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RESEARCH ARTICLE

Leadership and decision-making: Top management team age demographic and environmental strategy

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Abstract

This research examines the characteristics of the age demographic of a top management team (TMT) as drivers of a firm's environmental management (EM) strategy comprising compliance-only and beyond-compliance initiatives. Using a matched sample of publicly listed firms in Kinder, Lydenberg, and Domini and Bloomberg, panel data regression techniques on a unique dataset of 3,251 firm-year observations suggest that a link does exist. Driven by a desire for legacy and a preference for risk-averse decisions, aging TMTs will support beyond-compliance initiatives. On the other hand, age diversity is expected to enhance the innovative potential of a TMT for solving pressing compliance-related environmental issues. The study finds that aging TMTs support beyond-compliance as compared to compliance-only EM strategies. TMT age diversity, though helpful in developing compliance-only initiatives, is not instrumental in driving beyond-compliance initiatives. The study highlights the challenges in developing a comprehensive EM strategy suggesting paths for future research.

Keywords: environmental strategy leadership age; top management team; generativity; panel study

Introduction

Scholars continue to look for drivers of strategic initiatives resulting in positive environmental behavior in firms (Barnett & Salomon, 2012; Delmas, Nairn-Birch, & Lim, 2015; Galbreath, 2011; Huang, 2010; Klassen & McLaughlin, 1996; Kumar, Cantor, Grimm, & Hofer, 2017; Russo & Fouts, 1997; Trumpp & Guenther, 2015; Walls, Berrone, & Phan, 2012). The role of organizational leadership has drawn scrutiny in setting the environmental behavior of its constituents and the firm (Huang, 2010; Lipshitz & Mann, 2005; Robertson & Carleton, 2018). Robertson and Carleton (2018) find transformational leadership affects pro-environmental behavior witnessed in employees. Given that the top management teams (TMTs) have been cited to have the greatest effect on organizational functioning (Hambrick, 2007; O'Reilly, Snyder, & Boothe, 1993), and responsible for formulating strategic initiatives (Goll & Rasheed, 2005; Sharma, 2000), it is important to examine TMT attributes that bodes favorably for environmental management (EM) initiatives. Specifically, TMT age characteristics and its impact on firm innovation and performance has received continued attention (Tanikawa & Jung, 2016; Tanikawa, Kim, & Jung, 2017; Yang & Wang, 2014). In the EM context, age as a board characteristic has been examined for its impact on eco-friendly decision-making (Hafsi & Turgut, 2013; Post, Rahman, & Rubow, 2011), but the findings lack consensus. The ambiguity around the impact of age is potentially due to a lack of separation between distinct EM strategies. EM strategies can be divided into compliance-only and beyond-compliance initiatives (Chatterji, Levine, & Toffel, 2009; Walls, Berrone, & Phan, 2012) that carry different levels of commitment, risk, and exposure. Extant studies have noted that with age executives tend to be risk-averse (Al Shammari, 2018; Chaganti, Zimmerman, Kumaraswamy, Maggitti, & Arkles, 2016; Lippi & Di

Battista, 2017), and less willing to adopt change with a preference for established routine (Wiersema & Bantel, 1992). The uncertainty of outcomes from EM initiatives (see Paulraj, Chen, and Blome, 2017) creates risk in terms of adoption. On the other hand, extant research has also shown that increasing age leads to socially oriented decision-making (Grant & Wade-Benzoni, 2009; Joireman & Duell, 2005; Zaleskiewicz, Gasiorowska, & Kesebir, 2015), which would encourage socially responsible decision-making including positive EM initiatives. The maxim 'it's not how you start, it's how you finish' brings into focus the role of executive age in socially responsible decision-making (see Hunter & Rowles, 2005). By taking a closer look at the distinct types of EM strategies in the context of executive behavior driven by age, this study attempts to provide a clearer picture of the impact on EM strategy.

Research in upper management has identified TMTs as a primary driver of firm behavior (Hambrick, 2007) and strategic decision-making (Papadakis & Barwise, 2002). TMT characteristics such as education level and age diversity impact product performance (Bantel & Jackson, 1989; Hambrick, Cho, & Chen, 1996; MacCurtain, Flood, Ramamoorthy, West, & Dawson, 2010), and TMT composition has been found to impact a firm's stock market performance (Pollock, Chen, Jackson, & Hambrick, 2010). Extant research has also identified that the background of top managers can influence the actions of the firm (Finkelstein, 1992; Kumar & Paraskevas, 2018; Li, 2017). For instance, corporate social responsibility (CSR) including environmental behavior has been found to be influenced by a CEO's traits such as narcissism and hubris (Chin, Hambrick, & Treviño, 2013; Petrenko, Aime, Ridge, & Hill, 2016), and women in leadership roles as the CEO or as members of the board of directors (Glass, Cook, & Ingersoll, 2016). However, the current literature does not adequately address the underlying motivation behind environmental actions aligned with distinct EM strategies to explain the influence of the age demographic of a TMT. Risk-averse but socially oriented with increase age creates distinct agendas for establishing environmentally friendly strategies.

Drawing upon behavioral research, this study attempts to explain the impact of aging in TMTs on a firm's EM strategy. Specifically, the research looks at the influence of a TMT's average age and diversity in age composition on distinct firm-level EM strategies of compliance-only and beyond-compliance initiatives, which have also been described as reactive versus proactive strategies (Aragón-Correa & Sharma, 2003). Alternatively, reactive and proactive strategies have been categorized into higher- versus lower-cost commitments (Berliner & Prakash, 2014). As has been established in the extant literature, a firm can pursue a voluntary strategy of beyond-compliance EM initiatives, or a compliance-only strategy (Kumar, 2018; Lenz, Wetzel, & Hammerschmidt, 2017; Walls, Berrone, & Phan, 2012). Indeed, distinct EM strategies have different outcomes. Distinct EM strategies have different levels of risk and differing impact on a firm's reputation and financial performance (Bouslah, Kryzanowski, & M'Zali, 2018; Kumar, 2018). A compliance-only strategy is good for building goodwill, while a beyond-compliance strategy purposefully sways perception for influencing reputation (Kumar, 2018). A compliance-only strategy is reflective of current capabilities (or lack thereof), whereas a beyond-compliance strategy projects underlying strategic capabilities that firms commit to develop to improve their EM performance (Chatterji, Levine, & Toffel, 2009). Compliance-only initiatives are undertaken to have an immediate impact in terms of environmental performance, however, beyond-compliance initiatives do not accurately capture a firm's future environmental performance in terms of pollution and compliance violations (Chatterji, Levine, & Toffel, 2009). Relatedly, uncertain returns from environmental initiatives (see Margolis & Walsh, 2003), adds greater burden on the leadership decision-making with respect to environmental initiatives. Therefore, in the context of leadership age demographic of TMTs, this study seeks to answer the following questions:

(1) How does aging in TMTs impact distinct EM strategies (of compliance-only vs. beyond-compliance)?
(2) How does age diversity in TMTs impact distinct EM strategies?

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This paper contributes to the literature in environmental mangement by crafting original hypotheses to explore the impact of TMT age on a comprehensive EM strategy. A theoretical model is developed leveraging the theory of generativity including psychological perspectives to establish linkages between TMT behavior attributable to age and EM strategy. The distinction made between the two forms of EM strategy (compliance-only vs. a beyond-compliance strategy) allows for a finer theorization and yields a significant contribution to the general understanding of TMT decision-making in the environmental context. A research model, outlined in Figure 1, is developed based on these theoretical underpinnings. The model is tested using an original panel dataset of 3,251 firm-year records. Measures of distinct EM strategies are harvested from the Kinder, Lydenberg, and Domini (KLD) dataset. Bloomberg SPLC is used for developing measures of average age and age diversity in a TMT.

The remainder of the paper is structured as follows: The next section develops the hypotheses tested in this study with a description of the theoretical support. Next, the methodology section describes the sample, data, and the suitability of statistical models used for testing the hypotheses. Subsequently, the empirical results of the hypothesized relationships are presented. The paper concludes with a summary of the key findings, study limitations, and suggestions for future research on this topic to further expand this burgeoning area of TMT leadership research.

Theory and Hypotheses

As noted by Kumar and Paraskevas (2018), the impact of aging in environmentally friendly decision-making presents a conflicting picture. Straughan and Roberts (1999) conclude that ecologically conscious consumer behavior increases with age. Similarly, a survey by ICOM Information and Communication (2008) find that individuals over 55 years of age are the most prolific consumers of environmentally friendly products in the United States. However, in a Financial Times article, Hancock (2017) reports that younger people are driving the shift toward eco-friendly products. Within TMTs, Kumar and Paraskevas (2018) find that increasing age positively influences a firm's proactive or beyond-compliance EM strategies. Environmentally friendly behavior with aging is partially explained by changing workplace motivations. Kanfer and Ackerman (2004) suggest a decline in the importance of extrinsic work outcomes such as pay increases and promotion with age. In a meta-analysis of studies on aging and work-related motives, Kooij, De Lange, Jansen, Kanfer, and Dikkers (2011) highlight the research base leveraging socio-emotional selectivity theory that proposes an increase in the importance of social goals as opposed to materialistic gains in the context of self with aging. The explanation lies in the perception of limited time remaining by older people that results in greater importance to emotionally meaningful social interactions and goals, such as generativity. Generativity stems from concern for the future generation and is leveraged to understand the underlying motivation behind TMT decision-making.

A competing perspective is offered by research that investigates risk-averse decision-making with increasing age. According to Wiersema and Bantel (1992), flexibility and risk-taking decrease with age as resistance to change increases. Hambrick and Mason (1984) also point out that older executive might avoid risky decisions because of the importance of financial and career security. Risks related to uncertainty of financial outcomes associated with environmentally friendly decision-making have been noted in the extant literature (Figge & Hahn, 2012; Paulraj, Chen, & Blome, 2017). In line with risk-averse decision-making, Wayde, Black, and Gilpin (2017) have noted that older adults tend to make better decisions in familiar formats. Compared to their older counterparts, the authors note that younger adults demonstrate a better ability to navigate unfamiliar formats. Familiar formats will encourage status quo approaches and an avoidance of the adoption of new environmental initiatives. Arguments supporting socially oriented decision-making for environmentally friendly strategies are therefore tempered with

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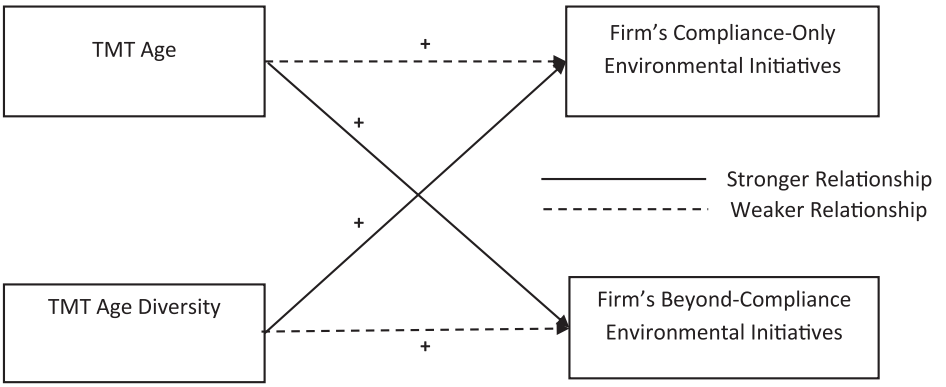

Figure 1. Research model.

risk-averse decision-making to understand support from aging executives for compliance versus beyond-compliance environmental strategies.

In sum, according to Buysse and Verbeke (2003), firms can engage in purposive environmental actions through the strategic planning process, which highlights the importance of decision-making at the leadership level in the TMTs. This study looks at the influence of a TMT's age composition on an organization's environmental strategy. As such, an appropriate theoretical base for understanding of the impact of aging on individuals is extended to study decision-making by a cohort of executives in the TMT vis-à-vis a comprehensive EM strategy. Behavioral perspectives are leveraged to understand the underlying motivations of TMT members in the context of age to hypothesize their impact on a comprehensive EM strategy of compliance-only and beyond-compliance initiatives.

The Impact from Aging on Environmental Management Strategy

Generativity has been defined as the concern for guiding and establishing the next generation (Erikson, 1950). Generative responsibility includes the responsibility to develop and maintain societal institutions and natural resources without which successive generations will suffer (Erikson, Erikson, & Kivnick, 1986). According to the theory of generativity, the motivation for generativity emanates from both cultural demands and an inner desire (Hunter & Rowles, 2005). As described by the authors, this motivation for generativity is followed by thoughts on how to act generatively that is driven by concern for the next generation, belief in the need for continuation of the species, and a commitment to generative behavior. In addition, cultural generativity is also associated with the desire to outlive oneself and is alternatively expressed as a desire to leave a mark or legacy (see Kotre, 1984). The salience of activities affecting legacy in old age has been emphasized by Schaie and Willis (2000) as well in their adult theory model of cognitive development.

Through a series of interviews, Fisher (1995) found that generativity was central to the belief in aging successfully. Though sparsely applied in strategy and management literature, the underlying principles of the theory of generativity have been used to study personal habits in specific industry contexts (Swami, Chamorro-Premuzic, Snelgar, & Furnham, 2011; Wells, Taheri, Gregory-Smith, & Manika, 2016). For instance, Wells et al. (2016) look at the link between generativity and environmental behavior in the tourism industry. They find that water and energy consumption habits are indeed influenced by the underlying motivations of generativity, which bears out of a concern for the next generation. As noted by Grant and Wade-Benzoni (2009), generativity emerges around midlife from two underlying motives spurred by death

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awareness, a desire to make lasting contribution and a desire to feel connected. According to the authors the motive to meaningfully contribute and connect can lead to personal responsibility for promoting the welfare of future generations. This can trigger a shift from self-serving values to more prosocial values (Joireman & Duell, 2005).

Generativity molded from concern for the next generation is theorized will lead to greater support among aging executives for initiatives that will ensure that the firm is compliant with laws and regulations. The support for a compliance-only strategy is based on the idea of undertaking generative actions with the belief in the need for continuation of the species (McAdams & de St Aubin, 1992), and in the quality of life associated with natural environments (Wright & Lund, 2000). Environmental infractions risk the ecosystem and the society at large. It can even cause significant loss of life and property. For instance, the British Petroleum Deepwater Horizon gulf oil spill led to the devastation of the ecosystem in states bordering the Gulf of Mexico, which has affected everyone from fishermen to people working in tourism (Vaughn, 2018). Given the extent of damage that can be incurred based on acts of omission with serious repercussions for future generations, generativity in aging executives will lead to a greater attention on compliance-only strategies. Being associated with environmental disasters as an executive of the firm would also lead to some level of social dismemberment or being ostracized, and counter to the desire of feeling connected. It would be perceived as contributing in a negative way to the wellbeing of the next generation.

Along with wellbeing of future generations, cultural generativity leads to the desire for a legacy that becomes central to decision-making as people age (Kotre, 1984). Legacy has been attached with the desire to outlive oneself creating a form of symbolic immortality. Cultural generativity is defined as the vehicle that carries the meaning of life from one generation to the other (Manheimer, 1995). Extant research has examined latent motivation to extend themselves into the future via their personal legacies, which may provide a pathway to pro-environmental, intergenerational action (Fox, Tost, & Wade-Benzoni, 2010; Wade-Benzoni, Tost, Hernandez, & Larrick, 2012; Zaval, Markowitz, & Weber, 2015). According to Wade-Benzoni et al. (2012), the latent motivation can generate preemptive actions on long-term environmental threats, such as switching from fossil fuels to clean-energy over a period of time. For creating a legacy, it is also important to manage and cultivate a perception of oneself. Compliance-only strategy helps with building goodwill and does not necessarily contribute to creating legacy. The fact is that it is often the case where compliance-only action does not attract attention, goes unreported, and only comes to light in terms of compliance inaction when there is an infraction. As such, compliance-only initiatives make it difficult to create a perceptive influence (Kumar, 2018). In contrast, beyond-compliance actions are highlighted for consumption by stakeholders. Thereby, beyond-compliance actions have greater relevance in the desire to create a legacy. Surveys indicate that people who care about legacy tend to care more about climate change issues and intend to perform more voluntary beyond-compliance environmentally friendly actions (Zaval, Markowitz, & Weber, 2015).

Anecdotal evidence exists in support of the arguments for beyond-compliance initiatives in aging executives. For instance, in his 'Ted Talk' Ray Andersen emphasizes how he came to an inflection point in life when he pivoted Interface, a producer of carpet tiles, by taking significant steps around energy conservation and pollution prevention to move away from the 'take, make, waste' industrial system that he refers to as a 'crime against our children' by focusing on renewables, energy conservation, and pollution prevention[1]. Ray Andersen's talk highlights that the pivot toward environmentally friendly activities stem from an inner desire for societal generativity that includes serving in roles of mentorship, providing leadership, and generally contributing to the wellbeing of the subsequent generation, which increases with age (Snarey, 1993). Examples, such as those of Ray Andersen highlight the importance of the phrase 'it's not how you start it's how you finish' in the context of environmental behavior.

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However, the enthusiasm for adopting environmentally friendly strategies might be tempered given the uncertain returns coupled with risk-averse decision-making by aging executives. As noted by Albertini (2013), environmental initiatives require significant investment. Given that the increase in production costs cannot be fully recouped from selling prices, there is a negative impact on firm performance (Klassen & Whybark, 1999). In addition, returns from environmental initiatives take time to fruition resulting in uncertainty about outcomes (Aragón-Correa & Sharma, 2003; Hart, 1995; Khanna & Damon, 1999). With the potential of compliance-only initiatives having an immediate impact on cost and firm performance, it would temper the enthusiasm for their adoption. Prior research has noted that compliance-only initiatives are considered higher-cost commitments (Berliner & Prakash, 2014). For instance, evidence of the cost of compliance has been reported by Wall (2018) where a small business must invest to convert its fleet of boats operating in Amsterdam's canals from diesel to electric to meet regulations.

In sum, aging executives will support a comprehensive environmental strategy of both compliance-only and beyond-compliance initiatives. However, with a compliance-only strategy it is difficult to create a perceptive influence to establish legacy. The desire for a beyond-compliance strategy is tied to both future wellbeing and legacy. In addition, the risk to impending firm performance is greater from compliance initiatives. Given the risk-averse characteristic of decision-making with increasing age coupled with the desire to leave a legacy, it is therefore the case that beyond-compliance initiatives will have a stronger calling for aging executives. Therefore, the relationship between aging and distinct components of a comprehensive EM strategy comprising compliance-only and beyond-compliance initiatives are formulated as follows:

Hypothesis 1: Compared to a compliance-only environmental management strategy, higher levels of aging within TMTs will have a stronger positive influence on a firm's beyond-compliance environmental management strategy.

The Impact from Age Diversity on Environmental Management Strategy

The age diversity on a leadership or TMT presents a different narrative in support of a comprehensive EM strategy. The arguments around greater support for environmental initiatives with aging do not fully capture the impact from the demographic variance in age within a TMT. Not only does the level of support for environmental initiatives differ between executives from different age groups, it is entirely possible that their preferences could straddle varying priorities in the pursuit of environmental objectives. Therefore, executives from different age cohorts will introduce their own unique set of ideas. Prior research findings have indicated that strategic choices are an outcome of the idiosyncrasies and unique perspective of TMT members (Talke, Salomo, & Rost, 2010).

The diversity in ideas from demographic variance sheds light on innovation and innovative approaches of tackling EM issues. In general, diversity within TMTs has been noted to promote innovation (Talke, Salomo, & Rost, 2010; West & Anderson, 1996). With individuals spanning a range on the age demographic within a TMT, it will result in a richer set of ideas promoting innovation. The role of innovation as a driver of improved environmental performance has been examined in the extant literature (Carrión-Flores & Innes, 2010; Chiou, Chan, Lettice, & Chung, 2011). For example, Aguado, Alvarez, and Domingo (2013) emphasize innovation for adopting sustainable and lean processes. Given the requirement for new approaches to meet the requirements of EM in terms of both processes and products, age diversity on TMTs can be beneficial. It can therefore be hypothesized that diversity in age within a TMT cohort will assist in finding solutions for compliance-only initiatives as well as beyond-compliance planning.

While there will be a positive impact from a diversity of ideas on EM issues through innovation, differences will exist in the impact of age diversity between compliance-only and beyond-

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compliance strategies. Compliance-only are regulation driven initiatives and firms are obliged to find solutions by law. In this respect, a diverse set of ideas will be helpful as a firm struggles to find solutions for compliance issues. However, beyond-compliance strategies are more futuristic with greater time for debate before finalizing such strategies. Without a pressing need to find solutions, it is understandable that beyond-compliance strategic initiatives would require more of a consensus among TMT executives. For example, launching of a new eco-friendly product would require buy-in from each member of the TMT for proper planning and effective utilization of a firm's resource base. However, demographic diversity in age, which leads to unique but differing perspectives will hinder the process of building consensus. Difficulty in building consensus due to diversity in the TMT has been established early on in extant research (Barkema & Shvyrkov, 2007; Chhabra & Popli, 2019; Harrison & Klein, 2007; Knight et al., 1999).

Given the arguments for the impact of age diversity in TMTs, the relationship with distinct environmental strategies is therefore hypothesized as follows:

Hypothesis 2: Compared to a beyond-compliance environmental management strategy, higher levels of age diversity within TMTs will have a stronger positive influence on a firm's compliance-only environmental management strategy.

Methodology

Sample and data

The sample is made up of US firms with environmental records in the KLD dataset. Bloomberg SPLC database is used for harvesting data on TMT age. Compustat database is used for financial data on the firms in the sample for control variables. KLD dataset has been extensively used in prior environmental studies (see Chatterji, Levine, & Toffel, 2009; Kumar, 2018; Walls, Berrone, & Phan, 2012). KLD rates firms on several dimensions that are mapped to categories comprising environmental, social, and governance initiatives within a firm (Chatterji, Levine, & Toffel, 2009). For the purposes of this study, data are collected on the environmental dimension. Using Bloomberg SPLC database, executive profiles for each manager is extracted to record their age. An unbalanced panel dataset is constructed covering a period from 2006 to 2013. The initial Bloomberg sample comprises 726 unique firms and 110 unique 4-digit NAICS codes with data over a period of 2006–2013. After limiting observations to firms with complete data in KLD, Bloomberg, and Compustat, the net result of the data collection efforts is an 8-year unbalanced sample of 538 unique firms covering 88 distinct NAICS industry codes at the 4-digit level for a total of 3,251 firm-year observations.

Dependent variable

The study employs two dependent variables, a compliance-only and a beyond-compliance EM strategy score. Following prior research (Walls, Berrone, & Phan, 2012), the study uses environmental strengths and concerns reported in the KLD data as distinct measures of a firm's beyond-compliance (*Beyond-Compliance Score*) and compliance-only (*Compliance-Only Score*) strategies, respectively. For the period 2006–2013, KLD rates firms on several factors comprising environmental strengths such as – beneficial product and services; pollution prevention; recycling; clean energy – that comprise a beyond-compliance strategy. Similarly, for concerns as well KLD rates several factors such as – hazardous waste, ozone depleting chemicals, substantial emissions; climate change, and regulatory violations – that comprise a compliance-only strategy. As noted by Walls, Berrone, and Phan (2012), 'Environmental concerns capture pollution levels fairly well, but environmental strengths do not accurately predict future pollution or compliance violations

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(Chatterji, Levine, & Toffel, 2009). Instead, environmental strengths capture underlying strategic capabilities that firms develop to improve their environmental performance (Walls, Berrone, & Phan, 2012)' (p. 892). Environmental strengths and concerns as recorded by KLD receive further attention by Berliner and Prakash (2014) from a cost perspective. According to the authors '… we interpret improvements in the "strengths" indicators to reflect lower-cost commitments, whereas only decreases in the "concerns" indicators reflect higher-cost commitments' (p. 221). An overall score of environmental strengths is calculated via aggregation of the binary ratings across all factors as a measure of a firm's beyond-compliance strategy. As with strengths, an overall score of environmental concerns is calculated via aggregation as a measure of a firm's compliance-only strategy with higher values denoting a greater level of concerns.

Independent variables

The key independent variables are the average age (*Average* Age) and age diversity (*Age Diversity*) of the TMT. The data on executive age is collected for all members of the TMT from the Bloomberg database. The *Average Age* in the TMT is then calculated by taking the average age of executives in the TMT. *Age Diversity* is calculated by taking the standard deviation of executives' age in the TMT.

Control variables

Certain industries are more regulated than the others, which would impact KLD ratings of strengths and concerns. As noted by Etzion (2007), natural resources sector is the most regulated, followed by manufacturing, and then services sector. To control for any industry effects, 4-digit NAICS codes are used as industry dummies in the model. Log of sales (*Size*) is used as a proxy to control for size of the firm given that larger firms have a larger resource base. Besides resource base, size is also used as a control for firm visibility which might influence the distinct dimensions of environmental strategy. The model also controls for a firm's financial performance using return on assets (ROA) to account for investment capability in environmental initiatives. *ROA* as a measure of financial performance has been used in extant research (Aupperle, Carroll, & Hatfield, 1985; McGuire, Sundgren, & Schneeweis, 1988) and is calculated as the ratio of net income to total assets. An additional control of capital expenditure intensity is included based on prior research (King & Lenox, 2002; Walls, Berrone, & Phan, 2012). Capital intensity (*CAPEX Intensity*) measure is calculated as capital expenditure over the value of plant, property, and equipment to control for current investments in upgrading infrastructure. Finally, the influence of the TMT is controlled by including the size of TMTs (*TMT Size*).

Descriptive statistics

The data are an unbalanced panel of 538 unique firms covering a period of 2006–2013 comprised of 3,251 firm-year observations. Table 1 provides the descriptive statistics on measures of interest used in the study.

The average firm in the sample had $8,504 million in annual sales. On average, a firm's panel lasted approximately 6 years. Based on the reported pairwise correlation values in Table 1, correlation of TMT size and firm size with environmental strengths and concerns could be of concern. However, a variance inflation factor (VIF) analysis resulted in estimates of less than 4 (2.42 being the highest). Commonly used VIF cutoffs for assessing multicollinearity is 10 or sometimes 4 (O'Brien, 2007) suggesting that the effects of multi-collinearity are limited in the sample used for this study. The maximum number of strengths and concerns are recorded at 5 with a slightly higher recording of strengths as compared to concerns in the sample. Approximately 31% of the sample has firm-year's recording at least one environmental strength. Similarly, about 21% of the

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Table 1. Descriptive statistics and correlations

		Mean	SD	1	2	3	4	5	6	7
1	EM compliance strategy score	0.35	0.84							
2	EM beyond-compliance strategy score	0.59	1.08	0.33*						
3	Average age	51.24	4.03	0.05*	0.07*					
4	Age diversity	7.17	2.81	−0.09*	−0.12*	0.14*				
5	TMT size	9.30	4.63	0.33*	0.40*	−0.09*	−0.05*			
6	Size (sales, million $)	8,504.86	27,416.41	0.58*	0.35*	0.03	−0.15*	0.31*		
7	Firm performance (ROA)	0.03	0.16	0.06*	0.12*	0.02	−0.05*	0.12*	0.07*	
8	Capital expenditure (CAPEX) Intensity	0.10	0.08	−0.11*	−0.08*	−0.14*	−0.04*	−0.09*	−0.01	0.03

Note: $N = 3,251$.
*$p < .05$.[1]https://www.ted.com/talks/ray_anderson_on_the_business_logic_of_sustainability#t-182896.

sample has firm-year's recording at least one environmental concern. The average age of executives in the sample is approximately 51 years with the average TMT size of about 9.

Statistical methods

To arrive at an appropriate estimation technique, the paper follows the guidance provided by Cameron and Trivedi (2009) and uses a similar approach adopted by Walls, Berrone, and Phan (2012). Compared to within firm variability, the between firm variability is higher on the variables of interest thereby increasing the suitability of random effects panel data regression techniques. Following the approach by Walls, Berrone, and Phan (2012), square root of the dependent variables is used so that random effects least squares technique for panel data can be employed. In addition, modified Wald's test suggests heteroskedasticity so robust standard errors are computed considering intragroup heteroskedasticity and potential serial correlation. To account for the possibility of fixed effects from operating in a specific industry or in a specific year, 4-digit NAICS codes and year dummies are included in the model specification. Finally, a 1-year lag is implemented between the dependent variable and the independent variables to control for within firm dynamics.

Results

The results from the random effects regression of the compliance-only and beyond-compliance environmental strategies are presented in Table 2.

Effect of age

Based on the results reported in Table 2, Hypothesis 1 is supported. Average age of a TMT has a positive and significant effect on a beyond-compliance EM strategy as reported in Table 2 ($\beta = 0.069$, $p < .05$). However, the results do not support a significant relationship between the average age of the TMT and a compliance-only EM strategy as reported in Table 2. Therefore, the results do support a stronger impact of average age of the TMT on a beyond-compliance strategy as compared to a compliance-only strategy.

Effect of age diversity

Based on the results reported in Table 2, Hypothesis 2 is supported. Age diversity in a TMT has a positive and significant effect on a compliance-only EM strategy as reported in Table 2 ($\beta = -0.006$, $p < .05$). Since higher levels of concerns are recorded as positive values, the negative coefficient supports the beneficial impact of age diversity in reducing environmental concerns. However, the results do not support a significant relationship between age diversity in a TMT and a beyond-compliance EM strategy as reported in Table 2. Therefore, the results do support a stronger impact of age diversity within a TMT on a compliance-only strategy as compared to a beyond-compliance strategy.

Individual contribution of independent variables was assessed using standardized values (Johnson, 2000). While the dominant contributors to compliance and beyond compliance scores are prior year performance and firm size, the magnitude of TMT age and age diversity coefficients range from one-third to one-tenth in size of the other dominant variables.

Robustness tests

In order to show that the results are robust to different estimation techniques, additional analyses using a fixed effects panel data model with robust standard errors (Stock & Watson, 2008) is

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Table 2. Results

Random effects GLS regression ($N = 3,251$)		
	Compliance-only	Beyond-compliance
Lagged compliance score	0.512*** (0.049)	
Lagged beyond-compliance score		0.459*** (0.041)
Firm performance (ROA)	−0.059 (0.032)	−0.125** (0.048)
Size (log(sales), million $)	0.071*** (0.011)	0.131*** (0.014)
CAPEX Intensity	−0.139* (0.058)	0.133 (0.094)
TMT size	0.012** (0.004)	0.018*** (0.005)
Year dummies	incl.	incl.
Industry dummies	incl.	incl.
Average age	−0.004 (0.024)	0.069* (0.032)
Age diversity	−0.006* (0.002)	−0.004 (0.004)
Constant	0.453 (0.541)	−1.230*** (0.191)
Overall R^2	63.5%	51.8%

Note: Standard errors (SE) are shown in parentheses below the parameter estimates.
*$p < .05$, **$p < .01$, ***$p < .001$.

performed to test the hypothesized relationships. Though within firm variability on the variables of interest is lower than between firm variability, Hausman test does confirm the suitability of a fixed effects model. The results of the robustness test with a fixed effects model is presented in Table 3.

As per the results reported in Table 3, there are no substantial differences in the results from random effects panel data regression method and results from the alternate estimation methods used for robustness check in terms of the direction and significance for the variables of interest.

Discussion

The present study sought to explore the impact of TMT age demographics on a firm's overall EM strategy. Given the importance of TMTs in organizational strategy, research into TMT characteristics provide an important avenue for expanding EM strategy research. An important demographic of TMT characteristic is executive age (Liu, Gulzar, Zhang, & Yang, 2018; Tanikawa, Kim, & Jung, 2017). Extant research presents a mixed view of the role of age in environmental decision-making. Some scholars have reported that aged individuals as compared to younger adults have a greater preference for socially oriented outcomes leading to eco-friendly choices (ICOM Information & Communication, 2008; Kumar & Paraskevas, 2018; Straughan & Roberts, 1999), while others have highlighted more eco-friendly choices by younger individuals as compared to their older counterparts due to an increased awareness of social issues (Hancock, 2017; McDougle, Greenspan, & Handy, 2011). Prior studies have also noted that demographic diversity in TMTs such as age can establish faultlines within the group impacting firm performance (Barkema & Shvyrkov, 2007; Li & Hambrick, 2005). This study addresses commonly held age-related notions of environmentalism in the context of TMT decision-making and highlights the challenges in reaching consensus on a comprehensive EM strategy between younger and older executives by looking at both average age and age diversity within TMTs. For a finer theorization, this study makes a distinction between beyond-compliance and compliance-only strategies in line with prior studies (Kumar, 2018).

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Table 3. Robustness checks

Fixed effects GLS regression (N = 3,251)		
	Compliance-only	Beyond-compliance
Lagged compliance score	0.497*** (0.053)	
Lagged beyond-compliance score		0.437*** (0.044)
Firm performance (ROA)	−0.005 (0.032)	−0.013 (0.020)
Size (log(sales), million $)	0.055** (0.016)	−0.014 (0.019)
CAPEX Intensity	−0.123* (0.058)	0.194 (0.091)*
TMT size	0.008 (0.006)	−0.005 (0.008)
Year dummies	incl.	incl.
Average age	−0.026 (0.034)	0.096* (0.049)
Age diversity	−0.007* (0.003)	0.003 (0.006)
Constant	−0.027 (0.211)	−0.174 (0.284)
Overall R^2	42.8%	10.4%

Note: Standard errors (SE) are shown in parentheses below the parameter estimates.
*p < .05, **p < .01, ***p < .001.

The results of the study highlight the importance of executive age in decision-making vis-à-vis a firm's EM strategy. TMTs are central to decision-making (Papadakis & Barwise, 2002), and executives at different stages of their life bring distinct viewpoints to formulate an EM strategy. As noted by Edmondson, Roberto, and Watkins (2003), in some situations, team members will have similar interests; in others, interests will diverge. By looking at the characteristic of TMT age, this study highlights the distinction in terms of preference between a compliance-only and a beyond-compliance EM agenda in different age cohorts based on TMT average age and age diversity.

The study finds differences in the impact of executive age on distinct elements of EM strategy. With increasing age comes a greater sense of social responsibilities and a desire to leave a legacy (Newton, Chauhan, & Pates, 2019; Wade-Benzoni, 2019). These elements of aging from a generative perspective drive decision-making in TMTs for adoption of a beyond-compliance EM strategy. The generative perspective could also benefit from greater emotional intelligence in older executives resulting in greater confidence in such decisions (Maqbool, Sudong, Manzoor, & Rashid, 2017). Interestingly, there is no significant link between aging and compliance-only initiatives, which could be due to the associated costs and the desire for legacy as a primary driver of beyond-compliance initiatives. Indeed, investments in compliance-only EM strategy could have an adverse impact on a firm's financial performance and therefore lacks support from an aging TMT that do not want to tarnish their image with a negative impact on a firm's performance as their legacy. Extant research has found that aging is tied to risk-averse decision-making (Al Shammari, 2018; Chaganti et al., 2016; Lippi & Di Battista, 2017). As such, aging executives might be wary of supporting activities causing financial strain.

This study also finds differences in the impact of age diversity in the TMT on the distinct components of an EM strategy. While age diversity tends to positively influence a firm's agenda for finding solutions to existing compliance issues, it does not have an impact on beyond-compliance strategies. The results related to age diversity could be highlighting the tension between innovation (assisting with finding solutions) and consensus (hindering efforts to develop a future vision around EM). In the context of extant research on diversity-related faultlines, the findings provide deeper insights by highlighting the differing impact between compliance-only and beyond-compliance strategies.

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Attribution theory has been used to examine the distinct preference for compliance-only and beyond-compliance strategies by studying the impact on a firm's environmental reputation (Kumar, 2018). This study contributes to the theoretical advancement through behavioral perspectives by linking the impact of TMT age on the distinct EM strategies of a firm. The theorization for support of the first hypotheses leveraging the theory of generativity expands the theoretical base of generativity with a novel context. Surprisingly, the study does not find support for a direct impact of TMT age on a compliance-only strategy. The study further contributes to the theoretical base by assessing the role of a firm's age diversity in its TMT and the impact on EM decision-making. The study theorizes that a greater age diversity with TMTs brings a richer set of idea to contend with compliance-only issues. However, distinct viewpoints on EM by executives spanning the age spectrum hinders with activities requiring consensus for beyond-compliance strategies.

The study helps in setting expectations for stakeholders on the direction of a firm's EM strategy based on the age characteristic of a firm's TMT. First, a highly diverse TMT with respect to age might require a more aggressive oversight role from the board in the context of EM strategies. Second, this study can support decision-making by environmental investors or CSR focused environmental funds by partially predicating a firm's strategy of compliance-only or beyond-compliance voluntary initiatives based on the age demographics of the TMT. Extant studies have reported on social screening as an investment criterion (Brooks & Oikonomou, 2018; Cahan, Chen, & Chen, 2017) due to the value enhancing capabilities of CSR for a firm (Malik, 2015). Finally, the study highlights a bias in support from aging executives based on the type of EM initiatives.

Conclusion

Aging results in a significant change in work motivations in individuals, however, there is a paucity of research in terms of executive age and the impact on a firm's EM strategy. Work motivations in older individuals are significantly different from their younger counterparts. Drawing on behavioral perspectives including the theory of generativity, this study develops and empirically validates new theoretical insights of the impact of executive age in TMTs on a firm's compliance-only and beyond-compliance EM strategy. This research compiles an innovative dataset from archival sources comprising Bloomberg SPLC, KLD, and Compustat and uses panel estimation techniques for assessing the various hypothesized relationships. The main finding is that aging executives have a distinct preference for beyond-compliance EM initiatives, whereas age diversity within TMTs help with developing strategies for compliance-only issues currently facing the organization.

There are some data limitations in the study that offer potential for future research. The use of Bloomberg in this study is limited primarily to manufacturing firms and therefore extending the results to other industries requires caution. KLD's binary rating approach could reduce (or increase) the salience of certain dimensions of environmental activities rated by KLD. Even with these limitations KLD data have been used extensively in environmental research for developing insights into drivers of EM strategy and performance. Executive age and sensitivity to undertaking EM decisions can be further explored by including contextual factors that can assist in creating TMT compositions that would pursue eco-friendly goals. Future studies should investigate additional characteristics of TMT composition such as race and culture, presence of an executive in the TMT with sole responsibility for CSR, or other contextual factors such as social awareness and concern toward environmental issues to further enhance our understanding of the role of TMT in driving a firm's EM strategy. Additional work is required to develop a better understanding of the drivers (or lack of thereof) behind compliance-only EM initiatives. Given that the climate change effects are not uniform and more imminent in some areas compared to others (like the impact on island nations from rising sea levels), geographic diversity in TMTs can be further explored to understand compliance-only EM strategy.

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