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# A Multilevel Model of Environmentally Specific Social Identity in Predicting Environmental Strategies: Evidence from Technology Manufacturing Businesses

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**Abstract:** This study proposed a multilevel model of environmentally specific social identity based on upper echelons theory and examined how environmentally specific transformational leadership influenced the environmentally specific social identity of the top management team (TMT), which consequently influenced a corporation's choices of proactive environmental strategies. Besides, the environmentally specific transformational leadership atmosphere at the TMT level also influenced the environmentally specific social identity atmosphere at the TMT level, which consequently influenced a corporation's choices of proactive environmental strategies at the same time. In particular, this study proposed a novel concept–environmentally specific social identity based on social identity theory, including environmentally specific self-categorization, environmentally specific affective commitment, environmentally specific self-esteem. This study employed a hierarchical linear model and collected longitudinal data of 210 chief executive officers with their 840 members of TMTs at technology manufacturing businesses of Greater China at three waves over six months to analyze the theoretical model. This study found that individual-level environmentally specific transformational leadership and TMT-level environmentally specific transformational leadership (atmosphere) influenced individual-level environmentally specific social identity and TMT-level environmentally specific social identity (atmosphere), which consequently influenced proactive environmental strategies. These findings provide theoretical insights for the field of sustainable development that can advance the literature on proactive environmental strategies.

**Keywords:** environmentally specific transformational leadership; environmentally specific social identity; hierarchical linear model; proactive environmental strategies

## 1. Introduction

Because environmental strategies are an important source of firm performance and competitive advantage [1–3], firms should make suitable environmental strategies to respond to this concern. Although environmental management may be seen as an ineffective investment [4], these environmental challenges can be transformed into business opportunities that drive a top management team (TMT) to execute social identity for environmental management, which further increases the opportunity to choose an environmental strategy. Previous researchers [5,6] have proposed that there is an urgent need to explore the key antecedents of proactive environmental strategies (PESs), which denote the strategies that corporations employ to decrease negative influences on the natural environment caused by corporate activities. The PESs are more than trivial notions because air pollution alone has caused 8 billion U.S. dollars in economic losses every day [7]. Besides, a recent study also proposed that 55 of 266 districts in China have serious pollution of PM2.5 [8]. Thus, there

is a need to better understand how corporations in Greater China can actively cope with environmental issues [9,10].

Past studies for the prediction strategy of PESs lack a complete research stream [5] because previous studies on the prediction strategy of PESs mainly have two streams, including organization factors (e.g., organizational learning) and social factors (e.g., external pressure) [5,6,11]. To this list, this study proposes a new stream that, using environmentally specific transformational leadership of chief executive officers, predicts a corporation's PESs through the environmentally specific social identity of TMT at an individual level and TMT level. This new list is crucial because previous studies always ignore how organizational internal factors can influence PESs through a multilevel framework. For example, previous studies employ legislation's perspective [6], market pressure [5,11], and green supply chain integration [9] to predict PESs. However, these perspectives are based on the individual-level external factors that almost come from institutional pressure on environmental issues. In addition to the institutional pressure, managers may want to know how to employ the internal management mechanism to push the firms toward the PESs to increase firm performance and competitive advantage. Indeed, previous study argued that organizational multilevel perspective is very important [12,13].

Social identity theory denotes that individuals realize their identity from the sense of self-awareness, evaluation, and emotional meanings of group members [14]. Relatively few studies focus on how this concept can be defined theoretically and measured empirically [15,16]. This study proposes a novel concept of "environmentally specific social identity" and argues that it includes environmentally specific cognitive identity, environmentally specific emotional identity, and environmentally specific evaluative identity. The symbol context is a key source of social identity creating because it guides interpretive schemes of group members to collectively create, act, choose, and behave [17,18]. Environmentally specific transformational leadership is a key symbol context of environmentally specific social identity, because the environmentally specific leadership process influences the interpretation of group members for environmental issues, supporting the antecedent role of environmentally specific transformational leadership for environmentally specific social identity. Besides, previous studies have focused on the direct effect of organizational factors and social factors on PESs, but few studies open the black box on how the environmentally specific transformational leadership of chief executive officers influences ESPSs through the environmentally specific social identity of TMT. The environmentally specific social identity is an important characteristic (values) of a TMT, and characteristics (values) of the TMT can significantly influence a corporation's choices of environmental strategies based on upper echelons theory [19]. Further, given that the TMT is responsible for launching the corporation's multiple resources [20], the environmentally specific social identity of the TMT should align strategic objectives of a corporation, supporting the consequence role of PESs for environmentally specific social identity. In other words, when the chief executive officers execute environmentally specific transformational leadership, it is more likely to increase the environmentally specific social identity of the TMT, which consequently influences the choice of PESs.

Taken together, this study employed a hierarchical linear model to survey how the individual-level and TMT-level environmentally specific transformational leadership can influence individual-level PESs through the individual-level and TMT-level environmentally specific cognitive identity, environmentally specific emotional identity, and environmentally specific evaluative identity. Most previous studies were on cross-sectional design and individual-level framework [10,21–23] rather than an examination of the multilevel framework. Therefore, it has little empirical evidence on whether the environment contexts (e.g., TMT-level variables) can explain individual-level behaviors (PESs). This study examined 210 chief executive officers with their 840 members of TMTs at technology manufacturing businesses of Greater China over six months to fill these gaps in the literature.

## 2. Literature Review and Hypothesis Development

### 2.1. Environmentally Specific Transformational Leadership and Proactive Environmental Strategies

Bass [24] proposes the concept of transformational leadership and includes four factors, including idealized influence (leaders exhibit charismatic leadership to attract their followers to approve themselves), inspirational motivation (leaders inspire followers to achieve goals), individualized consideration (leaders listen to and take care of the needs of followers), intellectual stimulation (leaders encourage nurturing innovations and independent thoughts in their team). In other words, transformational leaders employ idealized influence, intellectual stimulation, inspirational motivation, and individual consideration to teach followers to achieve a higher-level goal.

Environmentally specific transformational leadership denotes the four factors of transformational leadership that focus on environmental responsibility and ethical behavior and is significantly different from transformational leadership [25]. PESs denote the strategies through which a corporation intentionally changes production processes and raw materials for environmental responsibility [5,6]. Environmentally specific transformational leadership of chief executive officers employ idealized influence and inspirational motivation to cause corporates to understand and deploy priorities of environmental strategies. Besides, environmentally specific transformational leadership of chief executive officers also encourages nurturing innovations and independent thoughts that incorporate to improve environmental performance [25], and thus causes corporations to prefer PESs. Further, because characteristics of chief executive officers significantly influence strategic choices of corporations based on upper echelons theory [26], and leadership has been seen as key characteristics of chief executive officers [27], thus clarifying the role of environmentally specific transformational leadership of chief executive officers. The previous study also found that leadership can increase pro-behaviors [28] and green performance [28], and green performance has been confirmed as a key source of PESs [6,11]. This study proposes the first hypothesis:

**Hypotheses 1 (H1).** *Environmentally specific transformational leadership of chief executive officers can positively influence a corporate's PESs.*

### 2.2. The Mediating Role of Top Management Team Identity

Social identity theory denotes that individuals realize their identity from the sense of self-awareness, evaluation, and emotional meanings of a group member [14]. Based on Tajfel's [14] definition, this study proposes that the content of social identity theory should be divided into cognitive identity, affective identity, and evaluative identity because an individual who attributes themself to a group (cognitive identity) does not necessarily have an emotional attachment to the same group (emotional identity) or shares the same group's positive characteristics (evaluative identity). The cognitive identity denotes members' cognitive awareness within a group, and this study includes self-categorization as its representative variable. Self-categorization denotes that a cognitive categorization process of a self and a group is assimilated into the group [29]. Emotional identity denotes that individuals are emotionally attached to a group, and this study includes affective commitment as its representative variable. The affective commitment denotes identification, participation, and emotional attachment within a group [30]. The evaluative identity denotes a positive or negative evaluation for group members [15], and this study includes self-esteem as its representative variable. As the above discussion, this study further proposes three novel concepts–environmentally specific cognitive identity (self-categorization), environmentally specific emotional identity (affective commitment), and environmentally specific evaluative identity (self-esteem). The environmentally specific self-categorization denotes that a cognitive categorization process of a self and an environmental scheme is assimilated into the environmental scheme. The environmentally specific affective commitment denotes identification, participation, and emotional attachment with the environmental scheme.

The environmentally specific self-esteem denotes a positive or negative evaluation for the environmental scheme.

Based on the "management of meaning" [31], transformational leaders can shape the self-concept of their followers to meet a group self-concept [32] to achieve the effects of self-categorization. Similarly, Shamir and his colleagues [33] also suggest that transformational leaders can influence followers' affective commitments by transforming higher levels of personal commitment to common visions, missions, and organizational goals. Avolio and his colleagues [34] also suggest that transformational leaders can provide a meaningful challenge to their followers' work by enhancing followers' levels of self-esteem and meaning. Besides, a previous study [35] also proposes the importance of transformational leadership in forming an identity for a sustainable environment. As the above discussion, environmentally specific transformational leadership of chief executive officers can increase TMTs' (followers') environmentally specific self-categorization, environmentally specific affective commitments and environmentally specific self-esteem by the environmentally specific transformational process. For example, the environmentally specific transformational leadership of chief executive officers shapes the environmental scheme of TMTs to meet a corporation's environmental protection concept to achieve the effects of environmentally specific self-categorization of the TMT. Similarly, environmentally specific transformational leadership of chief executive officers influences TMTs' environmentally specific affective commitments by transforming higher levels of commitment to common visions, missions, and organizational goals of environmental protection. This study proposes the second to the fourth hypothesis:

**Hypotheses 2 (H2).** *Environmentally specific transformational leadership of chief executive officers can positively influence environmentally specific self-categorization of TMTs.*

**Hypotheses 3 (H3).** *Environmentally specific transformational leadership of chief executive officers can positively influence environmentally specific affective commitments of TMTs.*

**Hypotheses 4 (H4).** *Environmentally specific transformational leadership of chief executive officers can positively influence environmentally specific self-esteem of TMTs.*

Based on upper echelons theory [26], characteristics (values) of a TMT have significant effects on a corporation's strategic choices [27]. Environmentally specific social identity is one kind of value for environmental protection because the environmentally specific social identity represents the degree to which individuals within a group have cognitive identity, emotional identity, and evaluative identity for environmental protection, thus clarifying the role of environmentally specific social identity. Further, a TMT has the power to freely and effectively exchange knowledge and integrate skills and abilities to be beneficial for corporations [36], which enable the TMT to put personal interests aside [37], and may choose PESs to achieve a goal of solving a corporation's environmental problems. By contrast, a TMT who has a low level of environmentally specific social identity may have a low level of consensus within the team to reduce environmental impacts and is more likely to put a resource on sustainable interest development [38]. Indeed, a TMT may choose PESs to respond to the self-concept of TMT, because the TMT has desires to align with their behaviors (PESs) with their self-concept toward environmental scheme (environmentally specific identity). For example, a TMT who assimilates the concept of environmental protection into self-worth (environmentally specific self-categorization), makes an emotional commitment to environmental protection (environmentally specific affective commitment), and takes pride in environmental protection (environmentally specific self-esteem) will inevitably choose PESs, because the TMT wants to maintain the consistency between self-concept and behaviors. This research proposes the fifth to the seventh hypothesis:

**Hypotheses 5 (H5).** *Environmentally specific self-categorization of TMTs can positively influence a corporation's PESs.*

**Hypotheses 6 (H6).** *Environmentally specific self-categorization of TMTs can positively influence a corporation's PESs.*

**Hypotheses 7 (H7).** *Environmentally specific self-categorization of TMTs can positively influence a corporation's PESs.*

*2.3. Environmentally Specific Transformational Leadership, Environmentally Specific Self-Categorization, Environmentally Specific Affective Commitment, and Environmentally Specific Self-Esteem at TMT Level*

Although environmentally specific transformational leadership, environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem can be analyzed at an individual level, they can form a shared, collective perception of TMT-level constructs. For example, past studies [39,40] have surveyed transformational leadership and identity at the work-unit level by aggregating the individual-level transformational leadership and identity based on a multilevel organizational method [41]. This study suggests that environmentally specific transformational leadership, environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem should be surveyed in a TMT context because these variables can be characterized by a relational context that cannot be in terms of independent individuals [42], which is a bottom-up mechanism in the multilevel analysis [41]. This study uses social information processing theory [43,44] and socialization theory [45] to provide the basis for the yield of environmentally specific transformational leadership, because the two theories support that a group can yield a homogeneous environmentally specific transformational leadership, environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem.

*2.4. Cross-Level Effect of Environmentally Specific Transformational Leadership, Environmentally Specific Self-Categorization, Environmentally Specific Affective Commitment, and Environmentally Specific Self-Esteem on Proactive Environmental Strategies*

This study proposes a multilevel model of environmentally specific social identity and employs contextual model [46] and to connect TMT-level and individual-level environmentally specific transformational leadership, environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem to proactive environmental strategies. For example, TMT-level environmentally specific transformational leadership means an overall pattern of environmentally specific leadership behaviors displayed to the entire work context and can be viewed as a type of ambient stimulus which diffuses within a work context and is shared among TMT members [47], and the multilevel was recommended to study the effect of leadership at multiple levels of analysis [48,49]. The social cognitive theory [50], which proposes that interactions of personal factors and environmental factors cause individual behaviors, also supports the relationship between TMT-level and individual-level variables.

As the above discussion, this study further proposes that the inference between environmentally specific transformational leadership, environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem at the individual level can also be duplicated at the TMT level. This premise is also supported by the multilevel model, in which Chen and Kanfer [51] propose that psychological variables at the individual level and work-unit level are functionally similar and can simultaneously influence variables at the individual level and work-unit level. This study proposes the eighth hypothesis to fourteen hypotheses as below:

**Hypotheses 8 (H8).** *TMT-level environmentally specific transformational leadership can positively influence the individual-level corporation's PESs.*

**Hypotheses 9 (H9).** *TMT-level environmentally specific transformational leadership can positively influence the TMT-level environmentally specific self-categorization.*

**Hypotheses 10 (H10).** *TMT-level environmentally specific transformational leadership can positively influence the TMT-level environmentally specific affective commitment.*

**Hypotheses 11 (H11).** *TMT-level environmentally specific transformational leadership can positively influence the TMT-level environmentally specific self-esteem.*

**Hypotheses 12 (H12).** *TMT-level environmentally specific self-categorization can positively influence the individual-level corporation's PESs.*

**Hypotheses 13 (H13).** *TMT-level environmentally specific affective commitment can positively influence the individual-level corporation's PESs.*

**Hypotheses 14 (H14).** *TMT-level environmentally specific self-esteem can positively influence the individual-level corporation's PESs.*

## 3. Methodology and Measurement

This study proposes a multilevel model (Figure 1) that is from individual-level and TMT-level environmentally specific transformational leadership to individual-level corporation's PESs through a mediating role of individual-level and TMT-level environmentally specific cognitive identity (self-categorization), environmentally specific emotional identity (affective commitment), and environmentally specific evaluative identity (self-esteem). Based on Figure 1, individual-level ESTL, ESSC, ESAC, and ESSE mean the perception of members in TMT groups. For example, the individual-level ESTL comes from the CEOs' leadership to arouse the ESTL perceptions of members in TMT groups; individual-level ESSC is the ESSC perception of members in TMT groups. Team-level ESTL, ESSC, ESAC, and ESSE mean a shared atmosphere permeated inside the team. For example, team-level ESTL comes from the perception of the ESTL of members in TMT groups that forms a shared atmosphere permeated inside the team; team-level ESSC comes from the perception of individual-level ESSC of members in TMT groups that forms a shared atmosphere permeated inside the team.

### 3.1. Subjects and Procedures

This study surveyed empirical data in three-phase (Time 1 to Time 3) over six months from technology manufacturing businesses of Greater China to test the hierarchical linear model. The technology manufacturing businesses of Greater China were selected as the sample of this study because they have world-class standards with green management concepts that are synchronized with the world. This study asked chief executive officers of technology manufacturing businesses to join the survey of this study and to invite their members of TMTs. To mitigate common method bias, this study referred to Malhotra and his colleagues' [52] marker variables in our questionnaire design. Additionally, this study employed multiple times and multiple sources of data in a longitudinal survey that can also mitigate common method bias [53]. An anonymous questionnaire was employed to avoid that CEOs can know TMTs' questionnaire.

This study asked 235 chief executive officers in technology manufacturing businesses of Greater China, and 215 chief executive officers and their 860 members of TMTs agreed to participate in the survey. After this study received the Time 1 data of the 860 members of TMTs' assessments about chief executive officers' environmentally specific transformational leadership, and this study examined these members of TMTs again regarding the assessments about the TMTs' environmentally specific self-categorization, environmentally specific affective commitment, environmentally specific self-esteem at three months later (Time 2). This study examined the final data of these chief executive officers' assessments about the corporation's ESPSs six months later (Time 3). This study employed the lag of three months in the sampling framework of this study because attitude changes should be observable in this interval [54].

The final usable data were 210 chief executive officers with their 840 members of TMTs, representing a rate of 97.6%.
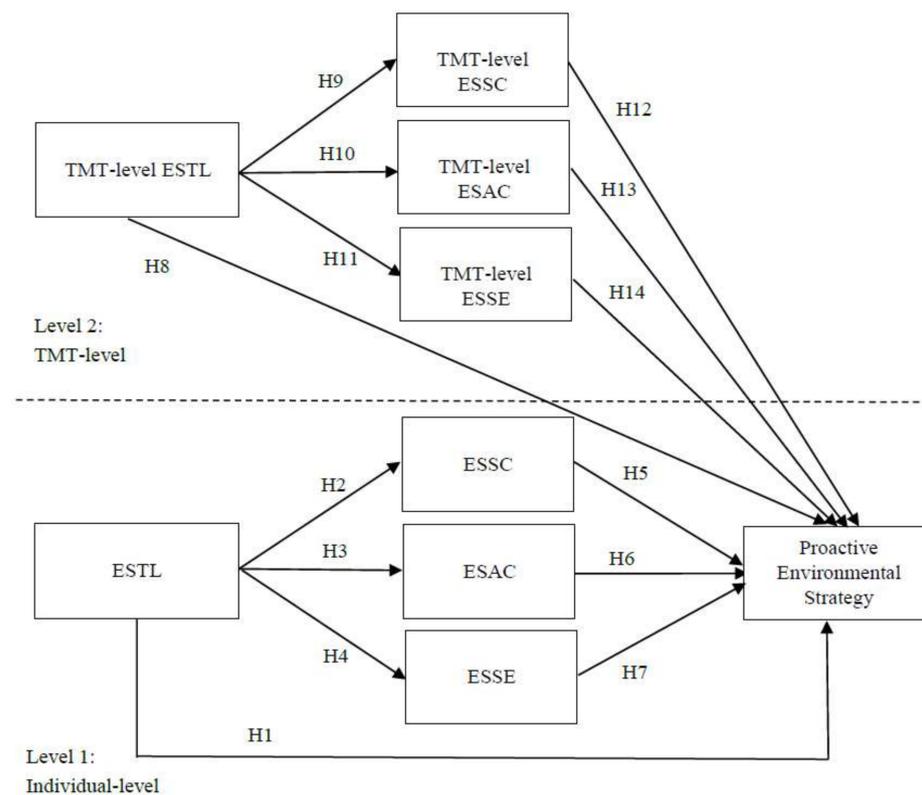
**Figure 1.** Research model of this study. Note: ESTL = Environmentally Specific Transformational Leadership; ESSC = Environmentally Specific Self-categorization; ESAC = Environmentally Specific Affective Commitment; ESSE = Environmentally Specific Self-esteem; PES = Proactive Environmental Strategy.

*3.2. Measurements*

This study referred to the backward translation design of Reynolds and his colleagues [55] to guarantee the translation quality, and a seven-point Likert was used in the self-report questionnaire. Besides, to measure work-unit-level constructs, this study used a within-group consensus rwg(j) to aggregate individual-level measures into TMT-level measures [56].

Environmentally specific transformational leadership of chief executive officers. This study employed a twelve-item scale of Robertson [25] to measure this construct, and this scale was filled by chief financial officers to evaluate environmentally specific transformational leadership of chief executive officers. An example item is "My chief executive officers act as an environmental role model". The rwg(j) of this variable is 0.83.

Environmentally specific self-categorization of TMT. This study referred to Ellemers et al.'s [15] self-categorization scale to develop a three-item scale. The rwg(j) of this variable is 0.79.

Environmentally specific affective commitment of TMT. This study referred to Allen and Mayer's [30] affective commitment scale to develop a four-item scale. The rwg(j) of this variable is 0.81.

Environmentally specific self-esteem of TMT. This study referred to Bergami and Bagozzi's [57] self-esteem scale to develop a four-item scale. The rwg(j) of this variable is 0.82.

Proactive environmental strategy. This study employed a three-item scale of Peng et al. (2018) to measure this construct, and an example item is "The corporate strictly implement cleaner production even without external supervision". The rwg(j) of this variable is 0.85.

## 4. Empirical Results

### 4.1. Validation of Multilevel Data Structure

According to a one-way analysis of variance, the five variables significantly differed between groups. Intraclass correlation coefficients and rwg(j) were all greater than the critical value (ICC(1) > 0.2, ICC(2) > 0.7, and rwg(j) > 0.7) for environmentally specific transformational leadership, environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem, comparable to aggregate as TMT-level variables [56,58].

### 4.2. Confirmatory Factor Analysis

Confirmatory factor analysis was used to analyze reliability and validity, including environmentally specific transformational leadership, environmentally specific self-categorization, environmentally specific affective commitment, environmentally specific self-esteem, and PESs. The average variances extracted from these variables were all above 0.61. The composite reliability (CR) of these variables were all above 0.71. The composite reliability, average variance extracted, RMR (<0.08), RMSEA (<0.05), GFI (>0.9), CFI (>0.9), GFI (>0.9), and NFI (>0.9) achieve the suggestion by Fornell and Larcker [59]. Additionally, the t-values for all standardized factor loadings are significant (The minimum *t*-value is 3.7).

### 4.3. The Results of the Analysis

The longitudinal data of this study was collected from a structure in which multiple samples were nested within a single group, and a hierarchical linear model was employed as a statistical technique to analyze for the lack of independence across different groups and cross-level variables [60]. Besides, HLM 7 for Windows was employed to analyze the nested structure data.

The individual-level environmentally specific transformational leadership significantly affected individual-level PESs ($\beta = 0.41$, $p < 0.01$). Hypothesis 1 proposes that chief executive officers who show more environmentally specific transformational leadership may positively affect PESs, which is supported. The individual-level environmentally specific transformational leadership significantly affected individual-level environmentally specific self-categorization ($\beta = 0.37$, $p < 0.01$), environmentally specific affective commitment ($\beta = 0.33$, $p < 0.01$), and environmentally specific self-esteem ($\beta = 0.31$, $p < 0.01$). Hypothesis 2, 3, and 4 propose that chief executive officers who show more environmentally specific transformational leadership may positively affect environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem, which are supported. The individual-level environmentally specific self-categorization ($\beta = 0.29$, $p < 0.01$), environmentally specific affective commitment ($\beta = 0.27$, $p < 0.01$), and environmentally specific self-esteem ($\beta = 0.31$, $p < 0.01$) significantly affected individual-level PESs. Hypothesis 5, 6, and 7 propose that TMTs who show more environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem may positively affect PESs, which are supported.

The TMT-level environmentally specific transformational leadership significantly affected individual-level PESs ($\beta = 0.52$, $p < 0.01$). Hypothesis 8 proposes that team-level environmentally specific transformational leadership (atmosphere) may positively affect PESs, which is supported. The TMT-level environmentally specific transformational leadership significantly affected TMT-level environmentally specific self-categorization ($\beta = 0.45$, $p < 0.01$), environmentally specific affective commitment ($\beta = 0.41$, $p < 0.01$), and environmentally specific self-esteem ($\beta = 0.42$, $p < 0.01$). Hypothesis 9, 10, and 11 propose that TMT-level environmentally specific transformational leadership (atmosphere) may positively affect TMT-level environmentally specific self-categorization (atmosphere), environmentally specific affective commitment (atmosphere), and environmentally specific self-esteem (atmosphere), which are supported. The TMT-level environmentally specific

self-categorization (β = 0.39, *p* < 0.01), environmentally specific affective commitment (β = 0.37, *p* < 0.01), and environmentally specific self-esteem (β = 0.41, *p* < 0.01) significantly affected individual-level PESs. Hypothesis 12, 13, and 14 propose that TMT-level environmentally specific self-categorization (atmosphere), environmentally specific affective commitment (atmosphere), and environmentally specific self-esteem (atmosphere) may positively affect PESs, which are supported.

In sum, individual-level PESs can be positively affected not only by individual-level environmentally specific transformational leadership but also TMT-level environmentally specific transformational leadership (atmosphere) through the mediating roles of individual-level and TMT-level environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem.

## 5. Conclusions and Implications

This study exhibits how individual-level and TMT-level environmentally specific transformational leadership can positively influence individual-level and TMT-level environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem, which consequently can influence individual-level PESs.

### 5.1. Implications

The first contribution of this study is to exhibit a hierarchical linear model that conceptualizes the novel concept of environmentally specific social identity based on Tajfel's [14] proposition through the environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem to detect its antecedents and outcome from an organizational cross-level perspective. Based on the empirical results, the environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem are explained well by the environmentally specific transformational leadership at the individual-level and TMT-level and can well predict PESs, supporting the validity of environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem [61,62]. That is to say, individual-level PESs are predicted not only by individual-level environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem but also team-level environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem. Individual-level environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem, and team-level environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem are predicted by individual-level and team-level environmentally specific transformational leadership. That is to say, managers of firms can employ environmentally specific transformational leadership to predict environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem, which consequently predicts individual-level PESs. Besides, individual-level environmentally specific transformational leadership, environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem can form a shared atmosphere permeated inside the team.

Second, this study provides a new stream about the environmentally specific transformational leadership on corporations' choices of PESs and shows a new way to increase PESs from a perspective of human (e.g., individual-level perceptions) and environment (e.g., TMT-level contexts) interaction, which also responds to the call of the previous study [5]. Previous studies have examined the ethical leadership of chief executive officers on corporate social responsibility, firm performance, and organizational citizenship behavior [63–66]. Surprisingly, there is little investigation of environmentally specific transformational leadership of chief executive officers on corporations' choices of PESs, because it is a general

leadership behavior [25]. In particular, there is little research to examine PESs with its antecedents based on a multilevel framework. To fill these gaps, this study proposes that individual-level environmentally specific transformational leadership and TMT-level environmentally specific transformational leadership (atmosphere) are key antecedents of a corporation's ESPSs, and also responds to previous study's call for detecting different characteristics and behaviors of chief executive officers with its outcomes [67].

Third, this study opens the black box on how environmentally specific transformational leadership influences corporations' choices of PESs through TMTs' environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem at the individual level and TMT level. Previous studies mainly examined the direct effects of organizational factors or social factors of external or internal factors on corporates' choices of PESs at the individual level [5,6,23]. This study employs upper echelons theory to propose individual-level and TMT-level environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem as key mediating roles between individual-level and TMT-level environmentally specific transformational leadership and corporates' choices of PESs and also responds to the previous study's call to explore a key intermediary mechanism between characteristics of chief executive officers and choices of corporate strategies [27].

Fourth, some methodological advances confirm the confidence in the results of the present study. For example, the longitudinal data from lag times can reduce common method bias [53], and use the hierarchical linear model technique to analyze the environmental context can fully understand the mechanism of how environmentally specific transformational leadership influences the PESs.

Finally, because corporations' PESs are critical for corporations' environmental performance, it is important to make an enhanced strategy for PESs. Based on the results of this study, individual-level environmentally specific transformational leadership of chief executive officers and TMTs' environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem are important antecedents of ESPSs, and it is important to strengthen these antecedents to implement corporations' PESs. As a result, leadership training programs [68] and enhanced strategies for TMTs' environmentally specific social identity are important mechanisms for PESs. For example, green HRM may be one kind of strategies to increase environmentally specific social identity [69].

### 5.2. Limitations and Future Research

First, this study is to use environmentally specific self-categorization, environmentally specific affective commitment, and environmentally specific self-esteem to conceptualize environmentally specific social identity because there may be other important constructs that should be included in the domain of environmentally specific social identity, which leaves it for future investigations. The second limitation of this study is the potential antecedents of environmentally specific social identity and PESs, because there may be other antecedents that are important in different environmental contexts. Therefore, it is important to explore a broader range of antecedents in future investigations. Third, the data are only collected from technology manufacturing businesses of Taiwan, and the results may not be generalized. For example, Rice [70] proposes that the differences in cultural values can influence pro-environmental behaviors. However, Calder et al. [71] argue that a particular sample is accepted, if the goal is only to confirm a theory. Fourth, the upper echelons theory is employed to be the basis of the theoretical framework in this study, but this theory cannot contain the H2 to H4. Future studies should explore more suitable theories to be the basis of the theoretical framework in this study. Finally, further study should provide more theories and empirical evidence to support the hypothesis 5, 6 and 7 in this study, because these hypotheses have an inadequate inference.

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