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## The relationships between corporate social responsibility, environmental supplier development, and firm performance

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### ABSTRACT

This research is intended to deepen our understanding of environmental supplier development (ESD), which is the development of suppliers to manufacturers for the purpose of environmental performance. Corporate social responsibility (CSR) is examined as the precedent of ESD. The impact of ESD on firm performance is examined as well. Using the survey method, 314 responses were collected from Turkish manufacturing plants with more than 250 employees. A partial least square structural equation model (PLS SEM) was constructed to test both the reliability and validity of measurement and the structural model. The results indicate that CSR is positively related to ESD and that ESD has a positive influence on the financial performance and competitive advantage of the participating firms. The effects of size and sector were analyzed. It was discovered that while larger firms are slightly more sensitive to CSR, all the links are significant in both group 1 (250–400) and group 2 (>400). However the relationship between CSR and ESD was not significant in heavy industries as compared to the sectors of consumer products, textiles, and chemicals. It is possible that heavy industries (i.e., metal casting) that are somewhat away from the public eye put little emphasis on CSR, or that they may have other reasons as they develop their suppliers. Firms can be encouraged to practice CSR and ESD by being exposed to the performance benefits. To the best of our knowledge, this study is the first to test these specific relationships.

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### 1. Introduction

The interaction and integration of corporate social responsibility (CSR) and supply chain management (SCM) has led to sustainable supply chain management (SSCM). The factors of anticipated increase in climate change, demand for transparency, increased environmental pollution, energy prices, and consumer awareness will definitely serve to amplify the importance of SSCM.

There are several definitions of sustainability. The most well-known definition was offered by the [Brundtland Commission \(1987\)](#): “development that meets the needs of the present without compromising the ability of future generations to meet their needs.” This broad macro-economic definition was criticized for not being specific enough to properly guide companies and their supply chains. Therefore, in response, the triple bottom line

concept was developed, which included societal, environmental, and economic performance.

Considering that, on average, manufacturers purchase approximately 60% of their product components from suppliers, it is impossible for firms to be sustainable without greening their supply chains. [Seuring and Müller \(2008\)](#) stated “supplier developments were required before focal companies were even able to offer ‘sustainable’ products to their customers. This demands much deeper information flows along the supply chain, where suppliers have to gain detailed insights ...” If companies, especially Original Equipment Manufacturers (OEM), are genuinely interested in sustainability, it is imperative that they not dump their hazardous and/or environmentally polluting operations onto Small and Medium Enterprises (SME), whether in their own or other countries. Using small and midsize suppliers that do not employ appropriate environmental capabilities should not be accepted as an excuse for large companies to continue to operate as they have in the past. It is not unusual for SME to not have the necessary resources and capabilities to become environmentally safe companies.

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Socially and environmentally responsible companies are increasing in number. For example, Sony uses suppliers that exceed environmental regulatory requirements and who also work with an environmentally sound supply base (Handfield et al., 2005). Manufacturing companies are increasingly incorporating environmental criteria into their supplier selection processes. However, this is far from sufficient. It is important to encourage their suppliers to become sustainable and environmentally friendly when lacking environmental capabilities. Supplier development is the very essence of SCM and SSCM. Supplier development is the effort of the buying firm to increase their suppliers' capabilities (Ehrgott et al., 2013), which can be challenging because it requires a major commitment of time, money, personnel, and other resources by both parties. Several barriers demonstrate the challenges of supplier development (Monczka et al., 2009). It can be risky, costly, unproductive, and at times, the required investment can be unrecoverable. There is a need for survey-based and other methods of research applied to supplier development (Simpson and Power, 2005), and in particular, supplier development in environmental activities and processes.

There are three major groups of processes measuring the environmental performance of suppliers: supplier selection based on environmental criteria; the supplier's control and monitoring of environmental activities; and environmental supplier development (ESD). Unfortunately, much of the literature on the environmental issues concerns supplier selection and control, ignoring supplier development (Govindan et al., 2013).

Firms may choose to help their suppliers with several performance dimensions such as cost, quality (Lin and Chai, 2012), and environment. Where the literature on supplier development is limited, the literature on ESD is very scarce comparatively; this study is intended to contribute towards closing this gap. In essence, the research outlines several elements of sustainability by way of searching for the answers to two questions: (i) is ESD affected by CSR? and (ii) does ESD affect the firms' performances? By providing answers to these questions, this study attempts to extend the literature through clarifying the effect of CSR on ESD, and ESD on firms' performance (i.e., financial performance and competitive advantage). On a practical level, will the results of this study help firms to understand which factors catalyze to develop the relationship with their suppliers in order to improve environmental performance? In particular, because the effect of CSR on the financial performance of firms is unstable, by searching this relationship through the agency of ESD, this study intends to clear the way for firms such that if they use supplier evaluation, incentives, and direct involvement, CSR has the potential to indirectly promote the performance of firms.

## 2. Literature review

### 2.1. Sustainable supply chain management

There are several perspectives on sustainability, but the *triple bottom line* approach is receiving particular attention (Seuring and Müller, 2008). According to Elkington (1998), sustainability can be achieved by considering environmental, social, and economic performance. SSCM tries to answer the question of "what is it that we need to do, not just to survive, but to thrive and not just one year, three years, or five years from now, but in ten years, 20 years and beyond" (Carter and Easton, 2011). To build on the literature and also for clarity, the definition of Carter and Rogers (2008) for SSCM as "the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chains," is herein adopted, based

on the triple bottom line concept. Reduced packaging, more effective redesigns for recycling, higher levels of motivation and productivity, lowering disposal costs, and sourcing from ISO 14000 qualified suppliers are examples of SSCM activities.

Carter and Rogers (2008) identified four aspects of sustainability: strategy, risk management, organizational culture, and transparency. Strategy refers to determining SSCM activities, and considering the overall sustainability issues of a firm. Risk management consists of planning contingencies for the upstream and downstream supply chain. Organization culture includes ethical standards and transparency means traceability (the ability of monitoring) and controllability of the supply chain.

In addition, supplier selection and development (SSD) are crucial processes for successful SSCM. If problems surface regarding waste levels, transportation of hazardous materials or carbon emissions, suppliers may not be considered for future contracts. SSD plays an important role in avoiding the risks mentioned above. Reuter et al. (2010) identified some of the advantages of SSD. Firstly, suppliers can quickly respond to buyer expectations. Secondly, the image of the purchasing firm improves by excluding suppliers that do not meet standards like ISO 14001. Lastly, SSD affects the performance of firms positively by providing higher quality products with their security of supply. Reuter et al. (2010) therefore proposed that SSD increases the effectiveness of the supplier selection and evaluation process, and vice versa.

Environmental activities vary from the safe and legal disposal of waste to developing sophisticated environmental management systems (EMS). The disposal of waste includes a number of activities, such as reduction, recycling, and design for the environment (e.g., Srivastava, 2007; Kapetanopoulou and Tagaras, 2011). Reduction refers to using less energy, water, and incoming materials. Alternatively, Srivastava (2007) defined source reduction as "focusing on preventing pollution at the source (in products as well as the manufacturing process) rather than removing it." Recycling is "simply the reuse of materials from returned products without conserving the product identity" (Kapetanopoulou and Tagaras, 2011). Design for the environment refers to solving problems at the beginning of the life cycle before waste is created. EMS implies the managerial procedures that guide a firm in its activities to organize its environmental initiatives (Lefevre et al., 2003). The firm may hire environmental engineers and establish sustainability departments. The level of sophistication of a supplier's environmental activities is proportionally related to the resources they have or receive from buyers. Govindan et al. (2014) wrote a literature review about eco-efficiency based green supply chain management. Moreover, Mudgal et al. (2009) pointed out the key variables to form a green supply chain for manufacturers.

### 2.2. Corporate social responsibility

Because of increasing pressures related to humanity and environment, major concerns have emerged in the business world. CSR has developed as a general framework for alleviating these pressures (Türker, 2009). The relevant literature has provided differing definitions of CSR. For example, Bowen (1953) defined CSR as the obligations of a manager "to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society." Alternatively, Carter (2005) defined the concept as a "corporate activity and its impact on different social groups ... the firm's consideration of, and response to, issues beyond the narrow economic, technical, and legal requirements of the firm." Taking these understandings into account, this study defines CSR as the behaviors of a firm which aim to affect social and nonsocial stakeholders positively and goes beyond its economic interest (Türker, 2009). In the current study,

the five-dimensional classification, which is borrowed from [Türker's \(2009\)](#) study, provides a useful means of conceptualization of CSR as (i) CSR to environment, (ii) CSR to media, (iii) CSR to employees, (iii) CSR to customers, and (iv) partnership with NGOs.

There are contradictory results in the extant literature about the effect of CSR on the financial performance of firms. Some researchers found no positive relationship between CSR and financial performance (c.f., [Goll and Rasheed, 2004](#); [Carter, 2005](#)) because socially responsible initiatives result in additional costs, such as employee welfare programs, charity, community development, and establishing environmental sensitive policies ([Carter, 2005](#)). In contrast, other researchers found that CSR is positively related to financial performance (c.f., [Goll and Rasheed, 2004](#); [Carter, 2005](#)). Accordingly, CSR may enhance shareholder value by boosting sales, raising employee morale, increasing productivity, and stimulating innovation. CSR can also improve the reputation of a firm, enhance its customer loyalty, and raise consumer demand directly ([Lev et al., 2010](#)).

There are two major theoretical approaches that link CSR to firm performance. Friedman and neo-classicists suggest the existence of a negative relationship between CSR and financial performance ([Goll and Rasheed, 2004](#)). According to [Friedman \(1970\)](#), only people have liabilities. A firm is an artificial person, so it has artificial concerns. This thought is called shareholder perspective, suggesting that the only duty of business managers is to serve the interests of shareholders by seeking more profit ([Sawyer and Evans, 2010](#)). On the other hand, [Freeman's \(1984\)](#) stakeholder perspective suggests that firms need to meet the needs of the stakeholders in addition to the shareholders. According to this perspective, stakeholders are critical for the existence of the firm. The basic idea of the stakeholder perspective is that a firm's success depends on how it is able to manage relationships with key groups, such as customers, employees, suppliers, communities, politicians, and owners, each of which can affect its ability to reach its goals ([Ihlen, 2008](#)). With this in mind, stakeholders contribute to a firm's wealth creating activities ([Sawyer and Evans, 2010](#)). Additionally, in fast changing and unpredictable environments, socially responsible behavior helps firms to gain support from various external stakeholder groups ([Goll and Rasheed, 2004](#)).

In today's literature, it is generally accepted that a business has responsibilities, such as economic, legal, and ethical issues, as does a human (e.g., [Ihlen, 2008](#)). CSR also includes such liabilities of environmental protection; human resource management; health and safety issues; cultural aspects; and stakeholders ([Freeman and Hasnaoui, 2011](#)). Firms therefore need to operate in both socially and environmentally responsible ways while maximizing stakeholder value by focusing on their financial performance ([Sawyer and Evans, 2010](#)). However, a critical question still remains as to whether CSR enhances performance or simply distributes corporate profits ([Lev et al., 2010](#)). There are mixed results in the extant literature on whether CSR has financial and other benefits for firms (e.g., [Goll and Rasheed, 2004](#); [Carter, 2005](#)) because concepts like CSR might be deeply rooted in the organizational culture. There is generally a big separation between CSR and financial performance, since the direct effect of CSR on financial performance cannot easily be observed (c.f., [Goll and Rasheed, 2004](#); [Carter, 2005](#)). Hence, this study investigates the effect of CSR on financial performance and further, competitive advantage through ESD which "encompasses all activities through which the buying firm helps its suppliers reduce their negative environmental impact" ([Ehrgott et al., 2013](#)). Firms with high levels of CSR are expected to improve their suppliers' products and procedures because society thinks that ESD is a natural component of CSR. However, the relationship between the social dimension of CSR and ESD is still not completely clear in SSCM studies ([Seuring and Müller, 2008](#)).

### 2.3. Environmental Supplier Development

Supplier development is a long term cooperative effort between the buying firm and its suppliers in order to increase the suppliers' capabilities ([Watts and Hahn, 1993](#)). Firms can help their suppliers in order to improve efficiency or solve problems in their supply chains ([Park et al., 2009](#)). Many suppliers in Asia, Eastern Europe and Latin America neither have the necessary managerial/technological capabilities nor environmental consciousness to begin with ([Child and Tsai, 2005](#); [Zhu et al., 2011](#); [Ehrgott et al., 2013](#)). As a result, firms in developed countries can face serious problems regarding environmental damage and work conditions evidenced by their suppliers in developing regions ([Ehrgott et al., 2013](#)).

The literature provides several supplier development activities such as trust building, monetary aid, relational norms development, knowledge transfer, communication, bilateral management involvement, internal and external supplier integration and socialization mechanisms ([Das et al., 2006](#); [Modi and Mabert, 2007](#); [Narasimhan et al., 2008](#); [Bai and Sarkis, 2010](#)). In addition, supplier development activities include assisting in the achievement of the supplier firm's performance goals, training, exchanging personnel, and monitoring supplier progress ([Li et al., 2007](#); [Govindan et al., 2010](#)).

Environmental Supplier Development (ESD) "encompasses all activities through which the buying firm helps its suppliers reduce their negative environmental impact" ([Ehrgott et al., 2013](#)). Green supplier development is important for the diffusion of green supply chain management among organizations ([Fu et al., 2012](#)). [Jabbour et al. \(2014\)](#) showed that collaboration with customers as well as green purchasing activities positively affect the green performance of organizations. [Krause et al. \(2000\)](#) classified supplier development as competitive pressure, evaluation/certification system, incentives and direct involvement. Competitive pressure involves using multiple suppliers to provide an environment in which suppliers feel obliged to operate efficiently and effectively. Regular evaluation and feedback activities motivate suppliers to become more efficient and qualified. Direct involvement can be in the form of: (i) capital and equipment investments in the operations of the supplier, (ii) partial or whole acquisition of the supplier firm, or (iii) investing in human and organizational resources, which is defined as operational knowledge transfer activities ([Modi and Mabert, 2007](#)).

ESD programs can largely be divided into two: evaluative and collaborative activities ([Krause, 1999](#); [Klassen and Vachon, 2003](#)). Evaluative activities refer to the assessment and monitoring of the environmental performance of suppliers. Collaborative activities means that the agencies of the supply chain struggle to achieve improvements together ([Wee and Quazi, 2005](#)). Environmental collaboration also includes the sharing of information and a mutual desire to learn related production processes in order to determine the goals for environmental improvement ([Vachon and Klassen, 2008](#)). [Bai and Sarkis \(2010\)](#) categorized green supplier development activities as knowledge transfer, resource transfer and organizational practices. Similarly, [Fu et al. \(2012\)](#) classified ESD into three categories: (i) green knowledge transfer and communications, (ii) investment and resource transfer, and (iii) management and organizational practices. In this study, middle management environmental pressure is the antecedent of ESD and the outcomes of ESD are the increased environmental reputation of the firm and the organizational learning by supplier management.

The environmental assessment of suppliers together with collaborative practices have a positive impact on environmental performance ([Ciliberti et al., 2009](#); [Schliephake et al., 2009](#); [Zhu and Sarkis, 2007](#); [Rao and Holt, 2005a,b](#); [Gimenez and Tachizawa, 2012](#)). Activities for the protection of the environment can



positively affect economic performance. For instance, Rao (2002) showed that green SCM affects economic performance through the mediating effect of environmental performance. To maintain sustainable relationships, assessment is not enough; collaboration is needed between the organizations as well (Dai and Chen, 2012; Lim and Phillips, 2008; Strand, 2009; Reuter et al., 2010). Lee and Klassen (2008) showed that both evaluation and collaboration together produce a better environmental performance for suppliers.

Many firms work together with their suppliers to improve their environmental performance. For instance, Xerox has maintained a partnership program with its suppliers to increase the amount of reused equipment (Mcintyre et al., 1998). Castrol, a lubricant supplier to automotive producers, together with one of its customers has created a joint program that has resulted in lower lubricant consumption as well as cost and environmental impact (Reiskin et al., 2000). BASF, a multinational chemical company, started a joint campaign with the United Nations Global Compact, the United Nations Industrial Development Organization, and the United Nations Environment Program to improve the environmental performance of small and medium suppliers in different countries. In this campaign, BASF and its suppliers evaluate their environmental performance in terms of energy consumption, emissions, and material consumption, while BASF provides technical support to suppliers for various projects (Bethke and Bluethner, 2003; Ehgott et al., 2013). Custom Print, a commercial printer in the USA, collaborates with its chemical suppliers to lessen refusal chemicals ([www.epa.gov](http://www.epa.gov)).

### 3. Conceptual model proposal

Firms have responsibilities beyond producing goods for a profit. These include contributing towards solving important social problems (Sawyer and Evans, 2010) and protecting the natural environment. The liability of a firm towards the natural environment is not only to avoid environmental damage, but also to protect and recover it (Türker, 2009). One of the ways CSR materializes itself is through helping suppliers to develop environmental capabilities. Due to the lack of experts, qualified employees or insufficient budgets, small and medium sized firms cannot structure their production capabilities regarding environmental matters. Firms with high levels of CSR are expected to develop their suppliers, because environmental responsibility is a natural and inseparable component of CSR. However, CSR is not uniformly understood and applied across the globe. It is possible that a firm which excels in employee rights might fails to protect the environment. On the other hand, one can argue that a firm that excels in human rights cannot ignore the environment. As Seuring and Müller (2008) and others pointed out, the social dimension of CSR is often neglected, even in SSCM studies. This study argues that CSR is a holistic concept, and that firms with high levels of CSR will attempt to find the balance and consistency among multiple stakeholders. Gallear et al. (2012) hypothesized the relationship among corporate responsibility behavior (CRB), supply chain partnership, and financial performance (i.e., sales and profit margin). They found support for the relationship between CRB and partnering suppliers, since supplier development is an advanced form of supply chain partnership. Kovacs (2008) also found that a focus on environmental responsibility, defined as the ecological dimension of CSR, led to new ways of collaboration with suppliers including the training provided for the second tier to ultimate suppliers. Therefore, the following hypothesis was developed.

**Hypothesis 1.** Corporate social responsibility is positively related to environmental supplier development.

For this study, two groups of performance measurement were used: financial and competitive advantage. While financial performance focuses on tangible measures including cost, profit and return on investment (ROI), competitive advantage focuses on intangible measures including image, reputation, and firm value.

Not only environmental, but any kind of collaboration has positive effects on cost and quality (Klassen and Vachon, 2003). ESD covers the environmental collaboration on product and process design, reduction, recycling, and environmental systems management. According to executives at the Eaton Corporation, supplier development programs provide improvements in quality, delivery, capacity, and productivity as well as reduction in lead times and supply costs (Modi and Mabert, 2007). Further, according to Lorenzoni and Lipparini (1999), supplier development leads to increased organizational capabilities.

ESD activities have positive effects on environmental performance metrics, ranging from source reduction to the environmental awards received. A comprehensive list of environmental performance metrics is provided by Hervani et al.'s (2005) study. While some of these metrics are geared towards reducing cost (e.g. energy use), others are geared towards quality (e.g. process modifications) and competitive advantage (e.g. publicly available missions). Wagner and Krause (2009) found a positive relationship between supplier development activities and the goal of improving the capabilities of the suppliers. As stated, supplier capability improvement items included product development, managerial, manufacturing, and financial capabilities which lead to high quality products and an improved financial situation for the suppliers. In return, quality parts improve the final product and hence benefit the buyer. Gallear et al. (2012) found support for the relationship between the supply chain partnership (e.g. supplier development) and the financial performance of the (buying) firm. It is expected that ESD should eventually lead to improvements in cost, quality, profit, and ROI. Therefore the following hypothesis was developed.

**Hypothesis 2.** ESD is positively related to a buying firm's financial performance.

Furthermore, ESD can be a source of competitive advantage for firms. Competitive advantage determines the survivability as well as the ranking of the firm in the market. Customers who are becoming more environmentally conscious generate pressure on firms to become more environmentally responsible. When firms help their suppliers with environmental issues, the image of the firm in public opinion may be enhanced (Min and Galle, 1997; Carter et al., 2000). In addition, revenues are positively impacted by the increasing number of paying customers who prefer environmentally safe products (Winsemius and Guntram, 1992). Krause et al. (2007) found support for the positive impact of supplier development on non-cost competitive factors, including quality, delivery, and manufacturing flexibility. Hollos et al. (2012) found positive effects from sustainable supplier co-operation (e.g., environmental supplier development), both on cost and operational performance (i.e., quality, lead time, and innovativeness) through green practices. In a recent article, Blome et al. (2014) found that green supplier development is positively related to supplier performance, which includes innovativeness, lead time, quality, and responsiveness. It is reasonable to expect similar benefits for buyers directly and indirectly through suppliers' performance. Furthermore, increased environmental performance provides a competitive advantage and leads to increases in revenue and market share (Klassen and McLaughlin, 1996; Rao and Holt, 2005a,b). Therefore we hypothesized that:

**Hypothesis 3.** ESD is positively related to a buying firm's competitive advantage.

While there was support for the hypotheses within the literature, there are several issues that must be highlighted. Written within a period of time, some of the aforementioned articles have simplistic measures of supplier development or ESD. Some of the studies concerned supplier development in general and were not about ESD in particular. Yet others measured the performance of the suppliers, leaving out the buyers, or their constructs were not exactly the same as those in this study (e.g., supplier co-operation versus ESD).

## 4. Research methodology

### 4.1. Data collection

Survey methodology is used in this study. Manufacturing firms employing more than 250 employees (above the SME size) were considered for this study. Initially 718 responses were collected. Of the 718 responses, 404 were eliminated due to inappropriate respondents (e.g., secretaries), industries (i.e., service), size, or several responses from the same person or firm, leaving 314 acceptable responses. In these remaining responses, missing values were minimal and were replaced by averages. The respondents were mid- or high-level managers, directors, and engineers in the main. The distribution of firms in terms of sectors was: finished goods including machinery, automotive, appliances and electronics (89), heavy industries including metal and construction companies (80), textile and apparel companies (78), and chemical and plastic manufacturers (67). The average firm size in terms of number of employees was 933, with a distribution as follows: 250–499 (181), 500–999 (64), 1000–2499 (47), 2500–4999 (14) and above 5000 (7).

### 4.2. Measurement development

Multi-item scales measured each of the constructs in the model. A 5-point Likert scale was used for the questionnaire. The majority of the CSR questions were taken from [Türker's \(2009\)](#) study. The environmental responsibility dimension was strengthened by adding some new questions (Q3–Q7). The ESD questions were largely adopted from [Bai and Sarkis' \(2010\)](#) study, and a few ESD questions were newly formulated for this study.

Since there were some new questions and some questions were translated into Turkish, a measurement model was assessed. An assessment of convergent and discriminant validity was conducted since the unidimensionality of a scale must be established before its reliability can be examined ([Gerbing and Anderson, 1988](#)).

To assess unidimensionality, factor analysis was conducted, using the principal component analysis with varimax rotation. The factor loadings for each construct are given in [Table 1](#). [Hair et al. \(2010\)](#) recommended factor loadings based on sample size in order to evaluate the statistical significance of the items. For a sample size of 314, the factor loadings can be as small as 0.35. Nevertheless, approach to factor loadings was followed strictly, eliminating items with loadings less than 0.6, items that did not load any factor or loaded on a different factor. Question 24 was not eliminated despite the fact that its loading is 0.54, because supplier training is a well-accepted supplier development activity.

Question 7 was eliminated, leaving the balance of the environment-related questions divided into two sub-dimensions, named 'CSR to Environment and CSR to Media' respectively. Questions 16 and 17 were eliminated due to poor loadings, which may be indicative of the issue that 'responsibility to next generations' is a vague concept. Questions 14 and 15 were loaded on a separate factor named 'Partnership with NGOs'.

ESD questions were loaded on three factors, which were named 'Supplier Evaluation', 'Incentives' and 'Direct Involvement'. Performance questions were loaded on two factors named 'Financial Performance' and 'Competitive Advantage'.

A partial least square structural equation model (PLS SEM) was constructed to test both the reliability and validity of measurement and the structural model. The measurement model represents the relationship between the manifest variables (measurable items) and the unobserved latent variables, while the structural model focused on the hypothesized relationship between the latent variables ([Hair et al., 1998](#)). A first order reflective model was employed in this study since the latent construct existed independent of the measures used; the variation in the construct caused variation in the item measures; this variation did not cause a variation in the construct; the items shared a common theme; the items were interchangeable so that adding or dropping an item did not change the conceptual domain of the construct; and the items should have had high positive intercorrelations in reflective models ([Edwards and Bagozzi, 2000](#); [Borsboom et al., 2003](#); [Jarvis et al., 2003](#); [Diamantopoulos and Siguaw, 2006](#)). Covariance Based Structural Equation Modelling (CBSEM) and PLS are considered to be complementary rather than competitive method ([Wold, 1985](#)). However, the PLS approach was employed in this study since PLS: a) places less premium on explaining the covariance of all item measures, b) avoids a negative impact due to errors in modeling or item usage, c) values soft distributional assumptions, d) sees the research as not simply exploratory in nature, but interactive, e) has formative measurement items (even if the formative model was not used), f) requires flexibility in modeling higher order Molar and Molecular models, g) is interested in obtaining determinate scores/indices that are predictive h) has high model complexity, i) faces a relatively smaller sample size, j) is less concerned with the accuracy of parameter estimation or does not hold a belief in the notion of an underlying covariance based latent variable generating mechanism, k) wants to shift the perspective of a "True" Model towards a Prediction Focus, and l) values ease of model specification and model interpretation ([Chin, 2010](#)). [Fornell and Bookstein \(1982\)](#) stated that PLS is a powerful method of analysis because of its minimal demands on measurement scales, sample size, and residual distributions. PLS avoids the two serious problems of inadmissible solutions and factor indeterminacy ([Fornell and Bookstein, 1982](#)). Many environmental based researchers have used the PLS method to analyze different relationships ([Loureiro et al., 2012](#); [Akamp and Müller, 2013](#)). SmartPLS ([Ringle et al., 2005](#)) software was employed as the analysis tool in this research to test the proposed model. The results are shown below.

### 4.3. Measurement model

To assess how well the given indicators explained the construct, testing of the measurement model was crucial. Therefore, the factor loadings, the composite reliability, the average variance extracted (AVE), as well as Cronbach's alpha, communality, convergent validity, and discriminant validity were used to test the measurement model. In essence, the reliability and internal consistency of the model were tested. [Table 2](#) shows the AVE, composite reliability, Cronbach's alpha, and communality scores used in analyzing the robustness and reliability of the measurement model.

According to the results, all the scores were above or near the threshold values. AVE scores for each construct ranged from 0.62 to 0.77, which exceeded the suggested threshold value of 0.5 ([Fornell and Larcker, 1981](#)). The composite reliabilities were all well above the recommended threshold value of 0.7 ([Nunnally, 1978](#)). Cronbach's alpha showed how well a set of indicators explained a single

**Table 1**  
Factor loadings.

		Factor loadings
CSR to Environment	1. Our firm implements special programs to minimize its negative impact on the natural environment.	0.684
	2. Our firm participates in activities which aim to protect and improve the quality of the natural environment.	0.812
	3. Our firm participates in activities to increase and improve environmental consciousness.	0.784
	4. Our firm pays attention to the negative impacts of the products on the natural environment during the product development process.	0.690
CSR to Media	5. Our firm has received rewards for the recognition of our environmental excellence.	0.698
	6. Our firm announces its environmental activities to the public through media.	0.601
CSR to Employees	7. Our firm cooperates with nongovernmental organizations in order to protect the ecological balance.	Dropped
	8. Our firm policies encourage the employees to develop their skills and careers.	0.690
CSR to Customers	9. Our firm implements flexible policies to provide a good work & life balance for its employees.	0.785
	10. The management of our firm is primarily concerned with employees' needs and wants.	0.795
	11. Our firm provides full and accurate information about its products to its customers.	0.806
Partnership with NGOs	12. Our firm respects consumer rights beyond the legal requirements.	Dropped
	13. Customer satisfaction is highly important for our firm.	0.835
	14. Our firm encourages its employees to participate in voluntary activities.	0.831
	15. Our firm supports nongovernmental organizations working in problematic areas.	0.802
	16. Our firm targets sustainable growth which considers future generations.	Dropped
Supplier Evaluation	17. Our firm considers its social responsibility to future generations when making investment decisions.	Dropped
	18. Our firm sets environmental performance goals for our suppliers.	0.863
	19. Our firm evaluates our suppliers' environmental performance.	0.880
	20. Our firm provides feedback regarding suppliers' environmental performance.	0.851
	21. Our firm has an environment-oriented supplier evaluation program.	0.815
	22. Our firm audits suppliers' environmental activities.	0.636
	23. Our firm asks for ISO 14000 certification from suppliers.	Dropped
	24. Our firm provides training to suppliers on environmental capabilities.	0.542
	25. Our firm works together with suppliers to solve environmental problems.	Dropped
	26. Our firm shares knowledge with suppliers regarding environmental issues.	Dropped
Incentives	27. Our firm is in continuous contact with our suppliers regarding environmental issues.	Dropped
	28. Our firm provides financial support to suppliers on environment-oriented projects.	0.793
	29. There is personnel transfer with our suppliers regarding environment-oriented activities.	0.810
	30. Our firm rewards suppliers based on their environmental performance.	0.804
	31. Our firm makes long-term contracts with suppliers based on their environmental performance.	0.645
Direct Involvement	32. Our firm cooperates with suppliers regarding environmental issues.	Dropped
	33. Our firm helps our suppliers with disposal of waste.	0.858
	34. Our firm helps our suppliers with recycling.	0.897
	35. Our firm helps our suppliers with environment-friendly production.	0.794
	36. Our firm helps our suppliers with environment-friendly design.	0.607
	37. Our firm helps our suppliers with getting ISO 14000 or similar certifications.	Dropped
Financial Performance	38. Total product cost	0.772
	39. Product quality	0.673
	40. Return on investment	0.806
Competitive Advantage	41. Profit in the long-term	0.605
	42. Market share	0.653
	43. Value of the firm	0.872
	44. Image of the firm	0.836
	45. Competitive advantage of the firm	0.745

latent construct; here, the scores were either close to or above the recommended threshold value of 0.7.

Convergent validity was used for assessing each indicator's relationship with the connected construct. The analysis of convergent validity is shown under factor loadings in Table 2, which shows how well each indicator was correlated with the construct that it is connected to. According to the table, factor loadings exceeded the value of 0.5 suggested by Hair et al. (1998).

Examining the degree of divergence of each construct from each other is known as discriminant validity analysis. For this analysis, the square root of the AVE scores for each construct was compared with their correlation with the other constructs. It is recommended that the square root of AVE scores should be greater than their correlation with the other constructs (Chin, 1998). Table 3 reveals the correlation matrix of constructs and the square root of AVE scores in bold. According to the obtained result, off-diagonal results (correlation of constructs) were less than or equal to the bolded diagonal (square root of AVE scores) values. There was no problem with discriminant validity, which indicated the validity of the proposed measurement model. It was therefore concluded that the measurement model was reliable.

#### 4.4. Structural model

A structural model was used to assess the hypothesized relationship of the constructs, the coefficient of determination ( $R^2$ ), the path coefficient and their corresponding significance scores. To assess the statistical significance between latent variables (constructs), traditional parametric tests were inappropriate in PLS (Chin, 1998). Therefore, bootstrapping as a non-parametric test was used to test the hypothesized relationship between constructs. In order to do this, 200 bootstrap samples were established by re-sampling with replacement from the original samples.

Table 4 shows that the  $R^2$  value of ESD was 9%, the financial performance was 28%, and the competitive advantage was 26% of the total variance.

In order to assess overall performance of the model as well as the measurement and the structural models, a global criterion of goodness of fit index (GoF index) as developed by Tenenhaus et al. (2004) was employed. The GoF index provides a single measure for the overall prediction performance of the model by taking the geometric mean of the average communality index and the average  $R^2$  value ( $\text{GoF} = \sqrt{\text{Average Communality} \times \text{Average } R^2}$ ). The GoF

**Table 2**  
Reliability of the measurement model.

	Loadings	Average variance extracted	Composite reliability	Cronbach's alpha	Communality
CSR to environment	0.7228 0.8615 0.8356 0.7134	0.6179	0.8653	0.7935	0.6179
CSR to media	0.9437 0.7792	0.7488	0.8552	0.691	0.7488
CSR to employees	0.8859 0.6722 0.7803	0.6151	0.8257	0.7105	0.6151
CSR to customers	0.9033 0.8547	0.7732	0.872	0.7091	0.7732
Partnership with NGOs	0.8014 0.9498	0.7722	0.8706	0.7293	0.7722
Supplier evaluation	0.8160 0.8584 0.8242 0.8491 0.7703 0.7274	0.6542	0.9188	0.8939	0.6542
Incentives	0.7683 0.8260 0.8652 0.8203	0.6735	0.8917	0.8393	0.6735
Direct involvement	0.7632 0.8284 0.8690 0.8582	0.6901	0.8988	0.8613	0.6901
Financial performance	0.7140 0.7620 0.8700 0.7918	0.6186	0.8658	0.7934	0.6186
Competitive advantage	0.8173 0.8916 0.8646 0.8174	0.7196	0.9111	0.8696	0.7196

index of the model was 0.39 which indicated that the model was able to take into account 39% of the achievable fit.

The model in this research confirms that CSR has a positive impact on supplier development activities, and it can be one of the crucial antecedents of ESD programs. In addition to this, ESD creates improved financial performance, providing a better competitive advantage for organizations. Table 5 shows the path coefficient results as well as their *t*-values which were obtained by using the bootstrapping re-sampling technique in SmartPLS (Ringle et al., 2005). The path coefficients and their associated *t*-values demonstrated the direction and strength of each hypothesized relationship. Based on obtained results, there was a positive significant relationship between CSR and ESD. It was found that the hypothesized relationship was statistically highly significant at the  $p < 0.01$  level with a  $\beta = 0.262$  path coefficient (CSR  $\rightarrow$  ESD;  $\beta = 0.262$ ,  $p < 0.01$ ). In addition, the financial performance latent

variable was influenced by ESD; there was a strong positive significant relationship to the (ESD  $\rightarrow$  Financial Performance;  $\beta = 0.436$ ;  $p < 0.01$ ), which had the highest path coefficient value. The result also showed a strong positive relationship between ESD and competitive advantage (ESD  $\rightarrow$  Competitive Advantage;  $\beta = 0.3520$ ,  $p < 0.01$ ). In conclusion, each of the three hypothesis (H1, H2, and H3) were supported at the 0.01 level.

#### 4.4.1. Firm size

The proposed hypothesized relationships, shown in Fig. 1 were investigated in relation to the size of the firms. While the first group included firms with number of employees between 250 and 400, the second group covered firms employing more than 400 people. The robustness and reliability of the measurement model were also investigated by using average variance extracted (AVE), composite

**Table 3**  
Test of discriminant validity: correlation of constructs and square root of AVE. Diagonals show the square root of AVEs.

	1	2	3	4	5	6	7	8	9	10
1) Direct involvement	<b>0.831</b>									
2) Financial performance	0.422	<b>0.787</b>								
3) Incentives	0.551	0.421	<b>0.821</b>							
4) Partnership with NGOs	0.202	0.204	0.314	<b>0.879</b>						
5) CSR to environment	0.273	0.211	0.210	0.323	<b>0.825</b>					
6) CSR to customers	0.155	0.099	-0.037	0.289	0.208	<b>0.879</b>				
7) CSR to employees	0.299	0.315	0.217	0.392	0.294	0.410	<b>0.784</b>			
8) CSR to media	0.279	0.271	0.371	0.228	0.372	-0.029	0.129	<b>0.865</b>		
9) Supplier evaluation	0.420	0.430	0.500	0.359	0.473	0.205	0.311	0.274	<b>0.809</b>	
10) Competitive advantage	0.380	0.708	0.360	0.188	0.321	0.061	0.239	0.186	0.516	<b>0.848</b>



**Table 4**  
R square values.

Constructs	R-Square
Environmental supplier development	0.09
Financial performance	0.28
Competitive advantage	0.26

**Table 5**  
Summary of testing results.

Relationship	Hypothesis	Coefficient	t-Statistics
Corporate social responsibility → environmental supplier development	H <sub>1</sub>	0.262	5.198**
Environmental supplier development → financial performance	H <sub>2</sub>	0.436	9.436**
Environmental supplier development → competitive advantage	H <sub>3</sub>	0.352	8.792**

\*\* = highly significant, \* = significant. Critical *t*-value: 1.96  $P < 0.05$  and 2.58  $P < 0.01$  (two-tailed).

reliability and Cronbach's alpha. There was no issue with the reliability of the measurement model in each sector group.

The results demonstrated that the hypothesized relationships were highly significant in the first group. The results provided very strong support for each of the H<sub>2</sub> and H<sub>3</sub> hypotheses at the 0.01 level, and H<sub>1</sub> was supported at the 0.05 level of significance. Similarly, the results provided very strong support for each hypothesis in the larger firms (i.e., the second group) at the 0.01 significance level.

#### 4.4.2. Sectors

Similar statistical analysis was undertaken for four sectors: finished goods, textiles, heavy industries, and chemicals. All the necessary scores for reliability were found to be adequate. Therefore, the proposed model was considered to be reliable in each sector type.

The results provided strong positive support for H<sub>1</sub>, H<sub>2</sub>, and H<sub>3</sub> at the 0.01 significance level in the finished goods and textile sector types. Regarding heavy industries, the results indicated no support for hypothesis H<sub>1</sub>. However, there was strong support for the H<sub>2</sub> and H<sub>3</sub> hypotheses at the 0.01 level of significance. For chemicals,

while hypothesis H<sub>1</sub> was supported at the 0.05 level of significance, hypotheses H<sub>2</sub> and H<sub>3</sub> were supported at the 0.01 level.

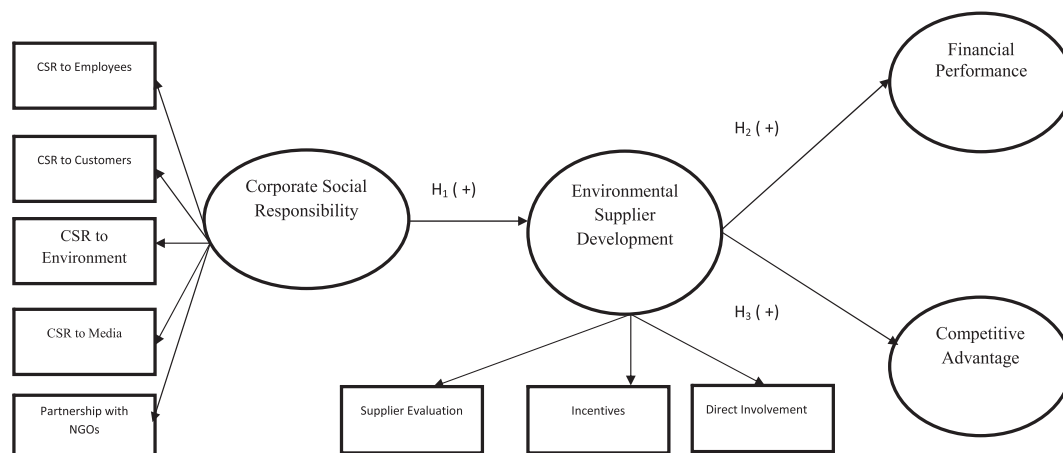
The analysis for size and sector as moderators provided partial support. The size analysis showed that as companies grow larger, they are relatively motivated by social responsibilities. Sector analysis showed that heavy industry and chemical companies are less motivated by CSR, as they are much further removed from the final consumers in the supply chain (i.e., less visible) and they are more likely to be motivated by regulations. These findings have important implications for governments and states.

## 5. Discussion

Although environmental responsibility is usually included as a dimension of CSR, since there are other dimensions (e.g., employees), it is not a given that CSR will automatically be associated with ESD activities. While it is reasonable to expect that CSR leads to ESD, it is a matter of scientific study to test this relationship and its strength. There are mixed results in the extant literature regarding whether CSR has financial and/or other benefits for firms. This research indicated that CSR enhances firms' performances, but perhaps only through mediating activities like ESD, community support, and employee wellbeing programs.

ESD was found to be positively related to both financial performance and competitive advantage. Supplier development in several areas has been the strength of Japanese auto makers for decades. Firms must investigate the best ways in which they can achieve successful supplier development programs. These efforts may require additional employees, cross-functional teams, and other resources. While CSR is definitely a strong motivator for ESD, there can be others which the model did not include. Future studies can investigate whether other motivators (e.g., legal requirements and customer pressure) exist and if they do, how strongly they are associated with ESD.

One of the fundamental questions is how the three dimensions of sustainability (i.e., societal, economic, and environmental) are balanced. How best is this balancing act realized in a firm with multiple shareholders, stakeholders, goals, functions, managers, problems, and responsibilities? Who represents each dimension? Do these groups/managers negotiate what needs to be done? Or is it rather a linear process such as in our model, where CSR initiates environmental activities which then lead to economic benefits? While it is impossible to give a definitive answer, future studies should be directed towards the nature and specifics of this balancing act. Otherwise, the triple bottom line will suffer from the



**Fig. 1.** Hypothesized relationships among CSR, ESD and Performance.



exact same problem of being vague, which was the reason it was developed as a response.

One other theoretical contribution of this study is to provide a reliable ESD scale with all its sub-dimensions. The study contributed to Türker's (2009) CSR scale by adding four new items to "CSR to Environment" dimension (i.e., two of them loaded under CSR to Media). Nevertheless, there is always a potential to improve scales and test relationships. Testing the model in an international context will increase its validity and generalizability. Although the size of the firm was operationalized in terms of number of employees, other means of operationalization may yield different results. Future studies can also investigate whether and how major retailers develop their suppliers in terms of environmental capabilities.

## 6. Conclusion

Managers concerned with the well-being of their firms should clearly realize the importance and consequences of CSR since managers will increasingly play a major role in writing and instituting CSR policies and code of conduct. CSR is a multifaceted concept, and implementing this philosophy requires the complete attention and efforts of managers. CSR is made up of the following: (i) CSR to employees, (ii) CSR to customers, (iii) CSR to environment, (iv) CSR to media, and (v) partnerships with NGOs. It is crucial to note the integrity of the concept because a "pick and choose" approach is not appropriate. Since CSR is based on ethical values, half ethics is not ethics at all or even worse.

One way that CSR will materialize is through helping suppliers to develop environmentally safe products, processes and technologies. Managers should also realize that supplier development is a multi-faceted concept including (i) supplier evaluation, (ii) incentives, and (iii) direct involvement. In order to succeed, ESD and hence the environmental performance evaluation of the buying company supplier are necessary. However, managers can apply incentives or direct involvement, or a combination of both. The right choice depends on the parts, the suppliers to be developed and the buying firm's resources at a particular time, which will all be judged by the respective managers. The survey questions present a good checklist for ESD activities.

One of our hidden assumptions is that focal (i.e. buying) companies have already excelled in environmental management maturity. While a few companies may be at that stage, many buying companies also need to improve themselves. There is a heavy burden on human resource management in training the focal companies' as well as the suppliers' employees on environmental issues (Jabbour, 2013). Managers should create an atmosphere that is conducive to adopt, implement, and improve CSR and SSCM. Equally important, as with any organizational activity, it is vital to link and document supplier development to the financial performance and the competitive advantage of the firm, in order to persuade and satisfy top management, owner(s) and/or shareholders.

In the opinion of the within researchers, the very essence of SCM is the management of the relationship with suppliers, where some of these relationships are close and strategic. Some of the suppliers need support from their customers and, if provided, these suppliers may turn into strategic partners. Where supplier development in general is a litmus test for a true supply chain orientation, ESD is a sign of concerns for both the suppliers and the environment. Supplier development efforts may eventually lead to cooperative, long-lasting (Krause, 1997) and close relationships. Seuring and Müller (2008) concluded that (i) focal firms should take a longer view of the supply chain for sustainability and (ii) that a much increased need for cooperation among partnering companies exists in SSCM. In other words, focal firms can be neither green nor

socially responsible if they take simplistic actions that do not go beyond first tier suppliers or customer.

OEMs have several SME operating as suppliers which have insufficient resources or capabilities to produce environmentally safe goods. If OEMs are truly concerned with the environment, they should assist their suppliers to develop the necessary environmental capabilities. Firms with high CSR show concern for their suppliers and the environment, similar to the concern they display towards their employees, society, and other stakeholders. The implication of these results demonstrates the urgent need to adopt, implement, and improve CSR in large firms. Unfortunately, this is easier said than done. CSR requires cultural changes in the genes of the firm DNA. CSR cannot be quickly implemented, but must be absorbed as second nature by the shareholders, managers, and employees of the firm. In order to encourage firms to do so, the economic benefits we are yet again emphasized whenever companies adopt CSR.

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