* and *e*. The sample

[25] Consistent with prior studies (Khan, Serafeim and Yoon 2016) if research and development expenditures are missing then we assume that they are zero. Capex are scaled to range from 0 to 50% of assets, R&D from 0 to 100% of sales, and debt from zero to 100% of assets.

includes all firms with available data in MSCI and Worldscope, producing a final sample of close to 39,000 observations; the number of observations varies somewhat depending on the metric we use as the dependent variable due to data availability.

4.2 Performance Implications Results

Table 6 reports results of OLS models using accounting measures of performance, and Table 7 reports results using Tobin's Q. Models 1–4 include industry and country fixed effects, time-varying firm controls, and the lagged dependent variable.[26] Across all specifications, the coefficient on *Unique Actions* is positive and significant. In contrast, the coefficient on *Common Actions* is insignificant. A 4-point increase typically moves a firm from being a laggard (i.e., a score of 3 or below) to a leader (i.e., a score of at least 7) on the MSCI scale. Such a move translates to approximately 1%, 0.46%, 1.2%, and 2.6% higher ROC, ROA, ROS, and asset turnover respectively; all are economically meaningful changes in operating performance.

****** Insert Table 6 and Table 7 about here ******

Moreover, in Models 1–4, an industry-action pair is classified as unique (common) if the estimated coefficient on a timetrend variable in industry-action-specific models, where the dependent variable is the coefficient of variation of actions across firms, is less (more) than −5%. In Models 5 and 6, actions are classified as unique (common) if the estimated coefficient is less (more) than 0 or −10% respectively. Comparing Model 1 to Models 5 and 6 confirms that the choice of the exact threshold makes little difference to the results.

Model 7 is identical to Model 1, but lagged operating performance is measured as the 1-year lag of the dependent variable instead of the average between 2010 and 2011. This is a more conservative specification because it arguably controls for some of the effect we are

---

[26] As expected, the lagged dependent variable is very significantly correlated with the dependent variable and explains a large part of the variation; this finding is well documented in the literature on the persistence in accounting profitability (Healy, Serafeim, Srinivasan, & Yu, 2014)

attempting to identify, given that the lagged level of the dependent variable now incorporates some of the likely performance effects that may be attributed to unique actions.[27] As expected, the estimated coefficient on *Unique Actions* declines from 0.251 to 0.163 but remains significant. The estimated coefficient on *Lag Operating Performance* jumps from 0.418 to 0.675 which is to be expected given that in this specification, *Lag Operating Performance* is measured at the immediately preceding year and that accounting performance persistence is higher for first rather than higher-order autocorrelation. Model 8 identifies the coefficients on sustainability actions using only within-firm variation, and Model 9 includes the time-varying firm controls. In both models, the estimated coefficient on *Unique Actions* is positive and significant.[28]

In Models 1 and 2 and 5 and 6, of Table 7, an industry-action pair is classified as unique (common) if the estimated coefficient on a timetrend variable in action-industry-specific models, where the dependent variable is the coefficient of variation of actions across firms, is less (more) than −5%. In models 3 and 4, practices are classified as unique (common) if the estimated coefficient is less (more) than 0 or −10% respectively. *Lag Tobin's Q* is measured as the average of the dependent variable of each model in years 2010 and 2011 for models 1 through 4. *Lag Tobin's Q* is measured as the 1-year lag of the dependent variable in Model 5. These specifications closely resemble Table 6. Across all of them, we find a positive and significant association between *Unique Actions* and *Tobin's Q.*[29] A 4-point change in *Unique Actions* translates to approximately a 4% change in Tobin's Q. In

[27] For example, when the dependent variable is return-on-capital in 2018, the lagged dependent variable is measured in 2017, thereby picking up any positive effects from unique actions undertaken between 2017 and 2018.

[28] When we run the same analysis for ROC on a sample of only US firms, we find significant positive estimated coefficient on *Unique Actions* both using across-firm and within-firm variation estimates. In a sample of firms only from developed markets outside the US we find significant positive estimate using within-firm variation, while for emerging markets we find significant positive estimate using across-firm variation. In all specifications the estimated coefficient on *Common Actions* is insignificant.

[29] We log-transform Tobin's Q in the models of Table 7 to mitigate skewness in the variable, consistent with past research (Gartenberg et al., 2019), but our results are similar using the raw variable.

contrast, the coefficient on *Common Actions* is insignificant in most of the specifications and unstable, as it takes a negative value in Model 2 and a positive value in Model 5. As in Table 6, controlling for time-varying firm characteristics turns the coefficient on *Common Actions* negative and significant. This is primarily driven by the positive association with firm size, which is positively correlated with Tobin's Q. Arguably, controlling for firm size could be problematic when the dependent variable is Tobin's Q, as market value is in the numerator of the dependent variable.

4.3 Robustness Checks and Further Limitations

This study is not without its limitations, but we do hope that these limitations will inspire future research. First, admittedly, our estimation process does not involve a natural experiment with random assignment. Therefore, our results provide evidence of association but not necessarily causality. Nevertheless, we do attempt to control for several variables that may threaten the validity of our inferences. The first threat would arise if a time-invariant firm characteristic is correlated with both the sustainability actions variables and performance at the end of the sample period. For example, it could be that firms that are more profitable and have higher market valuation multiples choose to pursue unique sustainability actions. Yet our models explicitly control for the beginning of sample-period financial performance, thereby controlling for time-invariant firm characteristics that are influencing the level of performance at the beginning of the sample period too. Therefore, this concern is mitigated by our empirical research design.

A further limitation is the threat to the validity of our estimates caused by a time-varying firm characteristic that operates as a correlated omitted variable. Yet it is not easy to identify such a variable that would *also* have a differential impact across unique and common sustainability actions. Since these are defined at the industry level, as industry–action pairs – and they are thus outside the control of any individual firm – they posit a higher hurdle for correlated omitted variable bias. Essentially, to impact our findings, it should be the case that a time-varying firm characteristic *is* correlated with firms' sustainability actions only in industries where these actions *are not* undertaken by other firms. At the same time, this *same* time-varying firm characteristic should *not* be correlated with firms' sustainability actions in industries in which these actions *are* undertaken by other firms. When we do introduce additional time-varying control variables in our models however, our results are robust.

Another limitation is that the adoption of unique but not common sustainability practices is a signal of a firm experiencing future improvements in financial performance that are not yet reflected in measures of accounting performance or market valuation multiples. That is, firms may be adopting sustainability actions that other firms in the same industry do not because their performance will improve over time. We note this argument could be valid for the adoption of unique sustainability actions (i.e., as a 'luxury good'), but less so for common actions, that are arguably less sensitive to a firm's performance. While certainly plausible, this explanation requires that management has visibility over future increases in financial performance over the next few years and that they are sufficiently certain so as to pursue unique sustainability actions. However, evidence that management has difficulty even predicting near-term earnings raises significant doubt that managers would adopt unique sustainability actions as a function of forecasting ability of future financial performance over the next few years (Lee, Matsunaga, & Park, 2012).

Similar to many studies in the sustainability space, our work is also limited by its use of particular datasets. Thus, even though the MSCI ESG ratings are widely used in the asset management industry, the data is available for the set of firms that MSCI covers, which are typically larger, public companies around the world. In addition, there are some apparent discrepancies across ESG data providers in the construction of ESG datasets that should be taken into consideration (e.g., Chatterji, Durand, Levine and Touboul, 2016). We hope that in future work, scholars will seek to extend our findings by using other data sources, and in fact, sources that would cover other types of firms, including private ones, and small to medium-sized enterprises.

Finally, in our study, we propose and empirically test a set of measures to capture convergence at the industry- and at the industry-action level, as well as measures to capture how unique (or common) the overall strategy of a focal firm is. These measures are likely to be imperfect and may not fully capture the real-world environmental and social impacts of companies (Freiberg et al. 2020). As such, our results should be interpreted with caution in the context of understanding the long-term socio-environmental impacts of business.

5 DISCUSSION AND CONCLUSION

In this paper, we explore the adoption of sustainability actions in recent years and pose a fundamental question for strategic management: under what conditions are companies able to maintain their sustainability-based differentiation advantage when faced with imitation pressures by industry peers? Our findings reveal that globally, within most industries, companies undertook an increasingly similar set of sustainability actions over the past decade. Moreover, we find that the interindustry variation in the degree of imitation of sustainability actions is explained, to an extent, by the variation in the materiality of environmental and social issues and variation in the level and tone of stakeholder attention that industries face. By considering variation at the industry-action level, we find that actions are more likely to be imitated when they are characterized by low regulatory uncertainty and that practices with a high degree of novelty are less likely to be imitated. We then utilize our understanding of the industry-level dynamics of imitation to develop a typology of actions at the firm level and provide evidence that, in fact, unique actions become and remain strategic during the sample period: they are reliably, consistently, and significantly associated with financial performance. Therefore, we show that even though sustainability actions are increasingly imitated within industries, some companies can maintain their competitive advantage by undertaking unique actions, characterized by a high degree of novelty, thus protecting the valuable industry positions that they occupy.

With our work we make three novel contributions to the literature. First, to the best of our knowledge, this is the first study to empirically explore the intraindustry convergence of sustainability actions over time for a large global sample and the antecedents to interindustry variation, while also exploring variation at the level of the action and then investigating implications for corporate performance. Hence, we contribute to the flourishing corporate sustainability literature by exploring how companies strategically choose which sustainability actions to adopt and how their choices may influence their ability to maintain a competitive advantage. These findings could hopefully facilitate future theoretical work seeking to understand how the dynamics of imitation at the industry level affect strategic choices at the firm level and characterize the process through which companies decide whether and how to respond to increasing environmental and social pressures (e.g., Durand et al., 2019). Incorporating the heterogeneity that exists across countries in terms of institutional structures would be particularly useful for understanding how such variation may be impacting the imitation of sustainability actions over time.

Second, we contribute to the stream of research that identifies the need to distinguish between different types of actions rather than treating sustainability as a monolithic construct (e.g., Durand et al., 2019; Hawn & Ioannou, 2016; McWilliams & Siegel, 2001). Thus, in addition to current distinctions such as between symbolic and substantive actions (Hawn & Ioannou, 2016), implicit and explicit social responsibility (Matten & Moon, 2008), and material and immaterial ESG issues (Khan et al., 2016), we propose a novel distinction between common and unique sustainability actions and provide evidence that the latter set could be also strategic. We also offer an explanation about why unique and valuable actions may remain hard to imitate: because they are characterized by higher market uncertainty, higher legal and regulatory uncertainty but also, they require a higher degree of novelty.

Third, we offer a novel contribution to the voluminous literature on imitation. Even though several studies explore the process of imitation and the factors that might accelerate or hinder it within an industry, our study proposes industry-level attributes that can (partially) explain *interindustry* variation in the rate of imitation (e.g., Romeo, 1975). Relatedly, our work enriches the stream of research that explores why unique and valuable strategies may remain hard to imitate (e.g., Lippman & Rumelt, 1982; Zander & Kogut, 1995; Ethiraj & Levinthal, 2004; Levinthal, 1997; Rivkin, 2000; Greve, 2009; Ryall, 2009) by showing that when a certain strategy can be decomposed into elements that become common versus elements that remain more unique, then imitation at the strategy level can also remain partial, thus enabling firms to *maintain* their competitive advantage. Future work may therefore seek to explore the decomposability of strategies and how the three practice-level characteristics that we propose in our work may impact imitation dynamics.

Finally, for executives, our findings imply that it is important to understand how sustainability actions diffuse over time within their industries when developing and implementing sustainability strategies. These strategies need to be based on unique actions that remain difficult to imitate in the long-run due to the novel knowledge or technology on which they depend thus allowing for a differentiation advantage to persist. In turn, such differentiation strategies should account for the materiality of the underlying sustainability issues and the stakeholder scrutiny that the industry faces. Above all, it is pivotal to realize how critical the understanding and integration of sustainability actions has become for the practice of strategic management in a world in which the social and environmental—and sometimes even existential—challenges that we are facing continue to rapidly deteriorate.

REFERENCES

Aggarwal, R., Erel, I., Ferreira, M. and Matos, P., 2011. Does governance travel around the world? Evidence from institutional investors. *Journal of Financial Economics*, 100(1), pp.154–181.

Aguilera, R.V. and Cuervo-Cazurra, A., 2004. Codes of good governance worldwide: what is the trigger? *Organization studies*, *25*(3), pp.415–443.

Aguinis, H. and Glavas, A., 2012. What we know and don't know about corporate social responsibility: A review and research agenda. *Journal of Management*, 38(4), pp.932-968.

Amel-Zadeh, A. and Serafeim, G., 2018. Why and how investors use ESG information: Evidence from a global survey. *Financial Analysts Journal*, 74(3), pp.87–103.

Aragòn-Correa, J.A., Marcus, A.A. and Vogel, D., 2020. The effects of mandatory and voluntary regulatory pressures on firms' environmental strategies: A review and recommendations for future research. *Academy of Management Annals*, 14(1), pp.339-365.

Barney, J., 1991. Firm resources and sustained competitive advantage. *Journal of management*, 17(1), pp.99–120.

Banerjee, A.V., 1992. A simple model of herd behavior. *The quarterly journal of economics*, 107(3), pp.797–817.

Bansal, P. and Roth, K., 2000. Why companies go green: A model of ecological responsiveness. *Academy of management journal*, 43(4), pp.717–736.

Baron, D.P., 2001. Private politics, corporate social responsibility, and integrated strategy. *Journal of Economics & Management Strategy*, 10(1), pp.7–45.

Bartley, T., 2007. Institutional emergence in an era of globalization: The rise of transnational private regulation of labor and environmental conditions. *American journal of sociology*, *113*(2), pp.297-351.

Baum, J.A. and Mezias, S.J., 1992. Localized competition and organizational failure in the Manhattan hotel industry, 1898–1990. *Administrative science quarterly,* pp.580–604.

Baum, J.A. and Singh, J.V., 1994. Organizational niches and the dynamics of organizational mortality. *American journal of sociology, 100*(2), pp.346–380.

Bebchuk, L.A. and Weisbach, M.S., 2010. The state of corporate governance research. *The review of financial studies*, 23(3), pp.939–961.

Bebchuk, L., Cohen, A. and Ferrell, A., 2009. What matters in corporate governance? *The Review of financial studies*, 22(2), pp.783–827.

Bhattacharya, C.B. and Sen, S., 2003. Consumer–company identification: A framework for understanding consumers' relationships with companies. *Journal of marketing*, 67(2), pp.76–88.

Bikhchandani, S., Hirshleifer, D. and Welch, I., 1992. A theory of fads, fashion, custom, and cultural change as informational cascades. *Journal of political Economy*, 100(5), pp.992–1026.

Bikhchandani, S., Hirshleifer, D. and Welch, I., 1998. Learning from the behavior of others: Conformity, fads, and informational cascades. *Journal of economic perspectives*, 12(3), pp.151–170.

Briscoe, F. and Safford, S., 2008. The Nixon-in-China effect: Activism, imitation, and the institutionalization of contentious practices. *Administrative science quarterly*, 53(3), pp.460–491.

Bode, C., Singh, J. and Rogan, M., 2015. Corporate social initiatives and employee retention. *Organization Science*, 26(6), pp.1702–1720.

Bundy, J., Shropshire, C. and Buchholtz, A.K., 2013. Strategic cognition and issue salience: Toward an explanation of firm responsiveness to stakeholder concerns. *Academy of management review*, 38(3), pp.352–376.

Burbano, V.C., 2016. Social responsibility messages and worker wage requirements: Field experimental evidence from online labor marketplaces. *Organization Science*, 27(4), pp.1010–1028.

Burns, L.R. and Wholey, D.R., 1993. Adoption and abandonment of matrix management programs: Effects of organizational characteristics and interorganizational networks. *Academy of Management Journal*, 36(1), pp.106–138.

Buysse, K. and Verbeke, A., 2003. Proactive environmental strategies: A stakeholder management perspective. *Strategic Management Journal*, 24(5), pp.453–470.

Carroll AB, Lipartito KJ, Post JE, Werhane PH. 2012. Corporate Responsibility: The American Experience. Cambridge University Press: Cambridge, UK.

Casadesus-Masanell, R. and Zhu, F., 2013. Business model innovation and competitive imitation: The case of sponsor-based business models. *Strategic management journal*, *34*(4), pp.464–482.

Cheng, B., Ioannou, I. and Serafeim, G., 2014. Corporate social responsibility and access to finance. *Strategic management journal*, 35(1), pp.1–23.

Chatterji, A.K., Durand, R., Levine, D.I. and Touboul, S., 2016. Do ratings of firms converge? Implications for managers, investors and strategy researchers. *Strategic Management Journal*, *37*(8), pp.1597-1614.

Conlisk, J., 1980. Costly optimizers versus cheap imitators. *Journal of Economic Behavior & Organization*, *1*(3), pp.275–293.

Csaszar, F.A. and Siggelkow, N., 2010. How much to copy? Determinants of effective imitation breadth. *Organization Science*, 21(3), pp.661–676.

Darnall, N., Henriques, I. and Sadorsky, P., 2010. Adopting proactive environmental strategy: The influence of stakeholders and firm size. *Journal of management studies*, 47(6), pp.1072–1094.

Delmas, M.A. and Pekovic, S., 2013. Environmental standards and labor productivity: Understanding the mechanisms that sustain sustainability. *Journal of Organizational Behavior*, 34(2), pp.230–252.

Dierickx, I. and Cool, K., 1989. Asset stock accumulation and sustainability of competitive advantage. *Management science*, 35(12), pp.1504–1511.

DiMaggio PJ, Powell WW. 1983. The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48(2): 147–160.

Dimson, E., Karakaş, O. and Li, X., 2015. Active ownership. *The Review of Financial Studies*, 28(12), pp.3225–3268.

Du, S., Bhattacharya, C.B. and Sen, S., 2011. Corporate social responsibility and competitive advantage: Overcoming the trust barrier. *Management Science*, 57(9), pp.1528–1545.

Durand, R., Hawn, O. and Ioannou, I., 2019. Willing and able: A general model of organizational responses to normative pressures. *Academy of Management Review*, 44(2), pp.299–320.

Dutton, J., Dukerich, J. and Harquail, C.V., 1994. Organizational images and membership commitment. *Administrative science quarterly,* 39(2), pp.239–263.

Eccles, R.G., Ioannou, I. and Serafeim, G., 2014. The impact of corporate sustainability on organizational processes and performance. *Management Science,* 60(11), pp.2835–2857.

Edmans, A., 2011. Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial economics,* 101(3), pp.621–640.

Ethiraj, S.K. and Levinthal, D., 2004. Modularity and innovation in complex systems. *Management science*, 50(2), pp.159–173.

Ethiraj, S.K. and Zhu, D.H., 2008. Performance effects of imitative entry. *Strategic Management Journal,* 29(8), pp.797–817.

Flammer, C., 2015. Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Science,* 61(11), pp.2549–2568.

Flammer, C. and Kacperczyk, A., 2016. The impact of stakeholder orientation on innovation: Evidence from a natural experiment. *Management Science,* 62(7), pp.1982–2001.

Flammer, C. and Luo, J., 2017. Corporate social responsibility as an employee governance tool: Evidence from a quasi-experiment. *Strategic Management Journal,* 38(2), pp.163–183.

Flammer, C., M. W. Toffel, and K. Viswanathan. "Shareholder Activism and Firms' Voluntary Disclosure of Climate Change Risks." *Strategic Management Journal*, forthcoming.

Freiberg, D., Park, D.G., Serafeim, G. and Zochowski, R., 2020. Corporate Environmental Impact: Measurement, Data and Information. *Harvard Business School Accounting & Management Unit Working Paper*, (20-098).

Gaba, V. and Terlaak, A., 2013. Decomposing uncertainty and its effects on imitation in firm exit decisions. *Organization Science,* 24(6), pp.1847–1869.

Gartenberg, C., Prat, A. and Serafeim, G., 2019. Corporate purpose and financial performance. *Organization Science,* 30(1), pp.1–18.

Glac K. 2010. The influence of shareholders on corporate social responsibility. History of Corporate Responsibility Project Working paper no. 2, Center for Ethical Business Cultures, University of St.Thomas: Minneapolis, MN.

Godfrey, P.C., 2005. The relationship between corporate philanthropy and shareholder wealth: A risk management perspective. *Academy of management review, 30*(4), pp.777–798.

Gompers, P., Ishii, J. and Metrick, A., 2003. Corporate governance and equity prices. *The Quarterly Journal of Economics,* 118(1), pp.107–156.

Greve, H.R., 2009. Bigger and safer: The diffusion of competitive advantage. *Strategic Management Journal,* 30(1), pp.1–23.

Hart, S.L., 1995. A natural-resource-based view of the firm. *Academy of management review,* 20(4), pp.986–1014.

Haunschild, P.R. and Miner, A.S., 1997. Modes of interorganizational imitation: The effects of outcome salience and uncertainty. *Administrative Science Quarterly,* pp.472–500.

Hawn, O., 2020. How media coverage of corporate social responsibility and irresponsibility influences cross-border acquisitions. *Strategic Management Journal,* forthcoming.

Hawn, O. and Ioannou, I., 2016. Mind the gap: The interplay between external and internal actions in the case of corporate social responsibility. *Strategic Management Journal,* 37(13), pp.2569–2588.

Hawn, O., Durand, R., and Ioannou, I., 2020. Organizational Responses to Environmental, Social and Governance Issues. *Working paper.*

Hawn, O., Chatterji, A.K. and Mitchell, W., 2018. Do investors actually value sustainability? New evidence from investor reactions to the Dow Jones Sustainability Index (DJSI*). Strategic Management Journal*, 39(4), pp.949-976.

Healy, P., Serafeim, G., Srinivasan, S. and Yu, G., 2014. Market competition, earnings management, and persistence in accounting profitability around the world. *Review of Accounting Studies,* 19(4), pp.1281–1308.

Husted, B.W., Jamali, D. and Saffar, W., 2016. Near and dear? The role of location in CSR engagement. *Strategic management journal,* 37(10), pp.2050–2070.

Ioannou, I. and Hawn, O., 2019. Redefining Strategy in the Age of Sustainability and Social Responsibility, forthcoming in Oxford Handbook of Corporate Social Responsibility: Psychological and Organizational Perspectives 2018/19

Ioannou, I. and Serafeim, G., 2015. The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics. *Strategic Management Journal,* 36(7), pp.1053–1081.

Kassinis, G. and Vafeas, N., 2006. Stakeholder pressures and environmental performance. *Academy of Management Journal*, 49(1), pp.145–159.

Khan, M., Serafeim, G. and Yoon, A., 2016. Corporate sustainability: First evidence on materiality. *The accounting review,* 91(6), pp.1697–1724.

King, B.G., 2008. A political mediation model of corporate response to social movement activism. *Administrative Science Quarterly, 53*(3), pp.395-421.

Knott, A.M., Posen, H.E. and Wu, B., 2009. Spillover asymmetry and why it matters. *Management Science*, 55(3), pp.373-388.

KPMG, 2017. The KPMG Survey of Corporate Responsibility Reporting 2017. Available at: https://home.kpmg/xx/en/home/insights/2017/10/the-kpmg-survey-of-corporate-responsibility-reporting-2017.html

Lee, M.D.P., 2011. Configuration of external influences: The combined effects of institutions and stakeholders on corporate social responsibility strategies. *Journal of Business Ethics*, 102(2), pp.281–298.

Lee S, Matsunaga SR, Park CW. 2012. Management forecast accuracy and CEO turnover. *The Accounting Review.* 2012 Nov;87(6):2095–122.

Levinthal, D.A., 1997. Adaptation on rugged landscapes. *Management science,* 43(7), pp.934–950.

Lieberman, M.B. and Asaba, S., 2006. Why do firms imitate each other? *Academy of management review,* 31(2), pp.366–385.

Lippman, S.A. and Rumelt, R.P., 1982. Uncertain imitability: An analysis of interfirm differences in efficiency under competition. *The bell journal of Economics,* pp.418–438.

Luo, X. and Bhattacharya, C.B., 2006. Corporate social responsibility, customer satisfaction, and market value. *Journal of marketing*, 70(4), pp.1–18.

Luo, X.R., Zhang, J. and Marquis, C., 2016. Mobilization in the Internet age: Internet activism and corporate response. *Academy of Management Journal*, 59(6), pp.2045-2068.

Marquis, C. and Tilcsik, A., 2016. Institutional equivalence: How industry and community peers influence corporate philanthropy. *Organization Science*, *27*(5), pp.1325–1341.

Marquis, C., Glynn, M.A. and Davis, G.F., 2007. Community isomorphism and corporate social action. *Academy of management review*, 32(3), pp.925–945.

Mathiasen C, Mell E, Gallimore A. 2012. U.S. Proxy Season Review: Environmental & Social Issues. Institutional Shareholder Services Inc. Available at: http:/ / www.issgovernance.com/ files/ private/ 2012USProxy SeasonReviewES.pdf.

Matten, D. and Moon, J., 2008. “Implicit” and “explicit” CSR: A conceptual framework for a comparative understanding of corporate social responsibility. *Academy of management Review*, *33*(2), pp.404–424.

Maxwell, J.W., Lyon, T.P. and Hackett, S.C., 2000. Self-regulation and social welfare: The political economy of corporate environmentalism. *The Journal of Law and Economics*, 43(2), pp.583–618.

McWilliams, A. and Siegel, D., 2001. Profit maximizing corporate social responsibility. *Academy of Management Review*, *26*(4), pp.504–505.

Meyer J. W., Rowan B. 1977. Institutionalized organizations: formal structure as myth and ceremony. *American Journal of Sociology* 83(2): 340–363.

Moon, J., Crane, A. and Matten, D., 2005. Can corporations be citizens? Corporate citizenship as a metaphor for business participation in society. *Business Ethics Quarterly*, 15(3), pp.429–453.

Nelson, R.R. and Winter, S.G., 1982. The Schumpeterian tradeoff revisited. *The American Economic Review*, 72(1), pp.114–132.

Obloj, T. and Sengul, M., 2020. What do multiple objectives really mean for performance? Empirical evidence from the French manufacturing sector. *Strategic Management Journal*, 41(13), pp.2518-2547.

Oliver C. 1991. Strategic responses to institutional processes. *Academy of Management Review*, 16(1): 145–179.

Oliver C. 1997. Sustainable competitive advantage: combining institutional and resource-based view. *Strategic Management Journal*, 18(9): 697–713.

Pedersen, E.R.G. and Gwozdz, W., 2014. From resistance to opportunity-seeking: Strategic responses to institutional pressures for corporate social responsibility in the Nordic fashion industry. *Journal of business ethics*, 119(2), pp.245–264.

Porter, M. E. 1980. Competitive Strategy. Free Press, New York.

Porter, M.E., 1991. Towards a dynamic theory of strategy. *Strategic Management Journal*, 12(S2), pp.95–117.

Porter M. E. 1996. What is strategy? *Harvard Business Review*, 74(6): 61–78.

Posen, H.E. and Martignoni, D., 2018. Revisiting the imitation assumption: Why imitation may increase, rather than decrease, performance heterogeneity. *Strategic Management Journal*, 39(5), pp.1350–1369.

Posen, H.E., Lee, J. and Yi, S., 2013. The power of imperfect imitation. *Strategic Management Journal*, 34(2), pp.149–164.

Reed, R. and DeFillippi, R.J., 1990. Causal ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of management review*, 15(1), pp.88–102.

Rivkin, J.W., 2000. Imitation of complex strategies. *Management science*, 46(6), pp.824–844.

Romeo, A.A., 1975. Interindustry and Interfirm Differences in the Rate of Diffusion of an Innovation. *The review of economics and statistics*, pp.311–319.

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

Ryall, M.D., 2009. Causal ambiguity, complexity, and capability-based advantage. *Management Science*, 55(3), pp.389–403.

Sharkey, A.J. and Bromley, P., 2015. Can ratings have indirect effects? Evidence from the organizational response to peers' environmental ratings. *American Sociological Review*, *80*(1), pp.63–91.

Schmalensee, R., 1985. Do markets differ much? *The American economic review*, 75(3), pp.341–351.

Sharma, S. and Vredenburg, H., 1998. Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strategic management journal*, 19(8), pp.729–753.

Shenkar, O., 2010. Copycats: How smart companies use imitation to gain a strategic edge. Strategic Direction.

Wu, Z. and Salomon, R., 2016. Does imitation reduce the liability of foreignness? L inking distance, isomorphism, and performance. *Strategic Management Journal*, 37(12), pp.2441–2462.

Zander, U. and Kogut, B., 1995. Knowledge and the speed of the transfer and imitation of organizational capabilities: An empirical test. *Organization science*, 6(1), pp.76–92.

TABLE 1 PANEL A: Convergence of sustainability actions within industries over time

Dependent Variable	Log CV		CV		Log CV		Log CV		Log CV	
Model	(1)		(2)		(3)		(4)		(5)	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	3.166	0.000	24.431	0.000	3.157	0.000	3.055	0.000	3.217	0.000
Timetrend	-0.279	0.000	-1.720	0.000	-0.265	0.000	-0.123	0.000	-0.135	0.000
Industry Effects	Yes		Yes		Yes		Yes		Yes	
Adjusted R-squared	81.9%		76.4%		81.8%		42.5%		35.5%	
N	509		509		523		685		826	

This table presents estimated coefficients and p-values from ordinary least squares models using panel data at the industry-year level. For models 1 and 3-5 the dependent (independent) variable is the natural logarithm of the coefficient of variation of practices across firms (the log transformed time variable starting with one in the first year and increasing by one every year after). For model 2 dependent variable is the coefficient of variation of practices across firms (the time variable starting with one in the first year and increasing by one every year after). In models 1 and 2 the coefficient of variation is constructed from a balanced sample with MSCI coverage that includes the same firms over all years between 2012 and 2019. In models 3-5 the coefficient of variation is constructed from an unbalanced sample of firms with MSCI coverage that varies across years. Model 3, 4 and 5 estimate the coefficient on the timetrend variable from years 2012 to 2019, 2009 to 2019 and 2006 to 2019 respectively. Standard errors are heteroscedasticity robust and clustered at the industry level.

TABLE 1 PANEL B: Estimated convergence rate for each industry

Industry	Convergence %	Convergence Linear
Containers & Packaging	-0.62	-3.11
Tobacco	-0.62	-8.37
Airlines	-0.57	-2.53
Biotechnology	-0.53	-1.88
Consumer Finance	-0.52	-2.05
Semiconductors & Semiconductor Equipment	-0.50	-2.85
Paper & Forest Products	-0.49	-2.36
Diversified Chemicals	-0.48	-3.30
Air Freight & Logistics	-0.46	-2.34
Technology Hardware, Storage & Peripherals	-0.46	-2.09
Building Products	-0.45	-2.68
Electronic Equipment, Instruments & Components	-0.45	-1.87
Casinos & Gaming	-0.41	-2.93
Household Durables	-0.41	-1.73
Construction & Farm Machinery & Heavy Trucks	-0.41	-2.39
Energy Equipment & Services	-0.40	-3.26
Auto Components	-0.40	-1.39
Asset Management & Custody Banks	-0.39	-2.72
Restaurants	-0.38	-1.16
Road & Rail Transport	-0.35	-1.75
Household & Personal Products	-0.32	-2.24
Specialty Chemicals	-0.31	-2.69
Utilities	-0.31	-2.37
Electrical Equipment	-0.31	-1.59
Commodity Chemicals	-0.30	-2.44
Diversified Financials	-0.30	-1.75
Hotels & Travel	-0.29	-1.63
Oil & Gas Exploration & Production	-0.28	-2.32
Real Estate	-0.27	-2.15
Banks	-0.27	-1.02
Life & Health Insurance	-0.27	-1.76
Textiles, Apparel & Luxury Goods	-0.27	-2.11
Professional Services	-0.25	-1.42
Metals and Mining - Precious Metals	-0.25	-1.59
Multi-Line Insurance & Brokerage	-0.24	-1.82
Marine Transport	-0.24	-1.70
Wireless Telecommunication Services	-0.23	-1.06
Software & Services	-0.23	-1.37
Construction & Engineering	-0.21	-1.79
Industrial Conglomerates	-0.21	-1.35
Metals and Mining - Non-Precious Metals	-0.21	-2.15
Integrated Telecommunication Services	-0.21	-1.55
Transportation Infrastructure	-0.20	-1.37
Retail - Consumer Discretionary	-0.20	-1.50
Oil & Gas Refining, Marketing, Transportation & Storage	-0.19	-1.71

Aerospace & Defense	-0.19	-0.67
Beverages	-0.17	-1.16
Health Care Providers & Services	-0.16	-0.93
Trading Companies & Distributors	-0.15	-0.34
Food Products	-0.15	-1.00
Construction Materials	-0.14	-1.46
Commercial Services & Supplies	-0.14	-0.97
Property & Casualty Insurance	-0.13	-0.63
Retail - Food & Staples	-0.13	-0.65
Leisure Products	-0.12	-0.73
Integrated Oil & Gas	-0.12	-1.10
Investment Banking & Brokerage	-0.10	-0.51
Steel	-0.09	-0.76
Health Care Equipment & Supplies	-0.08	-0.48
Media & Entertainment	-0.08	-0.51
Automobiles	-0.07	-0.37
Broadcasting, Cable & Satellite	0.00	0.45
Pharmaceuticals	0.00	0.07
Industrial Machinery	0.02	0.05

This table presents estimated coefficients for models where the dependent (independent) variable is the natural logarithm of the coefficient of variation of actions across firms (the log-transformed time variable starting with 1 in the first year and increasing by 1 every year after) or the dependent variable is the coefficient of variation of actions across firms (the time variable starting with 1 in the first year and increasing by 1 every year after). The former estimated coefficient from log-log model is defined as Convergence % and the latter as Convergence Linear.

TABLE 2 PANEL A: Industry-level summary statistics

Variable	N	Average	Standard deviation	Minimum	Maximum
Convergence %	64	-0.28	0.15	-0.62	0.02
Convergence Linear	64	-1.70	1.19	-8.37	0.45
Environmental Weight	64	35.60	18.12	5.41	70.00
Social Weight	64	40.84	14.07	17.57	73.38
Leader	64	33.28	16.81	0.00	89.50
Attention	64	26.45	25.11	3.46	165.77
Tone	64	60.72	4.28	48.55	67.46
Size	64	21.87	0.81	19.02	24.16
ROC	64	8.21	3.59	-10.00	23.61
PTE	64	16.42	4.51	-4.27	25.37
Herfindahl	64	9.45	4.29	2.92	20.65
USA	64	0.441	0.193	0.000	0.941
JP	64	0.115	0.103	0.000	0.512
UK	64	0.056	0.062	0.000	0.288
Australia	64	0.037	0.050	0.000	0.249
Canada	64	0.031	0.059	0.000	0.313
EU non-UK	64	0.094	0.089	0.000	0.438
Brazil	64	0.010	0.020	0.000	0.087

Korea	64	0.029	0.044	0.000	0.190
China	64	0.021	0.032	0.000	0.118
India	64	0.024	0.060	0.000	0.340
Mexico	64	0.005	0.015	0.000	0.074
Malaysia	64	0.013	0.033	0.000	0.150
Russia	64	0.007	0.032	0.000	0.242
Singapore	64	0.010	0.037	0.000	0.271
South Africa	64	0.029	0.044	0.000	0.219

TABLE 2 PANEL B: Industry-level correlation matrix

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Convergence %	(1)	1.00													
Convergence Linear	(2)	0.76	1.00												
Environmental Weight	(3)	-0.16	-0.23	1.00											
Social Weight	(4)	-0.05	0.09	-0.83	1.00										
Leader	(5)	-0.07	0.08	0.03	0.07	1.00									
Attention	(6)	0.16	0.22	0.00	0.14	0.07	1.00								
Tone	(7)	-0.13	0.15	0.28	-0.23	0.24	0.02	1.00							
Size	(8)	0.13	0.06	0.25	-0.11	0.04	0.37	0.04	1.00						
ROC	(9)	0.00	-0.34	-0.06	0.13	-0.09	0.09	-0.17	0.30	1.00					
PTE	(10)	0.16	0.07	-0.03	0.05	0.07	0.06	0.24	0.05	0.66	1.00				
Herfindahl	(11)	-0.38	-0.23	-0.01	0.07	0.26	0.16	0.05	-0.07	-0.06	-0.11	1.00			
USA	(12)	-0.23	0.00	0.00	0.03	0.14	-0.16	0.33	-0.37	-0.08	0.15	0.09	1.00		
JP	(13)	-0.03	0.00	0.05	0.10	0.12	-0.01	0.22	0.20	0.07	0.12	0.08	-0.22	1.00	
UK	(14)	0.03	-0.05	-0.27	0.25	-0.34	-0.02	-0.22	-0.29	0.16	0.08	-0.17	0.05	-0.24	1.00
Australia	(15)	0.11	-0.04	0.03	-0.16	-0.22	-0.15	-0.30	-0.22	-0.16	-0.07	-0.14	-0.33	-0.25	0.08
Canada	(16)	0.11	0.04	0.08	-0.16	-0.32	-0.07	-0.32	0.00	-0.09	-0.21	-0.21	-0.27	-0.31	0.09
EU non-UK	(17)	0.29	0.19	-0.14	-0.01	0.12	-0.02	-0.05	0.20	0.06	0.05	-0.06	-0.40	-0.14	-0.04
Brazil	(18)	0.07	0.02	0.15	-0.03	0.04	0.03	-0.04	0.42	0.02	-0.01	-0.20	-0.19	-0.07	0.00
Korea	(19)	-0.13	-0.08	0.22	-0.18	0.29	0.01	0.11	0.42	0.01	-0.07	0.19	-0.10	0.16	-0.31
China	(20)	0.10	0.07	0.10	-0.09	-0.12	0.36	-0.11	0.39	-0.11	-0.25	-0.18	-0.30	-0.08	-0.22
India	(21)	-0.03	-0.13	-0.10	0.20	-0.05	0.29	-0.18	0.06	0.15	-0.09	0.17	-0.21	0.17	-0.08
Mexico	(22)	0.25	0.17	0.00	-0.11	-0.08	-0.06	-0.24	-0.13	0.01	0.06	0.09	-0.27	-0.24	0.12
Malaysia	(23)	0.00	-0.09	0.01	-0.15	-0.13	-0.08	-0.06	0.04	0.01	-0.03	0.02	-0.24	-0.16	-0.08
Russia	(24)	0.17	0.07	0.16	-0.23	-0.21	0.12	-0.24	0.35	-0.04	-0.22	-0.08	-0.31	-0.16	-0.15
Singapore	(25)	-0.01	0.02	-0.04	-0.07	-0.12	-0.11	0.02	-0.09	-0.06	0.00	-0.08	-0.28	0.23	-0.14
South Africa	(26)	0.06	0.06	0.02	-0.06	-0.22	-0.06	-0.04	-0.02	-0.14	-0.02	-0.05	-0.30	-0.11	0.11

TABLE 2 PANEL B: (Continued)

Variable		(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Australia	(15)	1.00										
Canada	(16)	0.23	1.00									
EU non-UK	(17)	0.01	0.03	1.00								
Brazil	(18)	-0.12	0.03	0.13	1.00							
Korea	(19)	-0.05	-0.23	-0.20	0.14	1.00						
China	(20)	0.13	0.13	0.09	-0.04	-0.02	1.00					
India	(21)	-0.17	-0.13	-0.14	0.00	-0.07	0.13	1.00				
Mexico	(22)	0.31	0.33	0.11	-0.08	-0.09	0.15	-0.02	1.00			
Malaysia	(23)	0.20	-0.09	0.08	0.00	0.19	-0.08	-0.07	0.00	1.00		
Russia	(24)	0.09	0.40	0.17	0.29	-0.06	0.31	0.02	0.01	0.00	1.00	
Singapore	(25)	0.16	-0.11	0.26	-0.07	-0.03	0.06	-0.09	-0.06	-0.04	-0.04	1.00
South Africa	(26)	0.23	0.50	-0.03	0.10	-0.12	-0.03	-0.15	0.38	-0.03	0.01	-0.05

TABLE 3 Panel A: Industry-level variation in convergence of sustainability actions within industry over time (balanced panel)

Dependent Variable	Convergence %		Convergence %		Convergence %		Convergence %		Convergence Linear		Convergence %	
Model	(1)		(2)		(3)		(4)		(5)		(6)	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.4428	0.159	-0.2135	0.639	-1.1112	0.035	-1.1705	0.157	-19.9397	0.000	-1.3435	0.145
Environmental Weight	-0.0059	0.002	-0.0058	0.001	-0.0056	0.001	-0.0057	0.001	-0.0344	0.001	-0.0058	0.001
Social Weight	-0.0075	0.001	-0.0069	0.002	-0.0080	0.000	-0.0077	0.001	-0.0255	0.054	-0.0076	0.001
Leader	0.0001	0.929	0.0006	0.528	0.0423	0.002	0.0515	0.001	0.4507	0.000	0.0358	0.024
Leader x Tone					-0.0007	0.002	-0.0009	0.001	-0.0076	0.000	-0.0006	0.024
Attention	0.0015	0.011	0.0013	0.043	0.0018	0.000	0.0024	0.002	0.0208	0.000	0.0018	0.020
Tone	-0.0040	0.438	-0.0099	0.041	0.0131	0.139	0.0226	0.048	0.2476	0.000	0.0112	0.292
Size			0.0449	0.016	0.0230	0.245	0.0134	0.760	0.2878	0.177	0.0491	0.280
ROC			-0.0167	0.004	-0.0061	0.304	-0.0033	0.710	-0.1754	0.003	-0.0086	0.322
PE			0.0146	0.002	0.0106	0.019	0.0061	0.336	0.0926	0.057	0.0075	0.291
Herfindahl			-0.0120	0.003	-0.0085	0.028	-0.0125	0.018	-0.0711	0.034	-0.0136	0.037
Geographic Controls	No		No		No		Yes		Yes		Yes	
Adjusted R-squared	13.2%		34.0%		43.4%		43.7%		68.4%		35.6%	
N	64		64		64		64		64		64	

This table presents estimated coefficients and p-values from ordinary least squares models using cross sectional data at the industry level. For models 1-4 and 6 the dependent variable is the estimated coefficient on the logarithm transformed timetrend variable in industry specific models where the dependent variable is the natural logarithm of the coefficient of variation of practices across firms. For model 5 dependent variable is the estimated coefficient on the timetrend variable in industry specific models where the dependent variable is the coefficient of variation of practices across firms. In models 1-6 the coefficient of variation is constructed from a balanced sample that includes the same firms over all years between 2012 and 2019. Environmental (social) weight is the across years mean of the average weight across all firms within an industry assigned by MSCI to all environmental (social) issues when calculating the overall ESG score. Leader is the across years mean for each industry of the percentage of large firms (top decile of market capitalization in all models except for firm sales in model 6), that score at the top quartile of MSCI's ESG rating. Attention is the volume of ESG-related articles as measured by TruValue Labs averaged across companies and years in an industry. Tone is a measure of how positive or negative is the sentiment across the volume of ESG-related articles as measured by TruValue Labs averaged across companies and years in an industry. Size is the average natural logarithm of the market capitalization of all sample firms in an industry and then across years. ROC is the average Return on Capital of all sample firms in an industry and then across years. PE is the average Price to Earnings Ratio of all sample firms in an industry and then across years. Geographic controls include 15 variables that measure for each industry the percentage of firms coming from each one of the following geographies: USA, UK, EU x UK, Canada, Australia, China, Brazil, Mexico, India, Malaysia, South Korea, Japan, Singapore, Russia and South Africa. Herfindahl index is the sum of the squares of the market shares of the firms within the industry where the market shares are expressed as fractions of all sample firms in an industry and then averaged across years. All independent variables are constructed using the full unbalanced sample. Standard errors are heteroscedasticity robust.

TABLE 3 Panel B: Industry-level variation in convergence of sustainability actions within industry over time (unbalanced panel)

Dependent Variable	Convergence %											
Model	(1)		(2)		(3)		(4)		(5)		(6)	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	-1.6578	0.0001	-2.9030	0.0000	-2.3219	0.0164	-3.7418	0.0067	-2.7124	0.0205	-1.8138	0.2581
Environmental Weight	-0.0041	0.0015	-0.0037	0.0035	-0.0038	0.1290	-0.0021	0.4666	-0.0012	0.6583	-0.0030	0.4640
Social Weight	-0.0057	0.0000	-0.0043	0.0080	-0.0073	0.0233	-0.0040	0.3301	-0.0052	0.1901	-0.0069	0.2271
Leader	0.0440	0.0000	0.0578	0.0000	0.0740	0.0038	0.0862	0.0068	0.0505	0.0790	0.0736	0.0346
Leader x Tone	-0.0007	0.0000	-0.0010	0.0000	-0.0012	0.0050	-0.0014	0.0121	-0.0008	0.0999	-0.0012	0.0439
Attention	0.0024	0.0000	0.0026	0.0000	0.0033	0.0016	0.0033	0.0143	0.0012	0.3897	0.0025	0.1442
Tone	0.0163	0.0052	0.0303	0.0000	0.0257	0.1065	0.0371	0.1176	0.0288	0.1366	0.0445	0.0660
Size	0.0352	0.0087	0.0576	0.0232	0.0393	0.1909	0.0510	0.4421	0.0437	0.3478	-0.0440	0.5927
ROC	-0.0018	0.6807	-0.0012	0.8201	0.0197	0.0909	0.0270	0.0815	-0.0003	0.9832	0.0225	0.2248
PE	0.0022	0.5215	0.0008	0.8379	-0.0087	0.3419	-0.0138	0.2427	-0.0009	0.9358	-0.0117	0.4105
Herfindal	-0.0053	0.0667	-0.0079	0.0174	-0.0032	0.6304	-0.0059	0.5533	-0.0017	0.8411	0.0049	0.6031
Geographic Controls	No		Yes		No		Yes		No		Yes	
Adjusted R-squared	52.1%		60.3%		26.7%		18.9%		5.2%		1.0%	
N	66		66		66		66		66		66	

This table presents estimated coefficients and p-values from ordinary least squares models using cross sectional data at the industry level. The dependent variable is the estimated coefficient on the logarithm transformed timetrend variable in industry specific models where the dependent variable is the natural logarithm of the coefficient of variation of practices across firms. In models 1-6 the coefficient of variation is constructed from an unbalanced sample of firms with MSCI coverage that varies across years. Model 1-2, 3-4 and 5-6 estimate the coefficient on the timetrend variable from years 2012 to 2019, 2009 to 2019 and 2006 to 2019 respectively. Environmental (social) weight is the across years mean of the average weight across all firms within an industry assigned by MSCI to all environmental (social) issues when calculating the overall ESG score. Leader is the across years mean for each industry of the percentage of large firms (top decile of market capitalization), that score at the top quartile of MSCI's ESG rating. Attention is the volume of ESG-related articles as measured by TruValue Labs averaged across companies and years in an industry. Tone is a measure of how positive or negative is the sentiment across the volume of ESG-related articles as measured by TruValue Labs averaged across companies and years in an industry. Size is the average natural logarithm of the market capitalization of all sample firms in an industry and then across years. ROC is the average Return on Capital of all sample firms in an industry and then across years. PE is the average Price to Earnings Ratio of all sample firms in an industry and then across years. Geographic controls include 15 variables that measure for each industry the percentage of firms coming from each one of the following geographies: USA, UK, EU x UK, Canada, Australia, China, Brazil, Mexico, India, Malaysia, South Korea, Japan, Singapore, Russia and South Africa. Herfindahl index is the sum of the squares of the market shares of the firms within the industry where the market shares are expressed as fractions of all sample firms in an industry and then averaged across years. All independent variables are constructed using the full unbalanced sample. Standard errors are heteroscedasticity robust.

TABLE 4 Panel A: Summary statistics for convergence at the industry–action level

Actions	N	Average	Standard Deviation	3rd Quartile	1st Quartile	Maximum	Minimum	# of Industries Unique
All Practices	846	-0.08	0.37	0.08	-0.25	2.81	-2.89	N/A
Access to communication	4	0.15	0.32	0.40	-0.11	0.57	-0.12	2
Access to finance	10	0.09	0.25	0.13	-0.05	0.68	-0.22	7
Access to healthcare	3	-0.28	0.28	0.02	-0.55	0.02	-0.55	1
Anticompetitive practices	63	-0.24	0.34	-0.04	-0.43	0.71	-0.89	19
Biodiversity and land use	14	-0.03	0.22	0.05	-0.13	0.57	-0.35	7
Business ethics and fraud	66	-0.01	0.36	0.13	-0.22	1.01	-0.82	33
Carbon emissions	66	-0.06	0.14	0.02	-0.17	0.25	-0.38	32
Chemicals safety	18	0.03	0.32	0.20	-0.14	0.75	-0.58	10
Controversial sourcing	7	-0.16	0.59	0.25	-0.63	0.98	-0.67	2
Corporate governance	66	-0.21	0.15	-0.13	-0.32	0.22	-0.47	10
Corruption	44	0.07	0.32	0.18	-0.03	1.01	-0.67	34
Energy efficiency	19	-0.03	0.44	0.18	-0.20	0.77	-1.32	13
Electronic waste	5	-0.13	0.22	0.06	-0.17	0.07	-0.48	2
Financial system instability	8	-0.27	0.25	-0.14	-0.46	0.18	-0.60	1
Financing environmental impact	7	-0.09	0.17	0.07	-0.24	0.09	-0.32	3
Financial products safety	8	-0.17	0.59	-0.02	-0.54	1.03	-0.92	2
Health and safety	66	-0.25	0.27	-0.07	-0.45	0.36	-0.97	16
Human capital development	23	0.09	0.35	0.18	-0.14	1.43	-0.32	14
Insurance climate change risk	5	-0.07	0.47	0.21	0.00	0.32	-0.88	4
Insurance health demographic risk	6	-0.22	0.53	0.00	-0.19	0.34	-1.23	2
Labor management	66	0.11	0.20	0.19	-0.03	0.73	-0.19	51
Opportunities clean tech	26	-0.08	0.16	0.03	-0.17	0.22	-0.47	12
Opportunities green buildings	5	-0.16	0.65	-0.23	-0.51	0.97	-0.58	1
Opportunities nutrition health	5	-0.19	0.13	-0.16	-0.29	-0.01	-0.32	1
Opportunities renewable energy	1	-0.16	0.00	-0.16	-0.16	-0.16	-0.16	0
Packing materials and waste	3	-0.09	0.19	0.06	-0.31	0.06	-0.31	2
Privacy and data security	26	0.15	0.79	0.50	-0.32	2.81	-1.01	15
Product carbon footprint	9	0.03	0.17	0.09	-0.04	0.27	-0.29	7
Product safety and quality	29	-0.18	0.41	0.07	-0.35	0.42	-1.54	9
Raw material sourcing	14	-0.26	0.46	-0.01	-0.54	0.48	-1.25	6
Responsible investing	10	0.23	0.60	0.20	-0.06	1.85	-0.09	6
Supply chain labor	12	-0.55	0.88	-0.08	-0.80	0.41	-2.89	3
Toxic emission waste	66	-0.19	0.35	-0.02	-0.34	0.69	-1.97	19
Water stress	66	0.03	0.19	0.13	-0.08	0.56	-0.51	45

This table shows the magnitude of convergence across different sustainability actions estimated at the industry–action pair level. Convergence is the estimated coefficient from a model where the dependent variable is the natural logarithm of the coefficient of variation of actions across firms and the independent variable is the logarithm-transformed timetrend variable. The coefficient of variation is constructed from a balanced sample that includes the same firms over all years between 2012 and 2019. # of Industries Unique is a measure counting the number of industries that this practice would be classified as unique using an on average annual 5% convergence rate as the threshold to identify a unique action.

Table 4 Panel B: Industry-action level variation in convergence and action characteristics

Dependent Variable	Convergence %			
Model	(1)		(2)	
	Estimate	p-value	Estimate	p-value
Intercept	-0.019	0.627	-0.025	0.820
Low Market Uncertainty	-0.049	0.226	-0.046	0.245
Low Regulatory Uncertainty	-0.140	0.023	-0.142	0.022
High Practice Novelty	0.161	0.004	0.156	0.006
Industry effects	No		Yes	
Adjusted R-squared	5.4%		6.1%	
N	843		843	

This table presents estimated coefficients and p-values from ordinary least squares models using panel data at the industry-practice level. The dependent variable is the estimated coefficient on the logarithm transformed timetrend variable in industry specific models where the dependent variable is the natural logarithm of the coefficient of variation of practices across firms. Low Market Uncertainty is an indicator variable taking the value of one if the across firm and years average of the weight on a practice for all firms in the industry is above the median. Low Regulatory Uncertainty is an indicator variable taking the value of one for practices where policies and regulations are identified as drivers of the practice (e.g., anti-competitive practices, toxic emissions, chemical safety, corruption, financial stability, financial product safety, employee health and safety, product safety and supply chain labor). High Practice Novelty is an indicator variable taking the value of one for practices where they require the use of novel knowledge and technologies (e.g., access to finance, access to communications, financing of environmental impact, data privacy, product carbon footprint, responsible investing). Standard errors are clustered at the practice level and are heteroscedasticity robust.

TABLE 5 PANEL A: Summary statistics for financial performance analysis

Variable	N	Average	Standard Deviation	Minimum	Maximum
Unique Actions	39,424	4.98	1.54	0.00	10.00
Common Actions	39,424	4.14	1.78	0.00	10.00
ROC	39,040	7.47	11.95	-30.00	50.00
ROA	38,728	4.71	8.94	-30.00	35.00
ROS	39,118	8.63	16.50	-40.00	50.00
Asset Turnover	39,012	72.64	63.94	0.00	300.00
Log Tobin's Q	38,949	0.45	0.55	-0.69	2.20
R&D/Sales	39,424	3.52	12.85	0.00	100.00
CAPEX/Assets	37,216	5.19	6.46	0.00	50.00
Log Market Cap	39,064	21.70	1.51	17.00	28.26
Debt/Assets	38,895	25.10	20.07	0.00	100.00

TABLE 5 PANEL B: Correlation matrix for financial performance analysis

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unique Actions	(1)	1.000									
Common Actions	(2)	0.045	1.000								
ROC	(3)	0.047	0.062	1.000							
ROA	(4)	0.027	0.051	0.944	1.000						
ROS	(5)	0.066	-0.002	0.615	0.666	1.000					
Asset Turnover	(6)	-0.004	0.082	0.278	0.254	-0.206	1.000				
Log Tobin's Q	(7)	0.014	-0.005	0.304	0.265	-0.014	0.265	1.000			
R&D/Sales	(8)	-0.028	-0.047	-0.350	-0.401	-0.364	-0.112	0.324	1.000		
CAPEX/Assets	(9)	-0.110	-0.034	0.039	0.073	-0.022	0.025	0.047	-0.084	1.000	
Log Market Cap	(10)	0.003	0.138	0.225	0.224	0.210	-0.097	0.157	-0.072	-0.017	1.000
Debt/Assets	(11)	-0.033	0.029	-0.126	-0.057	-0.049	-0.129	-0.127	-0.106	0.101	0.033

TABLE 6: Operating performance analysis

Dependent Variable	ROC		ROA		ROS		Asset Turnover	
Model	(1)		(2)		(3)		(4)	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	14.480	0.001	5.753	0.003	2.124	0.471	-55.995	0.098
Unique Actions	0.251	0.000	0.116	0.001	0.295	0.000	0.652	0.000
Common Actions	-0.013	0.788	-0.043	0.197	-0.104	0.089	0.093	0.499
Lag Operating Performance	0.418	0.000	0.418	0.000	0.410	0.000	0.762	0.000
Industry Effects	Yes		Yes		Yes		Yes	
Country Effects	Yes		Yes		Yes		Yes	
Year Effects	Yes		Yes		Yes		Yes	
Firm Effects	No		No		No		No	
Firm Characteristics	No		No		No		No	
Adjusted R-squared	31.4%		31.8%		36.5%		83.6%	
N	35,464		35,485		37,184		36,818	

TABLE 6: operating performance analysis (Continued)

Dependent Variable	ROC		ROC		ROC		ROC		ROC	
Model	(5)		(6)		(7)		(8)		(9)	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	14.366	0.001	14.674	0.001	1.311	0.615	-0.019	0.916	-10.290	0.035
Unique Actions	0.238	0.000	0.220	0.000	0.163	0.000	0.197	0.000	0.153	0.002
Common Actions	0.007	0.885	0.012	0.805	0.049	0.062	-0.036	0.225	-0.180	0.000
Lag Operating Performance	0.418	0.000	0.417	0.000	0.675	0.000			0.339	0.000
Industry Effects	Yes		Yes		Yes		No		Yes	
Country Effects	Yes		Yes		Yes		No		Yes	
Year Effects	Yes		Yes		Yes		Yes		Yes	
Firm Effects	No		No		No		Yes		No	
Firm Characteristics	No		No		No		No		Yes	
Adjusted R-squared	31.4%		31.4%		51.8%		58.0%		40.0%	
N	35,464		35,464		38,861		39,040		33,332	

This table presents estimated coefficients and p-values from ordinary least squares models using panel-level data at the firm-year level. For Models 1 and 5–9, the dependent variable is return on capital (ROC) calculated as (Net Income + ((Interest Expense on Debt -Interest Capitalized) * (1-Tax Rate))) / average of current and last year's (total capital + short-term debt + current portion of long-term debt). For Model 2, the dependent variable is return on assets (ROA) calculated as (Net Income + ((Interest Expense on Debt -Interest Capitalized) * (1-Tax Rate))) / average of current and last year's (total assets). For Model 3, the dependent variable is return on sales (ROS) calculated as Net Income over Sales. For Model 4, the dependent variable is asset turnover calculated as sales over total assets. Unique actions is calculated as the weighted average score of all ESG actions classified as unique for that firm. Common actions is calculated as the weighted average score of all ESG actions classified as common for that firm. In Models 1–4 and 7–9, a practice–industry pair is classified as unique (common) if the estimated coefficient on a timetrend variable in practice-industry-specific models where the dependent variable is the coefficient of variation of actions across firms is less (more) than −5%. In Models 5 and 6, actions are classified as unique (common) if the estimated coefficient is less (more) than 0 or −10% respectively. Operating performance before is measured as the average of the dependent variable of each model in years 2010 and 2011 for Models 1–6 and 9. Operating performance before is measured as the 1-year lag of the dependent variable in Model 7. Firm characteristics as controls include firm size measured as the natural logarithm of calendar year-end market capitalization, capital expenditures over total assets, research and development expenditures over sales, and total debt over total assets. Standard errors are heteroscedasticity robust and clustered at the firm level.

TABLE 7: Market valuation analysis

Dependent Variable	Log (Tobin's Q)											
Model	(1)		(2)		(3)		(4)		(5)		(6)	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.420	0.080	-0.438	0.035	0.401	0.096	0.426	0.079	0.086	0.262	0.033	0.642
Unique Actions	0.010	0.000	0.007	0.000	0.011	0.000	0.008	0.000	0.005	0.000	0.004	0.012
Common Actions	0.000	0.846	-0.005	0.003	0.001	0.443	0.002	0.240	0.003	0.000	0.001	0.106
Lag Tobin's Q	0.658	0.000	0.536	0.000	0.658	0.000	0.658	0.000	0.883	0.000		
Industry Effects	Yes		Yes		Yes		Yes		Yes		No	
Country Effects	Yes		Yes		Yes		Yes		Yes		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes	
Firm Effects	No		No		No		No		No		Yes	
Firm Characteristics	No		Yes		No		No		No		No	
Adjusted R-squared	63.2%		68.8%		63.2%		63.2%		86.3%		88.9%	
N	34,431		32,502		34,431		34,431		38,559		38,949	

This table presents estimated coefficients and p-values from ordinary least squares models using panel-level data at the firm-year level. Across all models, the dependent variable is the natural logarithm of Tobin's Q calculated as (total assets – book value of equity + market value of equity) / total assets. Unique actions is calculated as the weighted average score of all ESG actions classified as unique for that firm. Common actions is calculated as the weighted average score of all ESG actions classified as common for that firm. In Models 1–2 and 5–6, a practice–industry pair is classified as unique (common) if the estimated coefficient on a timetrend variable in practice-industry-specific models where the dependent variable is the coefficient of variation of actions across firms is less (more) than −5%. In Models 3 and 4, actions are classified as unique (common) if the estimated coefficient is less (more) than 0 or −10% respectively. Tobin's Q Before is measured as the average of the dependent variable of each model in years 2010 and 2011 for Models 1–4. Operating performance before is measured as the 1-year lag of the dependent variable in Model 5. Firm characteristics as controls include firm size measured as the natural logarithm of calendar year-end market capitalization, return on assets, capital expenditures over total assets, research and development expenditures over sales, and total debt over total assets. Standard errors are heteroscedasticity robust and clustered at the firm level.