How to Promote the Agricultural Company Through Environmental Social Responsibility to Achieve Sustainable Production?

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This survey employs the multilevel growth curve model to demonstrate how to promote the development of the company's environmental innovation in agricultural companies specializing in the agricultural production and export of agricultural products to achieve sustainable production through environmental social responsibility and environmental engagement according to the engagement theory. The empirical data are collected 30 chief executive officers and their 90 supervisors of top management teams (TMTs) of Taiwanese agricultural companies in 2 months. The empirical results demonstrate that environmental social responsibility significantly influences the top management teams' environmental engagement development, which in turn significantly influences the agricultural company's environmental innovation. These empirical results can not only promote the sustainable production literature in the agricultural field but also help these agricultural companies implement environmental innovation to realize sustainable production of agricultural exports.

Keywords: agricultural company, environmental engagement, environmental innovation, environmental social responsibility, sustainable production

INTRODUCTION

Background

To realize sustainable agricultural production, agricultural companies must make effective product strategies to improve production performance and must also employ environmental strategies to promote the firm's environmental innovation. Indeed, previous studies have examined that environmental innovation is a key source of sustainable production (Anderson and Maughan, 2021; Moravčíková1 et al., 2021). In addition, the agricultural production process must cause huge resource consumption and environmental pollution in different countries (Elahi et al., 2019; Crippa et al., 2021; Huang et al., 2021). The demand for food may double in 2050 to cause a food crisis (Searchinger et al., 2018), thereby indicating the importance of sustainable production. This survey defines environmental innovation as the degree to which the company employees engage in environmental idea formation and implementation. However, past studies in examining the driving factors of environmental innovation almost adopted institutional perspective (Blakeney et al., 2020; Li and Wang, 2021), agricultural technology (Andrieu et al., 2019), or weather events (Elahi et al., 2021), and ignored

another pathway of organizational policy (e.g., environmental social responsibility) for driving the firm's environmental innovation. This survey, therefore, adopts the multilevel model (MLM) (Hoffman, 2015) to test why the environmental social responsibility (ESR) at phase one time can promote the top management team's (TMT) environmental engagement (EE) development, thereby promoting environmental innovation (EI) adoption development according to the engagement theory (Kahn, 1990). ESR denotes the extent to which the company's environmentally responsible policy pays attention to stakeholders (Wei et al., 2017).

The engagement theory (Kahn, 1990) believes that an individual is willing to show engagement because the individual feels the safety from his organization. ESR is an important source of safety because the ESR should pay attention to stakeholders, including employees, thereby indicating the relationship between ESR and EE. In addition, a TMT engaged in environmental-related tasks (e.g., EE) must form the innovation toward environmental improvement because the TMT exert more extra efforts to improve the environment that should show more environmental idea formation and implementation (e.g., EI), thereby indicating the relationship between EE and EI.

Finally, this research underlines the term "variable development" of ESR, EE, and EI because it denotes a serious gap in behavioral science research. In other words, past empirical studies of social science are almost cross-sectional design (e.g., Elahi et al., 2021; Leonardelli et al., 2021), so the assumption in behavioral science that people can adjust their behavioral intentions based on their interpretation of the surrounding environment is not sufficiently examined. For example, ESR, EE, and EI have confirmed that these variables can be changed (developed) over time (Huang et al., 2021; Huang et al., 2021; Huang et al., 2021). This survey employs the MLM with longitudinal data of 30 CEOs and their 150 supervisors of TMTs in Taiwanese agricultural companies over 6 months to fill in the second gap.

Review of the Literature and the Development of Research Hypotheses
Environmental Engagement Theory
The engagement theory was proposed by Kahn (1990), and he believes that an employee will put his cognitive resource, physical resource, and emotional resource into his work because of a high level of engagement. For example, a high-level engagement employee will show that he loves working (investing in emotional resources), thinks that hard work is necessary (investing in cognitive resources), and really works hard (investing in physical resources), which will inevitably produce positive work results Kahn (1990). This survey extends engagement into the field of environmental management and defines EE as the degree to which an employee puts his cognitive resource, physical resource, and emotional resource into work to achieve environmental concern. Also, Kahn (1990) also believes

that psychological safety can lead an employee to show a high level of engagement because psychological safety denotes that an employee can devote all their energy to the work environment without worrying about negative results.

Environmental Social Responsibility and Environmental Engagement
Because of the engagement theory (Kahn, 1990), safety denotes that an employee can devote all their energy to the work environment without worrying about negative results, and it is a key driving factor of engagement. Indeed, ESR denotes a corporate responsibility policy that pays attention to stakeholders (Wei et al., 2017), and these stakeholders should include employees. Therefore, the company with a high level of ESR should affect the employee's perception toward a high level of safety in his environment to meet the connotation of ESR. Thus,

Hypothesis 1: Individual-level ESR will significantly affect individual-level EE.

Environmental Engagement and Environmental Innovation
According to the engagement theory (Kahn, 1990), an engaged individual should put more resources and capabilities to work than a less engaged individual, and the engaged individual should look across the scope of work to demonstrate more innovation. Indeed, a TMT has the legitimacy to allocate company resources and manpower, so it can allocate those resources and manpower to its own preferred activities. Therefore, a TMT with a high-level EE level will inevitably like environmental innovation, which can affect the preferences of company employees. Thus,
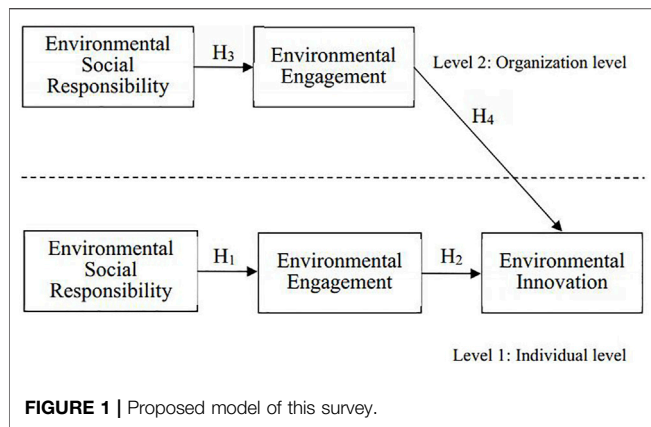
Hypothesis 2: Individual-level EE will significantly affect individual-level EI.

Organization-Level Environmental Social Responsibility, and Environmental Engagement to Individual-Level Environmental Innovation
Although ESR and EE can be analyzed at the individual level, they may be yielded as organizational-level variables (Jones et al., 2017; Chen et al., 2021). Indeed, the theory of the context model (Firebaugh, 1980) and the theory of social cognition (Bandura, 1986) both believe that individual behavior can be influenced by the environmental atmosphere and individual systems (e.g., organization-level and individual-level EE) at the same time, thereby suggesting the relationship between organization-level and individual-level EE to individual-level EI. That is to say, a company that determines to adopt EI may be influenced by personal perception factors and environmental factors (e.g., individual-level and organization-level EE). Therefore, the present research proposes that the relationships among ESR, EE, and EI should be similar at the individual level and organizational level. Thus,

Hypothesis 3: Organization-level ESR will significantly affect organization-level EE.

Hypothesis 4: Organization-level EE will significantly affect individual-level EI.

FIGURE 1 | Proposed model of this survey.

MATERIALS AND METHODS

The MGCM in this survey proves that ESR in phase 1 time will significantly affect the EE development, while the more EE development will significantly affect the firm's adoption of individual-level EI development more (**Figure 1**).

Sampling and Procedures

We stayed in touch with several agricultural associations in Taiwan to collect the sampling lists, and E-mails were sent to the CEOs of these agricultural companies specializing in the agricultural production and export of agricultural products to ask their willingness to participate in this survey. We also asked these CEOs to invite three supervisors of their TMTs to join this survey. 30 CEOs and their 150 supervisors of TMTs of these companies were willing to assist our investigation. The email was sent to collect questionnaires from these members of TMTs to avoid CEOs acquiring these questionnaires. We examined these 30 CEOs' estimations on EE, and these supervisors' estimations on ESR and EI at three-time points in 2 months. In phase 1 time, we investigated the evaluations of these members of TMTs about ESR and EE, and the evaluations of these CEOs about EI. One month later, we investigated the evaluations of these members of TMTs about EE and the evaluations of these CEOs about EI in phase 2 time. One month later, we investigated the evaluations of these members of TMTs about EE and the evaluations of these CEOs about EI in phase 3 time. The time (phase 1 time to phase 3 time) was designed as such structure because the past studies have also adopted the similar structure structure (Lee and Huang, 2020; Huang et al., 2021). Also, collecting samples at different time points can reduce the bias of the common method (Podsakoff et al., 2003).

Measures

ESR was assessed by Wei and his colleague's (2017) 4-item scale. EE was assessed by a 12-item scale developed by Aboramadan (2020). EI was assessed by Song and Yu's (2017) 4-item scale. The definition of these variables is demonstrated in **Table 1**.

Multilevel Model

Due to the fact that the data structure of the present study was nested within multiple agricultural companies (consistency within the group but differences between groups), we adopted the MLM to analyze the multilevel framework. We employed the MLM to estimate the patterns of three individual-level variables (ESR, EE, and ES) (within-group), and two work-unit-level variables (ESR and EE) (between-group). At organization level variables, their slope and intercept factors were related to their antecedents to capture the between-group differences. At individual-level variables, these constructs were used to predict the consequence constructs. For example, ESR and EE have the configuration of between-group variation (i.e., group-to-group differences) and within-group variation (i.e., variation within a group), and these variables in MLM are different. The organization-level and individual-level ESR is related to EE at the cross-level. Next, the organization-level and individual-level EE is related to the individual-level ES.

Model Validation

The reliability, validity, and fit index of the model to the empirical data of the present study are shown in **Table 2**, and the analysis results meet the recommendations of Fornell and Larcker (1980).

RESULTS

Analysis Results

The individual-level and organization-level analyses are demonstrated in **Table 3**. The individual-level ESR significantly affects individual-level EE development ($\gamma = 0.30$, $p < 0.01$). In other words, ESR would significantly affect TMTs' EE to support hypothesis 1. Next, the individual-level EE significantly affects EI ($\gamma = 0.27$, $p < 0.01$). In other words, TMTs' EE will significantly affect the company's EI adoption to support hypothesis 2. The organization-level ESR significantly affects organization-level EE ($\gamma = 0.37$, $p < 0.01$). In other words, ESR atmosphere within a company will significantly affect EE atmosphere within a TMT to support hypothesis 3. The organization-level EE significantly affects the company's individual-level EI adoption ($\gamma = 0.32$, $p < 0.01$). In other words, EE atmosphere within a TMT will significantly affect the company's EI adoption to support hypothesis 4.

DISCUSSION

This survey puts forward the MGCM to examine if the ESR significantly leads to EE development at cross-level, which in turn significantly leads to individual-level EI development. The MGCM provides significant contributions to the ESR, EE, and EI literature, and provides references to agricultural companies in implementing sustainable production through EI.

Academic Contribution

The present survey establishes a milestone in realizing sustainable agricultural production. According to the empirical results, ESR

TABLE 1 | Variable definition.

Constructs	Definition
Environmental social responsibility	The extent to which the company's environmentally responsible policy pays attention to stakeholders.
Environment engagement	The extent to which an employee puts his cognitive resource, physical resource, and emotional resource into work to achieve environmental concern.
Environmental innovation	The degree to which the company employees engage in environmental idea formation and implementation.

TABLE 2 | Analysis results of CFA.

Constructs	AVE	CR
Environmental social responsibility	0.51	0.93
Environment engagement	0.50	0.82
Environmental innovation	0.53	0.81

Note: RMR = 0.071; RMSEA = 0.043; GFI = 0.92; CFI = 0.92; NFI = 0.91.

would cause more growth of EI through the intermediary role of EE. First, we dig the important antecedent of EI according to the MLM to fill in the first gap of exploring the driving factors of EI. Second, ESR has gradually received much attention, and ECSR still needs to be investigated in different areas (Vlachos et al., 2014), such as the agriculture field. In other words, the present survey investigated how ESR would cause EE, and then would cause EI adoption, and few studies have examined the driving factors of EI to open the black box in different contexts. The present survey contributes to the EI literature through which ESR would lead to more growth in individual-level and organization-level EE, as well as more growth in EI adoption over time, which responses to the call of researchers in the past to open more black boxes of corporate social responsibility (Aguinis and Glavas, 2012; Huang et al., 2021). Finally, this survey employs MLM to analyze the dynamic process of ESR, EE, and EI to fill in the second gap of employing a longitudinal survey. In sum, this survey contributes to the sustainable production literature through the MLM of this survey.

Practice Contribution

To achieve sustainable production in the agriculture field, this survey explores why agricultural production companies adopt EI to improve environmental sustainability that is a great benefit to sustainable agricultural production. In other words, this survey poses the other pathway that employs organizational policy (e.g., ESR) to implement EI. These agricultural companies

specializing in the export of agricultural products can implement EI through ESR and EE, and EI is an important source of sustainable production (Anderson and Maughan, 2021; Moravčíková1 et al., 2021; Qadri et al., 2020). In addition, sustainable production is also an important method to deal with environmental concerns because sustainable production can reduce resource consumption and environmental pollution. In addition, managers always invest many resources to improve organizational performance and employees' positive behaviors. However, these managers do not seem to be aware that these green variables (ESR and EE) are essential for the company's sustainable production. Therefore, investing resources in green variables should be more important than investing in other projects. In addition to encouraging companies to adopt ESR, the other feasible method is to establish a good green working atmosphere to increase EE. Next, the results of this research show that these companies should implement EI through the ESR and EE. For example, to effectively implement EI, these companies should devote resources to ECSR activities because ESR is an important driving factor for companies to adopt EI. In addition, ECSR has been recognized as a source of corporate sustainability (Kong et al., 2020), so ECSR may also be an important source of sustainable agricultural production. Finally, managers often devote key resources to increasing the employee's positive behavior for company performance, but these managers may ignore the key antecedent of green management (e.g., ESR and EE). Therefore, these human resource managers should keep in mind that maximizing these green management behaviors and constructing a green work environment are the key driving factors of sustainable production.

Conclusion

This survey puts forward the MLM to prove that ESR would lead to more development of EE, which in turn would lead to more development of EI adoption. The MLM has important

TABLE 3 | Statistical results.

Hypothesis	Path	Coefficient
H₁	Individual-level environmental social responsibility → individual-level environment engagement	0.30**
H₂	Individual-level environment engagement → individual-level environmental innovation	0.27**
H₃	Organization-level environmental social responsibility → organization-level environment engagement	0.37**
H₄	Organization-level environment engagement → individual-level environmental innovation	0.32**

*Note: *p < 0.05; **p < 0.01.*

contributions to guide agricultural production companies on how to implement sustainable agricultural production through EI, thereby promoting the practice and academic development of EI, which fills the gaps in the previous literature on multiple level framework and the cross-section study.

However, some limitations should be mentioned in the current research conclusions. This survey poses that EE is a significant mediator in transforming the ESR into the firm's EI, but there should be other constructs that are important in different environment settings. Therefore, further study must investigate the theoretical model of this survey in other contexts to detect key constructs. Next, the Taiwanese sample may limit the generalization of the proposed model in this survey. Therefore, further study must employ different data to confirm the generalization. Finally, this survey employs the MLM to infer the causal relationship among ESR, EE, and EI that may generate bias. Further study must use an experimental design to confirm the causal relationship.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/Supplementary Material; further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

SH contributed to conceptualization, YL contributed to methodology, YL contributed to software, CY contributed to validation, CY contributed to formal analysis, CY contributed to investigation, YL contributed to resources, SH contributed to data curation, SH contributed to writing—original draft preparation, CY contributed to writing—review and editing, CY contributed to visualization, SH contributed to supervision, SH contributed to project administration, and YL contributed to funding acquisition. All authors have read and agreed to the published version of the manuscript.

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