

IMPACT OF CORPORATE SOCIAL RESPONSIBILITY ON ECO-INNOVATION IN VIETNAM AGRO-FOOD ENTERPRISES TO PROTECT THE FOREST

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Abstract: Nowadays, studies of corporate social responsibility (CSR) and eco-innovation is not a new issue. However, linking them with enterprises in the agro-food industry has not received much attention from research. This is because the agro-food industry is judged to be inelastic to innovation and to CSR. With the products of agro-food enterprises in Vietnam being mostly raw products, research on CSR and eco-innovation becomes even less attractive in this country. This study was conducted to confirm this relationship in Vietnam agro-food enterprises. Based on a sample of 496 agro-food enterprises in Vietnam, this study has obtained positive results. Firstly, most aspects of CSR have a positive impact on eco-innovation in the enterprise. Secondly, the impact of different aspects of CSR on eco-innovation is not the same. CSR towards the environment and suppliers has been confirmed to have the strongest effect on eco-innovation in enterprises. Finally, customer-oriented CSR does not have much impact on eco-innovation in agro-food enterprises. From these results, recommendations have been made to improve the sustainability of agro-food enterprises in Vietnam.

Keywords: corporate social responsibility, eco-innovation, Vietnam agro-food enterprises

1. Introduction

In Western countries, corporate social responsibility (CSR) is considered a common issue for enterprises and governments (Chapple and Moon, 2005). In contrast, for developing countries in Asia, the concept of CSR is still quite unfamiliar due to weak institutions, standards, and systems on CSR in these countries (Mishra and Suar, 2010). This has posed a significant challenge for

enterprises in the practice of CSR in developing Asian countries, including Vietnam. Although extensive research on the role of CSR in influencing company development has been carried out in many developed countries (Belal, 2001), there are still very few such studies in Vietnam. Current research on CSR in Vietnam is mostly limited to self-reported questionnaire surveys on CSR, with little in-depth analysis of its benefits with other aspects of the business, such as innovation. Since then, most of these studies only give general conclusions without a deep understanding of the role of CSR for enterprises.

Although it has been around for a long time, there are still many very active debates on the issues of CSR. Initially, researchers used different ways to assess CSR (McGuire et al., 1988; Cochran and Wood, 1984; Aupperle et al., 1985). After Freeman's (1984) stakeholder theory was introduced, the assessment of CSR from the stakeholder theory promoted a new direction for CSR research (Clarkson, 1995). One-dimensional CSR measures have been replaced by multi-dimensional CSR measures that cover different stakeholder issues. Studies using stakeholder perspectives often aggregate aspects of CSR for various stakeholders into one composite indicator while examining its relationship to corporate activities (Waddock and Graves, 1997; Ruf et al., 2001). Such aggregation has facilitated cross-company comparison of companies' CSR levels. However, such aggregation runs the risk of masking the individual effects of CSR across specific dimensions (Galbreath, 2006). In aggregate, a company's high level of CSR can be driven by only some CSR policies that are favorable to some stakeholders, completely or partially ignoring the problems of others. Analysis of the effect of biased measures of CSR on firm performance may not reflect the true relationship between the two constructs. This requires examining the influence of individual aspects of CSR on business performance. This study examines the influence of different aspects of CSR according to stakeholder theory as well as its impact on corporate innovation.

Enterprises place a high priority on R&D teams and highly qualified people in addition to the advancement of science and technology. Although the importance of innovation cannot be denied, there is still disagreement on the elements that encourage it, particularly eco-innovation (Galliano et al., 2015). Marshall's theory of specialization is predicated on the notion that knowledge effects only happen between businesses operating in the same industry and can thus only result from the geographic concentration of businesses engaged in related businesses. Jacobs, in contrast to Marshall, stresses that the diversity of local sectors is what fosters knowledge transfer and, eventually, innovation. However, a company's access to its skills and resources, as well as the strength of the tertiary and industrial base in the area, are all impacted by its position in a low-density area. Low density has an impact on the spread of information and the diversity of industries. Another theory is that related types tend to make up for reduced activity agglomeration in peripheral locations, such as rural areas (Naldi et al., 2015; McCann and Ortega -Argilès, 2015; Camagni and Capello, 2013). Its primary beneficial effect is to promote knowledge sharing in the region where the usage of related technology brings businesses closer together cognitively (Boschma and Frenken, 2011). In the innovation sector system generally, and even in eco-innovation, the local industrial environment is significant (Malerba, 2005; Galliano and Nadel,

2015). This has caused some to wonder whether innovation for agro-food businesses differs from innovation for other businesses.

Studies on eco-innovation have revealed that appropriate policies and regulation are crucial to the creation and spread of eco-innovation in businesses (Horbach et al., 2012). Their significance is related to the fact that eco-environmental innovation's impact is non-tradable. This has prevented enterprises from taking advantage of all the positive effects of eco-innovation. Businesses in the agro-food sector have been compelled by this obstacle to rely on appropriate rules and regulations to provide incentives for eco-innovation. These regulations give businesses incentives to get over financial and technological barriers to implementing eco-innovation (e.g., difficulty in forecasting possible business impacts). The kinds of responsible laws and policies that are established and how they affect CSR differ. Galliano and Nadel (2015), for instance, note that tight adherence to rules has a negligible effect on manufacturing enterprises' application of responsible practices to comply with the law and the environment. CSR also has an impact on agricultural initiatives, particularly those that are directly tied to farmers. In particular, steps are taken as part of the overall strategy and financial support is given to encourage agro-food businesses to adopt more environmentally friendly farming methods. These many studies all tend to point out the critical role that corporate CSR plays in the various stages of innovation projects' growth, particularly in the eco-innovation of agro-food businesses. This support, however, could differ for various stakeholder-focused CSR initiatives. Despite this, there aren't many research looking at how CSR's many facets affect agro-food companies' eco-innovation. According to the results of this study, no research has been done specifically in Vietnam.

This study was conducted to assess the link between CSR and eco-innovation of agro-food enterprises in Vietnam. Characterized by their small size and the unattractive nature of the industry to innovative activities, these enterprises need strong incentives to implement eco-innovation. This study is based on stakeholder theory to measure aspects of CSR. From there, explore the individual impact of each aspect on eco-process innovation and eco-organization innovation.

2. Theoretical background and hypotheses development

2.1. CSR base on stakeholder theory

Constraints related to the economy, society, and the environment are more than just analytical ideas; they also reflect dynamics that a firm may employ to match its business model with its business plan. CSR is frequently referred to be a strategy for incorporating social and environmental considerations into business operations (Baumgartner, 2014). The academic community has demonstrated that encouraging long-term stability, growth, and sustainable operations in a dynamic and changing environment requires a CSR approach (Prado-Lorenzo et al., 2008; Gyves and O'Higgins, 2008; Luo and Homburg, 2007). There are numerous ways to look at the CSR idea. Carroll (1979), for instance, makes a connection between it and social performance, Solomon (1993), Freeman and Evan (1990), a connection with corporate governance, and Elkington (1998), a consideration of the accountability perspective. Then, Lo (2010) explores the words "corporate sustainability" and "social responsibility," acknowledges that both are "voluntary business practices," and outlines the transitional phase that a corporation must

go through on the way there. Stakeholder Theory, Institutional Theory, and Management Theory are just a few of the ideas that have been used to explain how economic units behave when it comes to CSR issues. The stakeholder theory used by the other theories in this study does not fully evaluate every aspect of CSR (Mirsha and Suar, 2010). According to Freeman (1984), managers must consider the requirements of various stakeholders, including suppliers, customers, the environment, and local communities, in addition to those of shareholders. This also serves as the basis for CSR measurement using the stakeholder theory.

CSR towards employees includes measures and policies that benefit staff. An employer-focused company will make a commitment to investing resources in enhancing employee wellbeing (Mirsha and Suar, 2010). In a survey of 3,500 Americans, 85% of participants believed that employers should treat employees better (O'Brien, 2005). However, workplace problems include unsafe working conditions, a lack of equitable chances, and child labor commonly catch the public's, regulators', and media's attention.

CSR towards customers refers to a company's capacity to deliver superior goods and services while keeping the appropriate level of product quality and cost, addressing concerns like limiting consumer complaints and customer safety during product use, among other things (Mirsha and Suar, 2010).

CSR towards investors: Investors prefer to work with socially conscious businesses (Gillis and Spring, 2001). Businesses put strategies and practices into practice to earn the respect and prestige of investors and lending institutions: To ensure annual information provision and to assess business success, use intermediaries (for example, credit rating agencies).

CSR towards community: Recent studies on the community frequently highlight the Triple Bottom Line, which includes: People, Planet, and Profit. Increasing business-community connections is one idea that frequently benefits businesses financially. As part of an economic agreement with the community, businesses should commit to community commitments. These agreements cover topics like charity, public-private partnerships, and community social and economic development.

CSR towards environmental: The Earth Summit on Climate Change in 1992 increased global awareness of environmental challenges. Environmental laws in various nations have been developed together with international standards like ISO 14000, EMAS, and OHSAS 18000. Studies have emphasized the significance of environmentally friendly manufacturing methods in business. Environmental CSR initiatives place a focus on topics including ethical waste management and emission regulations, resource conservation, training, and the advancement of environmental technologies.

CSR toward suppliers: Researchers and businesses in the real world have recently observed the importance of concerns related to the social responsibility audit of suppliers growing (Arminas, 2005). By ensuring that suppliers ethically source raw materials, interact with suppliers ethically, and stop violating child or human rights at suppliers.

In terms of CSR procedures, Asian businesses frequently lag behind their Western counterparts (KPMG, 2005). But with trends toward liberalization and globalization, growing

consumer expectations for businesses, and the rise of pressure organizations have strengthened the argument for CSR in other nations. Asia, including Vietnam. But Vietnamese companies hardly appreciate the role their CSR practices play. The implementation of CSR in Vietnam by companies has not been diversified, mainly due to being bound by law or implementing CSR in the direction of charity and belief.

There are many debates about CSR in the agro-food industry. In fact, the agro-food industry has for many years faced several CSR challenges (Hartmann, 2011). Basically, human, material, and environmental resources all have an impact on the food sector, as well as being directly impacted by them. Further demonstrating the divergent viewpoints in this area is the fact that the food industry is diverse and multifaceted, which offers several angles on handling CSR. Nine CSR achievement-focused activities that were originally created for the dairy industry but are transferable to other food industries are compiled by Costanigro (2016). Following that, these actions are focused on waste management, adherence to sustainable agricultural methods, control of water and energy consumption, encouragement of employment opportunities, stimulation of local activity, and air pollution prevention. In addition to these behaviors, it can be stated that sharing CSR-related information is a CSR activity in and of itself, seen as a test of honesty and dependability. Therefore, a stakeholder theory-based CSR assessment for the agro-food industry would be a safe and comprehensive assessment.

2.2. Eco-innovation in agro-food enterprises

Over the past few decades, businesses have become much more environmentally conscious (Daz-Garca et al., 2015). The scholarly literature on the topic, with very few exceptions, tends to shun SMEs and has primarily concentrated on high-tech industries and major enterprises (Schiederig et al., 2012; Segarra-On et al., 2014). (Cuerva et al., 2014; Popa et al., 2017; Klewitz and Hansen, 2014). Small businesses frequently struggle to turn adopting environmentally friendly practices into a competitive advantage (Del Ro González, 2005), and as a result, they are often reluctant to incorporate environmental considerations into their management processes (Revell and Rutherford, 2003). Additionally, there is a dearth of research on this subject in conventional fields like the traditionally low-tech agro-food industry, with some significant exceptions (Cuerva et al., 2014; Bossle et al., 2016; Triguero, 2018). Because of this, it is still unclear how using green practices helps businesses in low-tech industries like the agro-food industry succeed. The role of external influences, internal resources/competencies, the company's eco-friendly orientation, and the financial implications of environmental initiatives, for example, have all been extensively studied in the broader environmental business literature and can only be addressed by the tangential approach, according to a recent literature review (Leonidou et al., 2011).

The numerous partners and collaborators of the food system are involved in the intricate process of innovation in the agro-food sector. Innovations in this sector can include the introduction of a new ingredient, the creation of a more effective manufacturing process, or the adoption of a new technique for food preservation. As a result, in order to grow and introduce innovations, the agro-food industry depends on having established contacts with the distribution

sector and being able to network (Capitanio et al., 2010). The terms "green," "ecological," and "environmental" innovation are frequently used synonymously in the literature to refer to inventions that lessen harmful environmental effects (Daz-Garca et al., 2015). Environmental risks, pollution, and other negative effects of resource use (including energy use) are reduced over the course of a product's life cycle when compared to appropriate alternatives. Eco-innovation is the production, assimilation, or exploitation of a new product, production process, service, management, or business method for the organization. The Oslo Handbook (OECD, 2005) and this concept allow us to distinguish between technological and non-technology eco-innovations. The former speaks of environmentally friendly goods and methods of production, including services. The management, marketing, and business strategies that lessen a company's operations' detrimental effects on the environment are covered in the section that follows. Businesses attempt to deal with mounting pressure to go green while maintaining their competitiveness (Stefan and Paul, 2008). The literature has highlighted four key sources as the forces for eco-innovation. Numerous studies demonstrate that consumers are eager to pay extra for goods and services that are produced with greater consideration for the environment (McDonagh and Prothero, 2014). Due to customer demand for greener goods and services, which might compel businesses to create eco-friendly goods, there is market traction for EI (Kesidou and Demirel, 2012; Triguero et al., 2013).

Eco-innovation will assist businesses in entering new markets where consumers are greener-aware and even support public green purchasing. Additionally, as we previously indicated, research indicates that consumers are prepared to pay more for goods and services that are created in a way that is more considerate of the environment (McDonagh and Prothero, 2014). The business can offer more variety, customize products, and modify product features to better suit client needs through eco-innovation. Eco-innovation is a strategy that aims to satisfy customers while also being connected to better corporate performance (Capitanio et al., 2010). Therefore, eco-innovation can be a point of differentiation and the foundation of a firm's competitive advantage. Additionally, lowering expenses may serve as the foundation for improving a company's operational efficiency. The likelihood of cost reduction for businesses is increased in numerous ways through eco-innovation. It is evident that eco-innovation can increase businesses' production efficiency and lower their energy and raw material consumption (Torugsa et al., 2012). As a result, it is simple to lower the costs related to these aspects. Furthermore, it's feasible that greener businesses that may access capital markets through "green" and "ethical" funds will have reduced costs of capital as a result of their improved environmental performance (Leonidou et al., 2016).

Four metrics were used by Arundel and Kemp (2009) to assess eco-innovation: inputs, intermediate outputs, direct outputs, and indirect effects. The input measurements primarily take into consideration the costs of research and development (R&D). Although they have significant drawbacks, R&D statistics are frequently utilized in innovation research (Coad and Rao, 2010; Leiponen and Helfat, 2010). They frequently take place in formal R&D laboratories and have a tendency to capture formal R&D; yet, R&D cannot take organizational and service innovation into account. According to the OECD (2005), patents are given for new and inventive ideas with

industrial applications. However, patent applications are not required to be made for profit. They consequently do not serve as a direct indicator of advances, particularly in the agro-food sector. Direct output metrics include information on new product sales, the number of enhancements, descriptions of each improvement, and more. The fact that there are so few product information databases including eco-information and eco-innovation outputs poses a significant issue, though. Surveys are probably the best source of comprehensive data on eco-process advancements. Measures of indirect effects, including adjustments to resource efficiency and productivity, are obtained from aggregated data. Eco-innovation can be quantified indirectly using performance statistics on eco-efficiency or information on changes in absolute impact. In conclusion, Arundel and Kemp (2009) made an effort to create four different types of eco-innovation indicators. This is helpful since we frequently have an interest in the resources used for eco-innovation and the benefits that result from it. However, occasionally businesses may need to assess how well their eco-innovation strategy is being carried out. This demand cannot be satisfied by the Arundel and Kemp (2009) gadget. A more complete and appropriate method is required for monitoring eco-innovation in the agro-food sector. The initial eco-innovation implementation, according to Morgan et al. (2009), can be viewed as a collection of consistent steps taken to carry out a specific eco-innovation project. All of these steps must come under the organization, process, or product dimensions. Cheng and Shiu (2012) created the three-dimensional concept of eco-innovation, which includes eco-organization, eco-process, and eco-product innovation. Since most agro-food businesses in Vietnam are small-scale and lack adequate technological resources to conduct eco-product innovation, it appears inappropriate in this environment. As a result, just two aspects—eco-process innovation and eco-organization innovation—were chosen for this study.

Eco-organizational innovation is the capacity and dedication of organizational members to put new eco-innovation management practices into place. Eco-organizations can help implement eco-processes (for instance, in production) and eco-product developments, but they cannot directly minimize environmental effect (Murphy and Gouldson, 2000). Arundel and Kemp (2009) state that the introduction of eco-learning approaches, eco-product design programs, eco-training programs, and other activities are all part of the implementation of eco-innovation initiatives. In conclusion, eco-innovation can result from a variety of internal organizational activities. The term "eco-process implementation" refers to the use of production procedures that have a lower negative impact on the environment, such as closed solvent loops, material recycling, or filters. Implementing eco-processes entails upgrading current manufacturing techniques or introducing fresh ones to lessen their negative effects on the environment. Kemp (2009) asserts that new processes can be additive ones (such as fume extractors), those that optimize output or production, those that enhance output, those that integrate into the manufacturing process through input substitution, etc.

2.3. Relationship between CSR and eco-innovation

2.3.1. CSR towards employees and eco-innovation

The company's intention to accommodate employee interests and needs is shown in its proactive employee policies and procedures. Policies and practices that represent the CSR of the business to its employees include those pertaining to labor relations, worker engagement in decision-making, remuneration plans, working conditions, and the elimination of child and forced labor. Companies can boost eco-innovation within the organization and employee satisfaction by adhering to such criteria. A productive workplace is one where working circumstances respect social protection, equality, and human decency (Somavia, 2000). The social responsibility of a company influences its reputation and attracts both current and potential employees (Turban and Greening, 1997). Because it generates favorable reactions from employees' relatives and friends, an ethical reputation raises employee happiness and reduces employee turnover (Riordan et al., 1997). The effectiveness of the organization's eco-innovation is increased by satisfied personnel who are more efficient and productive due to their improved morale and motivation (Berman et al., 1999). Studies from the past demonstrate that better human resource management techniques, such as employee training and development, their participation in problem-solving, progressive compensation policies, and complaint procedures, decrease employee turnover, increase their productivity, and foster their capacity for innovation (Huselid, 1995; Youndt et al., 1996). From the above arguments, the following two hypotheses are proposed,

H1a: CSR towards employees has a positive effect on enterprises' eco-process innovation

H1b: CSR towards employees has a positive effect on enterprises' eco-organization innovation

2.3.2. CSR towards customers and eco-innovation

Positive customer perceptions of product quality lead to innovative incentives to cut costs associated with stakeholder relationships (Waddock and Graves, 1997). In the modern context, negative customer response is the result of a lack of corporate social responsibility (Bromiley and Marcus, 1989). When customers are not satisfied with a product or its related services, enterprises will not take the risk to innovate because this can directly affect profits (Berman et al., 1999). In such a context, eco-innovation is even less feasible. In general, even though there is no direct impact, customer reactions will cause enterprises to abandon existing innovation plans and turn to fulfilling customer responsibilities. As a result, businesses need to exercise caution when it comes to things like moral advertising standards, the quality of the products that customers receive, and similar issues. Company policies and practices for dealing with these issues send a strong message about a company's approach to customer responsibility and can significantly boost eco-innovation in businesses. From the above arguments, the following two hypotheses are proposed,

H2a: CSR toward customers has a positive effect on enterprises' eco-process innovation

H2b: CSR toward customers has a positive effect on enterprises' eco-organization innovation

2.3.3. CSR towards investors and eco-innovation

Companies can improve their relationships with investors by implementing suitable governance rules. Governance regulations and laws are being emphasized to safeguard the interests of shareholders and investors in the wake of corporate governance disasters in the 1990s, such as Enron in the US. CSR for Investors looks at corporate policies and practices regarding things like insider trading rules and shareholder participation in decision-making. Evidence shows that adopting better corporate governance standards increases a company's innovation performance. Environmental technology is driven by regulations and improves corporate image as well as personal commitment of managers. Implementing CSR policies towards investors will help enterprises receive appropriate investment commitments. This can be an important resource to help enterprises realize eco-process innovation and eco-organization innovation. Economic risk and investor caution are other factors that might either deter or encourage environmental technologies (Norberg-Bohm, 1999). Unless a suitable CSR policy is geared towards long-term investors, companies can engage in technological eco-innovation when there are clear short-term benefits, but such innovations are less likely to occur when returns are long-term or more uncertain. Furthermore, regarding economic risks and uncertainty, investors will have a steady demand for business operations before considering investing in cleaner technologies in the long term (Montalvo, 2008). From the above arguments, the following two hypotheses are proposed,

H3a: CSR towards investors has a positive effect on enterprises' eco-process innovation

H3b: CSR towards investors has a positive effect on enterprises' eco-organization innovation

2.3.4. CSR towards community and eco-innovation

Charity donations, relationships with the community, and involvement in local economic and social development issues are all examples of community-oriented CSR. To empower local communities, businesses are exploring meaningful relationships with NGOs. Business activities like collaborating with an NGO to improve elementary education of high quality in rural areas or assisting women in finding jobs in rural areas (Dunn and Yamashita, 2003). Businesses will profit from a positive social reputation among their staff and the neighborhood as they concentrate their social initiatives on the communities in and around their region of operation (Husted, 2003). These positive images will facilitate enterprises to access high-quality human resources as well as local support in eco-innovation. Although prior research has found a link between corporate social responsibility (CSR) for the community and poor corporate performance (Berman et al., 1999), it has also been observed that investing in community development activities gives businesses a competitive edge by lowering costs associated with taxes and regulations and raising the caliber of local labor. These conditions contribute significantly to resource access and thereby reduce the burden of converting eco-processes or eco-organizations. As a result, enterprises feel they are being facilitated and are more willing to innovate ecologically. From the above arguments, the following two hypotheses are proposed,

H4a: CSR towards community has a positive effect on enterprises' eco-process innovation

H4b: CSR towards community has a positive effect on enterprises' eco-organization innovation

2.3.5. CSR towards environment and eco-innovation

In recent years, there has been increasing global pressure to enact and adopt stricter laws related to environmental protection at home and globally. Companies are proactively implementing emission reduction initiatives to stay ahead of future policy, social developments and environmental competition. Companies are becoming more aware of the significance of implementing environmental standards for their long-term sustainability as the demand for ecologically friendly products, processes, and services increases. This has made it easier to comply with international standards like ISO 14000, OHSAS 18000, and environmental laws as well as to build green resources and capabilities. From here, eco-innovation is enhanced by advancements in a variety of areas, including manufacturing technology, end-of-pipe control technology, environmental worker training program systems, improved technology for recycled products, and other resource-saving initiatives. Studies linking corporate environmental commitment to eco-innovation have been established quite early. Initially, environmental tools of government were classified into market-based tools and command-and-control tools (Lindeneg, 1992). and this affects the company's adaptation to these tools differently. Enterprises that are more concerned and have more environmentally friendly CSR policies will adapt more quickly to changes in environmental laws. Therefore, enterprises soon shape the eco-innovation trend. With the development of environmentally friendly CSR policies, tools such as media and voluntary agreements have emerged, and these create better innovation governance efficiencies. Therefore, based on the mandatory impact of policy instruments on enterprises, eco-innovation as a trend towards which these enterprises are aiming. From the above arguments, the following two hypotheses are proposed,

H5a: CSR towards environment has a positive effect on enterprises' eco-process innovation

H5b: CSR towards environment has a positive effect on enterprises' eco-organization innovation

2.3.6. CSR towards suppliers and eco-innovation

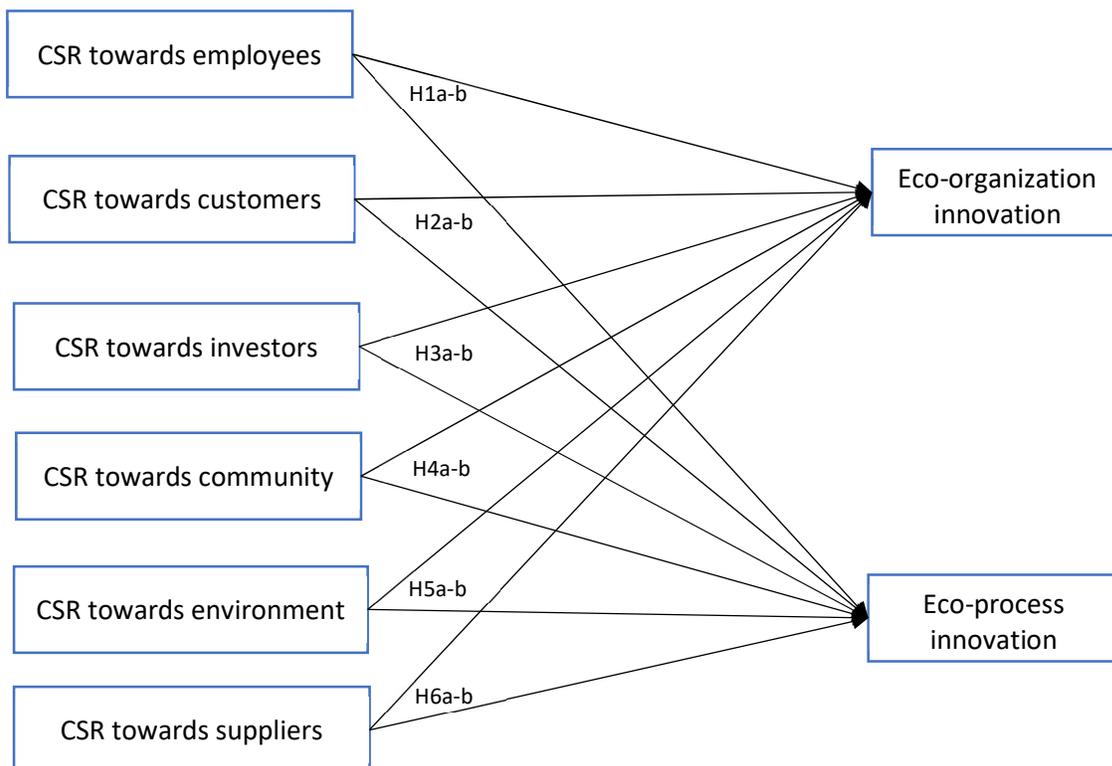
Since businesses started concentrating more on their core competencies and outsourcing other functions to suppliers, the influence of suppliers has grown in importance. Issues with suppliers, such as their impact on the environment, their involvement in the community, and their ability to pay their workers a living wage, have gained importance in recent years. Supplier-focused CSR standards address concerns like the eradication of human rights violations at supplier locations and the ethical procurement of raw materials. A company sends strong signals about its commitment to CSR by requiring suppliers to adhere to CSR standards, which enhances its reputation and ability to innovate. Moving towards supplier CSR policies will help enterprises get better cooperation and is also a resource for eco-innovation. Thanks to the respect gained through implementing CSR towards suppliers, enterprises will receive positive feedback from suppliers.

Incentives coming from home are also a source to improve the eco-innovation capacity of enterprises. Greater access to outside knowledge and exposure to other technology may also be advantages of applying CSR toward suppliers (Clark and Fujimoto, 1991). From the perspective of the client, being more familiar with the technology and procedures being used and developing tighter ties with their suppliers can also result in higher levels of creativity (von Hippel, 1988). For many ideas to be effectively implemented in practice, complementary assets must first be developed (Teece, 1986). These resources could include technological advancements or associated know-how that is not necessarily situated inside the confines of a firm. Teece (1986) emphasizes the significance of collaboration between businesses that provide various components to a technological system that is interconnected and calls for strong coordination as well as information flows across corporate boundaries for successful implementation. From the above arguments, the following two hypotheses are proposed,

H6a: CSR towards suppliers has a positive effect on enterprises' eco-process innovation

H6b: CSR towards suppliers has a positive effect on enterprises' eco-organization innovation

Figure 1. Conceptual framework



3. Methodology

3.1. Sample and data collection

Agro-food enterprises in Vietnam are identified by the government as having the role of "pillars" in promoting the development of agricultural production towards commodity production, improve the competitiveness of Vietnamese agricultural products. The Government has set a target that by 2030 there will be 80-100 thousand enterprises with effective business investment activities in this field. The agro-food industry in Vietnam still has a lot of potentials and opportunities that need to be exploited, especially in terms of land fund, human resources and taking advantage of opportunities in the era of industrial revolution 4.0. Vietnam has made significant progress in this area, serving as the second-largest exporter of agricultural goods in Southeast Asia and ranking 15th globally with 10 categories of agricultural, forestry, and fisheries products, 6 of which have an annual export turnover of over \$1 billion USD. Businesses are the "pillars," the driving force behind the development of agricultural production value chains toward the production of large quantities of commodities, the application of science and technology, and the improvement of efficiency, competitiveness, and the development of the brand name of Vietnamese agricultural products. However, compared to the potential and benefits of development, the growth of businesses in the agro-food industry is still quite low. Currently, just 8% of all businesses operating in the nation invest in the agricultural sector, and only 1% of those businesses are engaged in agriculture, forestry, or fisheries. More than 9.2 million extremely small-scale families serve as the primary organizational structure for agricultural production today. The worker productivity in the agricultural sector is still poor, at just 38% of the national average and lower than in the majority of the surrounding nations. Enterprises still have a low level of science and technology. Only around 5% of agriculture, forestry, and fisheries firms have received VietGAP or comparable certificates, demonstrating the still inadequate use of science, technology, and national and international quality standards. Additionally, the market for these items is not sustainable; there are still few chain product distribution channels with significant retail distributors; there are few businesses producing throughout the value chain; and the technical and quality hurdles of the global market are becoming stricter. Food safety violations continue to occur; this harmful rivalry for agricultural productivity. When reflecting several infractions that inadvertently had the result of a boycott of Vietnamese agricultural products due to food safety concerns, the communication problem is ineffective. Since then, they have an impact on the production and commercial operations of companies who invest in the agro-food sector. Therefore, for sustainable development, the agro-food industry needs to harmonize and integrate the value of the industrial revolution 4.0 with knowledge agriculture. Smart agriculture through one of the invisible resources is innovation. From the experience of other countries, innovation in agriculture helps to change production processes, build standard raw material areas, improve quality, building product value chains, changing production management with digital agriculture to increase farmers' incomes, and approaching world standards. With the above benefits, innovation in agriculture is a story of interest to many ministries, sectors, and localities in recent years. To solve this problem, the context of agro-food enterprises in Vietnam was selected.

A random sample of 7000 enterprises stratified by size and address was selected to send the survey. After two months of data collection, we only obtained 533 responses (reaching a response rate of 7.61%) and of which only 496 valid responses (reaching a rate of 93.06%). Only less data was collected than expected because it was collected online and, many enterprises were reluctant to share information. Even so, the very high rate of valid responses (over 90%) indicates that most of the enterprises that responded are serious about the research problem. The results of descriptive statistics show that the participating agro-food enterprises are mainly small and medium sized (the percentage of enterprises with less than 200 employees is 72%). Enterprises are evenly distributed in all three areas north, central, and south of Vietnam. However, the number of enterprises in the central of Vietnam is relatively small, accounting for only 26.4%. Regarding the export ratio, there is a clear polarization and is divided into two trends. The first trend is no or very little participation in export activities (accounting for 20.6%) and the second trend is for exporting enterprises to be 60% higher (accounting for 65.9%). This also indicates that if firms engage in export, they will focus heavily on the export market, and if not, they will mostly focus on the domestic market.

Table 1: Sample descriptive statistics

NUMBER OF EMPLOYEES	Number	Percent
< 50	67	13.5%
50 - 99	158	31.9%
100 - 199	132	26.6%
200 - 499	99	20.0%
>= 500	40	8.1%
ADDRESS		
North	194	39.1%
Central	131	26.4%
South	171	34.5%
EXPORT RATE		
0-20	102	20.6%
20-40	45	9.1%
40-60	22	4.4%
60-80	128	25.8%
80-100	199	40.1%

3.2. Measurement and data analysis

CSR is divided into 6 aspects which are CSR towards employees, CSR towards customers, CSR towards investors, CSR community, CSR towards environment, CSR towards suppliers. The scales for them are developed from the study of Mishra and Suar (2010), specifically:

CSR towards employees is measured through 10 items, rated on a 5-point Likert scale, with two examples being “Policies for the training and development of employees” and “The right to freedom of association, collective bargaining and complaint procedure”.

CSR toward customers is measured through 7 items, rated on a 5-point Likert scale, with two examples being “Policy/management systems for customer satisfaction” and “Commitment to quality through a well-developed, company-wide quality program”.

CSR toward investors is measured through 7 items, rated on a 5-point Likert scale, with two examples being “Provision of all required information to credit rating agencies” and “Policies and procedures for engaging in wide range of stakeholder-dialogs”.

CSR toward community is measured through 9 items, rated on a 5-point Likert scale, with two examples being “Supports for third party social and sustainable development related initiatives” and “Policy for social accountability or sustainable reporting”.

CSR toward environment is measured through 15 items, rated on a 5-point Likert scale, with two examples being “Systems for measuring and assessing environmental performance” and “Mechanism for supporting research and development of environmental technologies”.

CSR towards employees is measured through 5 items, rated on a 5-point Likert scale, with two examples being “Inspection of supplier facilities for health, safety and environmental aspects” and “Policy for social accountability or sustainable reporting by the supplier”.

Eco-innovation is divided into 2 aspects which are Eco-process innovation and Eco-organization innovation. The scales for them are developed from the study of Cheng and Shiu (2012), specifically:

Eco-process innovation is measured through 6 items, rated on a 5-point Likert scale, with two examples being “Our unit often updates manufacturing processes to protect against contamination” and “Our unit often establishes recycling systems into manufacturing processes”.

Eco-organization innovation is measured through 9 items, rated on a 5-point Likert scale, with two examples being “Our unit management often uses novel systems to manage eco-innovation” and “Our unit management often communicates experiences among various departments involved in eco-innovation”.

The theories and models of impacts from CSR on eco-innovation of agro-food enterprises in Vietnam have not been agreed, therefore, the selected data analysis method is PLS-SEM with Smart PLS 3 software (Ringer et al., 2015). This method is optimal for SEM models when the sample size is small, suitable for development studies (Hair et al., 2014). This method can be conducted based on 2 stages: (1) model evaluation (including measurement model and structural model, and (2) hypothesis testing through Bootstrap technique). Regarding the evaluation of the measurement model, the evaluated criteria are reliability (Cronbach’s Alpha > 0.7 by Nunnally and Bernstein, 1994; Composite Reliability by Hair et al., 2019), convergent validity (Outer loading > 0.7 by Henseler et al., 2009; AVE > 0.5 by Hair et al., 2019), discriminant validity (HTMT < 0.85 by Henseler et al., 2015), and multicollinearity (VIF < 10 by Mason and Perreault, 1991). Regarding aspects of structural model evaluation, R-square, f-square coefficients and model

fit criteria are used. In the model fit assessment, the criteria used are SRMR < 0.08 (Hu and Bentler, 1999), NFI > 0.85, and rms Theta = 0.077 < 0.12 (Hair et al., 2014).

4. Results

First, items that do not guarantee reliability will be removed to improve the quality of the quantitative model. According to Henseler et al. (2009), items with Outer loading < 0.7 will show weak convergence and should be discarded. The results of running the algorithm in Smart-PLS show that Outer loading of items: CSR community (9th), CSR employees (2nd, 7th, 8th, 9th), CSR environment (3rd, 4th, 8th, 15th) are all less than 0.7 and therefore these items are all removed (Henseler et al., 2009). After testing again, there are no more items with Outer loading < 0.7 and thus a measurement pattern is formed.

Measurement model

First, the reliability of the variables is evaluated based on two criteria: Cronbach's Alpha > 0.7 (Nunnally and Bernstein, 1997) and Composite reliability > 0.7 (Hair et al., 2019). The results in Table 2 show that the Cronbach's Alpha values, and the Composite reliability values are both greater than 0.7, satisfying the reliability criteria proposed by Nunnally and Bernstein (1997), Hair et al. (2019). In addition, the results in Table 2 also show that the convergence value of the variables is also satisfied with the criterion AVE > 0.5 (Hair et al., 2019).

Table 2: Reliability and convergent validity

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
CSR - Community	0.946	0.955	0.727
CSR - Customers	0.866	0.897	0.554
CSR - Employees	0.919	0.937	0.713
CSR - Environment	0.922	0.934	0.562
CSR - Investors	0.919	0.935	0.673
CSR - Suppliers	0.827	0.879	0.594
Eco-organization innovation	0.910	0.926	0.582
Eco-process innovation	0.934	0.948	0.752

Next, the discriminant validity was evaluated based on the criterion of HTMT coefficient < 0.85 (Henseler et al., 2015). The results in Table 3 show that the variables are distinct from each other because the coefficients of HTMT are all less than 0.85 (Henseler et al., 2015). In addition, to check for the possibility of multicollinearity between items, Outer VIF values were used with a maximum accepted threshold of 10 (Mason and Perreault, 1991). The results show that no Outer VIF value exceeds 10, so the problem of multicollinearity is accepted in this model.

Table 3: HTMT values

	CSR-Community	CSR-Customers	CSR-Employee	CSR-Environment	CSR-Investors	CSR-Supplier	Eco-organization innovation
CSR Customers	0.290						
CSR Employees	0.327	0.108					
CSR Environment	0.412	0.257	0.284				
CSR Investors	0.366	0.520	0.229	0.418			
CSR Suppliers	0.272	0.473	0.366	0.508	0.379		
Eco-organization innovation	0.456	0.407	0.403	0.560	0.516	0.516	
Eco-process innovation	0.481	0.362	0.422	0.617	0.488	0.624	0.760

Structural model

The R-square coefficient in Table 4 shows that the variability of Eco-process innovation can be explained up to 52.3% by the variables in the model. This shows that improving CSR in the six related aspects has a strong influence on Eco-process innovation. On the other hand, the variability of Eco-organization innovation is less explained (about 44%) but still a significant result. In general, the R-square coefficient has shown that the practice of CSR will have a relatively strong impact on both Eco-organization innovation and Eco-process innovation.

Table 4: R-square

	R-square	R-square Adjusted
Eco-organization innovation	0.447	0.440
Eco-process innovation	0.529	0.523

The f-square coefficient in Table 5 shows that CSR - customers does not have much influence on Eco-organization innovation (f-square = 0.014 < 0.02) and even has no effect on Eco-process innovation (f-square = 0.001 ≈ 0.000). Even so, there are still some aspects of CSR that have a strong influence on Eco-process innovation such as CSR – Environment (f-square = 0.117) and CSR – Suppliers (f-square = 0.108).

Table 5: f-square

	CSR - Communi- ty	CSR - Customer s	CSR - Employee s	CSR - Environme- nt	CSR - Investor s	CSR - Supplier s
Eco- organization innovation	0.030	0.014	0.039	0.079	0.047	0.024
Eco-process innovation	0.049	0.001	0.036	0.117	0.033	0.108

The model fit criteria in Table 6 show that the SRMR values are all less than 0.08, satisfying the suggestion of Hu and Bentler (1999). On the other hand, the NFI values of both models are > 0.85 and the coefficient rms Theta = 0.077 < 0.12 also satisfy the model fit criteria of Hair et al (2014).

Table 6: Model fit criteria

	Saturated Model	Estimated Model
SRMR	0.041	0.049
NFI	0.856	0.851
rms Theta	0.077	

Hypotheses test

Figure 2 below is the estimated result of the model with the value inside the brackets being the p-value and the outside value being the impact factor. The results show that CSR towards customers has no impact on Eco-process innovation since p-value = 0.518 > 0.05. The remaining effects are statistically significant at the 5% level and the impact coefficients are all positive. This result has shown that only hypothesis H2b is rejected while the remaining hypotheses are supported. This result shows that the aspects of CSR mostly have a positive impact on eco-process and eco-organization innovation.

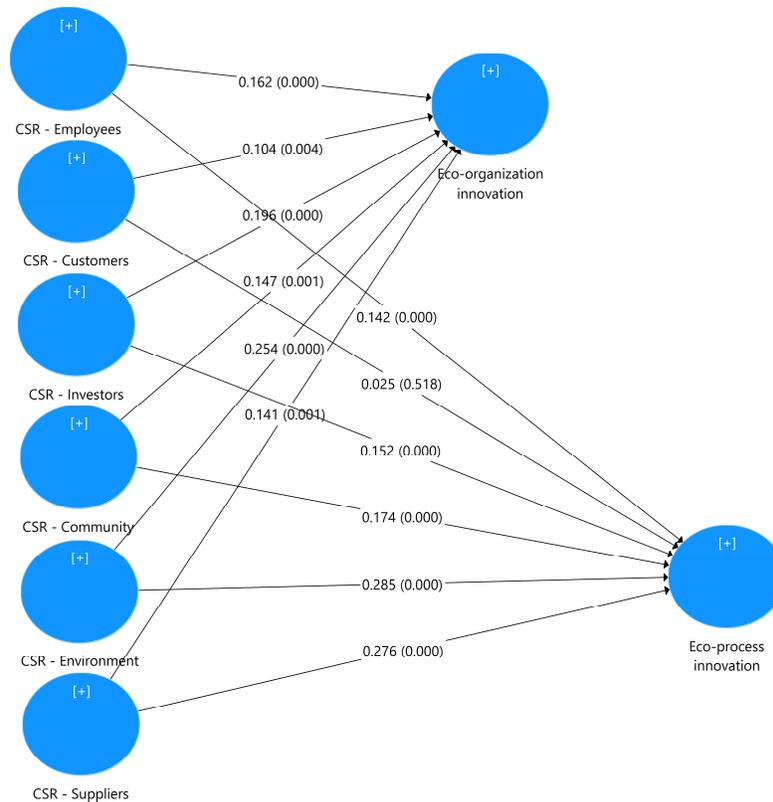


Figure 2. Model estimation result

The model estimation results also show that CSR – Environment has the strongest impact on eco-organization innovation with a coefficient of 0.254. CSR towards investors also has a very significant impact on eco-organization innovation with a coefficient of 0.196. The effects of the remaining aspects of CSR on eco-organization innovation are moderate. For the dependent variable eco-process innovation, CSR – Environment (coefficient = 0.285) and CSR – Suppliers (coefficient = 0.276) are the two factors that have the strongest impact on this variable. CSR – Community has a lower impact on eco-process innovation with a coefficient of 0.174 but is still relatively large. The impact from CSR - Investors and CSR - Employees on eco-process innovation is only moderate and the impact from CSR - Customers on this variable, as mentioned, is not statistically significant. More detailed analyzes of these effects will be presented later in this study.

5. Discussion and conclusion

This study is based on stakeholder theory to assess the impact of CSR on eco-innovation of agro-food enterprises in Vietnam. Research results have confirmed the importance of implementing CSR for stakeholders in improving the eco-innovation ability of these enterprises. Specifically, for the improvement of eco-process innovation, Vietnam agro-food enterprises should pay the most attention to improving CSR towards environment and suppliers. Enterprises that implement CSR through supporting research and development of environmental technology will have the opportunity to update their anti-pollution production processes more often. This is

also true when an enterprise clearly defines its environmental policy or long-term environmental plan. In addition, clearly defining environmental responsibility while implementing CSR will create opportunities for enterprises to access new eco-production processes and update them. Through the policy of voluntarily providing information on environmental management to stakeholders, enterprises can also receive support to update equipment in the production process. From there, enterprises have more opportunities to innovate eco-processes. The role of CSR towards suppliers is also very important. Thanks to policies that ensure ethical and friendly procurement, enterprises can quickly access new technologies that can innovate more eco-processes and save energy. On the other hand, the implementation of the CSR policy to offer attractive payment contracts and reasonable purchase prices will help agro-food enterprises access new eco-production processes, timely meet the increasingly stringent standards of environmental law.

In addition to their importance for eco-process innovation, environmentally oriented CSR policies also play an important role in renewing the eco-organization of agro-food enterprises in Vietnam. Environmentally friendly CSR policies will not only make the process eco-innovative, but also help provide a lot of useful information to management. Through the environmental technology research and development support of environmentally oriented CSR practices, management will be more motivated to gather information on eco-innovation trends as well as participate in eco-innovation activities. Management in agro-food enterprises often do not have as much access to modern environmental technologies as in other sectors. Therefore, having clearer environmental policies and long-term environmental plans also makes management more willing to invest in R&D towards eco-innovation. They even believe that they are willing to spread the eco-innovation trend to a set of enterprises, not just a few departments. Unlike in other industries, management in agro-food enterprises need stronger motivation to change their classical thinking about eco-innovation. Having voluntary policies to provide regular information to stakeholders on environmental management also creates pressures on eco-innovation for management. Since then, the trend of eco-organization innovation has been respected and facilitated to develop in agro-food enterprises.

For customer-oriented CSR, the results have shown that implementing customer-oriented CSR policies will not bring much effect to eco-innovation. Agro-food enterprises in Vietnam should pay attention to this aspect. The distinct nature of the agro-food industry has led to this result. The fact that agro-food enterprises in Vietnam mainly supply agricultural products and raw foods to customers explains this. Customers of agro-food enterprises need a steady supply rather than innovation but are exposed to risks. Therefore, if agro-food enterprises promote customer-oriented CSR policies, they will sometimes curb the driving forces that create eco-innovation in enterprises, especially process innovation. Although it is undeniable that paying more attention to customers will be a positive force for enterprises to eco-innovate, prioritizing customers also makes agro-food enterprises more forced. As a result, the driving force for eco-innovation from customer-oriented CSR policies is not much.

In general, improving CSR for stakeholders has improved the ability to innovate eco-processes and renew eco-organization of agro-food enterprises in Vietnam. However, enterprises need to determine what to do first. Based on the research results, we suggest that enterprises should prioritize CSR policies towards the environment and suppliers first. Then, enterprises can consider improving CSR towards investors and the community for long-term benefits. The remaining CSR aspects can also be implemented, but only to a moderate extent to ensure the cost-benefit issue.

Practice shows that the state needs to have policies so that enterprises have more motivation in implementing CSR as well as implementing eco-innovation in the field of agro-food. This can replace traditional policies such as preferential land resources or other favorable conditions for large-scale agricultural production. The government can also introduce policies to encourage mechanization of agricultural production, application of new and high technology in agriculture, produce high-quality agricultural products with greater added value, capable of participating in global value chains; create a position to build the national brand of Vietnam's agriculture; at the same time, mobilize social resources to invest in the development of agricultural and rural infrastructure and agricultural support services, creating an exciting competitive environment in agriculture. In addition to the preferential policies of the government and local authorities, agro-food enterprises also need to learn about techniques; must meet the eco-production process, ensure the quality of the product according to the partner's requirements.

To promote the implementation of eco-innovation in practice, localities should combine 4 core values of innovation, including: Developing a search system, selecting feasible CSR policies; strengthen the capacity of actors to create conditions for enterprises to implement CSR; promote the application of eco-innovation for sustainable agro-food business models; and policy advice, communication to replicate the application of eco-innovation. Localities need to organize specialized departments to support enterprises in sustainable farming techniques and methods; methods of improving production organization; market solutions; make use of waste by-products as bioenergy in an environmentally friendly manner. Optimizing CSR implementation of agro-food enterprises by using information technology, internet of things (IoT) technology on a small scale, etc. Implement smart technology transfer programs through online training and solutions to support sustainable development for enterprises that perform well in CSR.

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