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The Relationship Between Sustainable Supply Chain Management Controversies, Sustainability Practices, and Firm Performance: The Role of Different Organizational Resources and Environmental Turbulence

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by

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To My Dearest Parents, Mohammad Hossein and Tahereh

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ABSTRACT

The Relationship Between Sustainable Supply Chain Management Controversies, Sustainability Practices, and Firm Performance: The Role of Different Organizational Resources and Environmental Turbulence

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This dissertation explores the relationship between sustainable supply chain management (SSCM) controversies and sustainability practices, and their direct and indirect effects on firm performance. SSCM controversies refer to the conflicts between companies and stakeholders due to the negative impact of the company's activities on different pillars of sustainability throughout the supply chain. I study the direct relationship between SSCM controversies - measured by indicators in the Sustainalytics database (Tamayo-Torres et al., 2019) – and future sustainability practices. Using resource-based view, and the influence of investments in other resources on this relationship, I posit that the relationship between SSCM controversies and sustainability practices would be influenced by the levels of the focal company's investments in value-creating (e.g., R&D) and value-appropriating (e.g., advertising) resources. Moreover, considering the contingency view and environmental turbulence, the present dissertation explores these moderating effects in stable and turbulent industry environments. The environmental turbulence during the COVID-19 pandemic caused the most devastating disruption that occurred over the past

few decades in global supply chains and highlighted the importance of studying supply chain sustainability at varying levels of environmental turbulence. Using a sample of 610 firms, and 5,625 firm-year observations, I find that SSCM controversies have different impacts on sustainability and firm performance in the presence of different strategic organizational resources and at different levels of environmental turbulence. Our findings advance the limited previous research that studies the effect of SSCM controversies and their influence on sustainability and performance. Our findings reveal that in a turbulent environment if a firm faces controversy throughout its supply chain, additional investment in value-creating resources would facilitate implementing better governance and environmental sustainability practices. Also, in the same situation for a firm in a stable environment, investment in value-appropriating resources would be a better choice and help the firm to move towards better social sustainability practices. I also investigate the direct and indirect effects of SSCM controversies on financial performance of the firm and find that environmental sustainability practices mediate this relationship, and environmental turbulence deteriorates this positive effect. I conclude that only a substantive reaction to SSCM controversies, such as investing in appropriate organizational resources, can reduce stakeholder concerns and restore trust and reputation. The findings of this dissertation provide insights into how SSCM controversies can affect firm performance and how firms can improve their sustainability practices to gain reputation and competitive advantage and better performance. These findings help managers develop effective SSCM strategies and understand the role of investments in different organizational resources in implementing better sustainability practices in different industry environments.

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CHAPTER 1: INTRODUCTION

The present dissertation explores the relationship between sustainable supply chain management (SSCM) controversies and sustainability practices, and their effect on firm performance. SSCM controversies refer to the struggles between companies and stakeholders due to the negative impact of the company's activities throughout the supply chain on different pillars of sustainability. The study investigates the influence of the levels of advertising and research and development (R&D) investments, and the turbulence of the industry environment on the relationship between SSCM controversies, sustainability practices, and firm financial performance. The findings of this dissertation could provide insights into how SSCM controversies can affect firm performance and how firms can improve their sustainability practices to gain reputation and competitive advantage and better performance. The findings of our research can help firms develop effective SSCM strategies and understand the role of investments in different organizational resources in implementing better sustainability practices in different industry environments.

Sustainable Supply Chain Management Controversies and Sustainability Practices

Sustainable supply chain management (SSCM) is one of the topics both researchers and practitioners recently had impressive consideration about it. Sustainable supply chain management controversies are struggles between companies and stakeholders as a result of the harms the company’s activities throughout the supply chain incur to the environmental and/or social pillars of sustainability, like pollution or bad working conditions and strikes (Tamayo-Torres et al., 2019).

Different controversies urged big names like Apple, Starbucks, Nike, and many others to revise their sustainability guidelines in recent years (Klassen & Vereecke, 2012; Kumar et al., 2012).

The lack of leadership, monitoring, and control resulted in many incidents throughout the supply chains of many big world-class international corporations. It was this time when these firms comprehended the importance of sustainability in supply chain management. Companies try their best to sustain being trustable among their customers and in society, and in case of any controversy put considerable effort to reconstruct their tarnished reputation (C. J. Fombrun et al., 2000a; Klassen & Vereecke, 2012). It is very important to react properly to the incidents that happen throughout the supply chain and the attention that they attract from customers and other stakeholders (Svensson et al., 2018). In today's business environments, we can find numerous examples of big names in different sections of industries that do not see SSCM as important as other aspects of mostly internal sustainability practices and do not consider themselves responsible for what happens throughout their supply chains because of financial issues related to these practices and the complex nature of directing the whole responsible supply chain (Damberg et al., 2022). The consequence of this inactivity is that we still almost persistently hear numerous social or environmental incidents related to the direct or indirect suppliers of world-class manufacturers and service providers all around the world specifically in poor, and developing countries (Bradshaw et al., 2021).

Hall, Matos, and Silvestre 2012; Kumar, Teichman, and Timpernagel 2012; Mani, Gunasekaran, and Delgado 2018; Taylor and Vachon 2018 and others mentioned the importance of incorporating sustainable practices in the supply chain. Tamayo-Torres et al. (2019) recently observed the effect of SSCM controversies on the financial performance of the organization. Aouadi & Marsat (2018) found that some controversies do not have a negative influence on the

financial performance of companies with satisfactory corporate social performance (CSP). This research follows the work done by Tamayo-Torres et al. (2019) who studied the relationship between sustainability (Measured as SSCM controversies) and firm value (Measured as Tobin's Q) by focusing on the ESG sustainability practices as mediators. They reported a positive relationship with governance, non-significant for the environment, and negative for social dimensions to performance. They found more SSCM controversies will result in better sustainability practices and the ESG benefits from these controversies two years later.

Since moving towards sustainability and investing more in its practices does not happen in isolation, and instead, work together with other organizational resources, and in different industrial environments, I focus on the influence of the levels of other resources at the time the firm faces controversies with its stakeholders and a contingency view (Lawrence & Lorsch, 1967) considering the uncertainty in the firm's industry environment. Thus, the first part of this dissertation focuses on the impact of SSCM controversies on the implementation of different sustainability practices and examines the questions below:

Q1: Is there any difference between the effect of SSCM controversies on sustainability practices when the firm has different levels of advertising investments?

Q2: Is there any difference between the effect of SSCM controversies on sustainability practices when the firm has different levels of R&D investments?

Q3: How does the turbulence of the industry environment change the way SSCM controversies and advertising investments affect future sustainability practices?

Q4: How does the turbulence of the industry environment change the way SSCM controversies and R&D investments affect future sustainability practices?

>>>**Insert Figure 1 here**<<<

Sustainable Supply Chain Management Controversies and Firm Performance

The studies focusing on the effect of sustainability on performance resulted in contradictory results. Aouadi & Marsat (2018) found that the main reason for different conclusions in most of the studies in this literature was regarding finding the driving mechanisms of this relationship. Therefore, studying the indirect relationship between any of the different pillars of sustainability and firm performance could help us to explain this relationship (Surroca et al., 2010). SSCM could provide better and more robust relationships between buyers and suppliers and guarantee financial prosperity and long-term survival (Parmigiani et al., 2011; Reuter et al., 2010). Stakeholder theory describes the relationship between sustainability and a firm's financial performance (Jiao, 2010). SSCM controversies tarnish the reputation and challenge the legitimacy of the firm (Du et al., 2011; Palazzo & Scherer, 2006). In today's business environment, stakeholders believe that corporations and focal firms should be considered responsible for their actions throughout their supply network and should react to any incident related to sustainability that happens to their suppliers. Implementing sustainability practices would help firms to gain a reputation and trust that would result in higher performance and competitive advantage (Birindelli et al., 2015; Donaldson & Preston, 1995; Franceschelli et al., 2018).

Beside this huge effect, SSCM controversies and especially their impact on performance is overlooked in the literature (L. Li et al., 2018). In the second part of the present dissertation, I focus on the stimulating effect of sustainable supply chain management (SSCM) controversies on

implementing environmental, social, and governance sustainability practices, as an attempt to explore new channels through which sustainability affects the firm performance.

In the first part of this dissertation, I study the direct relationship between SSCM controversies - measured by indicators in the Sustainalytics database (Tamayo-Torres et al., 2019) – and different dimensions of sustainability practices. Now to observe the financial effects of this relationship I study the indirect relationship between SSCM controversies and firm performance - measured as Tobin's Q ratio and the data from the Compustat database- with sustainability practices as mediators. The studied relationship is depicted in Figure 2. Thus, the second part of this dissertation examines the questions below:

Q5: Do SSCM controversies have any direct impact on firm's performance?

Q6: How does the turbulence of the industry environment change the way SSCM controversies affect future sustainability practices?

Q7: Does implementation of Sustainability practices have a positive impact on performance?

Q8: How does the turbulence of the industry environment change the way sustainability practices affect firm's financial performance?

>>>Insert Figure 2 here<<<

The dissertation is structured in the following manner: Chapter two comprises a review of the literature on various topics such as Sustainable Supply Chain Management (SSCM), SSCM Controversies, Stakeholder Theory, The resource-based view (RBV), Contingency View, and The

Relationship Between Sustainability and Firm Performance. These topics form the foundation for the arguments presented in the dissertation. Chapter three discusses the research model, conceptual rationale for hypotheses, and the theoretical model. The sample, measures, and methods used to test the hypotheses are described in Chapter four. Chapter five presents the results of the research. Finally, Chapter six provides a summary of the study findings, describes the theoretical contributions and practical implications, and discusses the limitations of the study, setting the stage for future research.

CHAPTER 2: LITERATURE REVIEW

Sustainable Supply Chain Management (SSCM)

Sustainability is not a new concept for researchers and practitioners, and many researchers explored its social, environmental, and economical pillars separately or concurrently and at a strategic level (Álvarez-Gil et al., 2007; Beske, 2012; Beske et al., 2014). Besides this attention to the core concept, implementing sustainability practices in the supply chain, or SSCM as a more comprehensive term still needs more focus to facilitate its implementation in industries, especially in emerging economies where many of the key suppliers of big names in different industries are located (Ortas et al., 2014; Thornton et al., 2013). Many researchers see sustainable supply chains and being eco-friendly in the whole supply chain as the future of supply chain management (Seuring, 2011; Vermeulen & Kok, 2012; Walker & Jones, 2012).

Firms make decisions about making their products or providing their services with their internal resources, or only focus on their core competencies and outsource those processes to

reduce their costs (Prahalad and Hamel, 1990). The problem is that records have shown that firms mostly do not pay attention to monitoring and managing those external resources, especially in terms of the environmental and social externalities of their suppliers (Ramsay, 2001).

This lack of leadership, monitoring, and control resulted in many incidents throughout the supply chains of many big world-class international corporations. It was this time when these firms comprehended the importance of sustainability in supply chain management which as Pagell & Shevchenko (2014) defined are to foster economic development while considering its negative consequences on the environmental and social conditions of all the actors throughout the supply chain. Besides practitioners, researchers also focused on the sustainable supply chain management area (Carter & Rogers, 2008; Pagell & Wu, 2009; Svensson et al., 2018; Tachizawa & Wong, 2014). SSCM has been successful not only in evaluating the benefits and outcomes of this theory but also in recognizing the effective players and contextual factors in supply chain management (Whetten, 1989).

Based on the definition of sustainable supply chain management by Seuring & Müller (2008), "SSCM is managing the flow of material, information, and capital and cooperating with different companies in the supply chain considering all three pillars of sustainability required by customers and stakeholders." SSCM has been defined by Carter & Rogers (2008) as " Strategic incorporation of, and achieving social, environmental, and economic targets with the systematic interrelation of important processes in the individual organization itself to boost the economic performance of the core company and others in its supply chain."

In Ahi & Searcy (2013) definition, " SSCM is incorporating environmental, social, and economic aspects of sustainability voluntarily to make harmonized and interrelated supply chains, using common business system among different firms in the supply chain to manage the flow of

material, information, and capital-related to procurement, manufacturing, and production, and distribution of product or service efficiently and effectively to respond well to stakeholders' requirements leading to enhancements in profitability, competitiveness, and flexibility of the firm in long and short periods."

The focus of the SSCM study was mostly on internal processes of the core firm like working conditions or reducing hazardous materials and wastes (Klassen & Whybark, 1999), then it covered much broader activities including the core firm's leadership role in reducing negative environmental and social incidents throughout its whole supply chain and even all the stakeholders (Gong et al., 2019; Villena et al., 2021). The focal firm's role is very important to manage SSCM processes for all the actors throughout the supply chain. This effort has positive effects not only on the environmental and social conditions of the suppliers like waste reduction, better working conditions, etc. but also on the performance of the firm itself (Gualandris et al., 2014; Kumar et al., 2012). The focal firm reaction to the incidents throughout the supply chain according to the pressure it receives from the stakeholders is very critical (Svensson et al., 2018). Unfortunately, there are still many firms that have not perceived the importance of SSCM and do not consider themselves responsible for their suppliers' wrongdoings, or many which find this intercontinental leadership role too costly and complicated (Damberg et al., 2022). That's the reason that we still almost persistently hear about bad incidents or negative actions by different suppliers located all around the world specifically in poor or developing countries (Bradshaw et al., 2021).

Many researchers worked on different aspects of SSCM to develop its theory and provide managerial insights for practitioners. Chen et al. (2017) and Gold et al. (2010) focused on the role of suppliers in implementing SSCM protocols and strategies and found it an important factor in better sustainability throughout the supply chain. Gold & Schleper (2017) studied the role of

different stakeholders, and Roy et al. (2020) mentioned the importance of other competencies that could have a positive effect on SSCM. There are also external factors such as the controversies like bad news about any sustainability wrongdoing by a supplier which forces the firm to consider more monitoring and establishing protocols for its suppliers. This external pressure from different stakeholders like customers, governments, NGOs, etc. can force the focal firm to move towards better sustainability practices or demand a higher level of environmental and social commitment from its suppliers (Gualandris et al., 2015). Research shows that the ethical commitment of managers has positive effects in moving towards SSCM and better sustainability practices throughout the supply chain (Carter, 2004; Carter & Jennings, 2002; Hartmann, 2020; Kitsis & Chen, 2020). Also, firms with better supply management capabilities would establish SSCM easier than their competitors (Damberg et al., 2022; Klassen & Vereecke, 2012; Lu et al., 2012).

As mentioned before, besides the huge attention to the core concept of sustainability, implementing sustainability practices in the supply chain still needs more focus from practitioners and scholars to facilitate its implementation in industries and one of the important aspects of this research subfield is the impact of controversies including all the incidents and their media coverages throughout the supply chain of a firm.

SSCM not only could have environmental and social benefits for both the focal firm and its suppliers, but it could also positively impact the financial conditions of all the players in the supply chain since it could expand better effective collaborations among different players- specifically buyers and sellers- and help to establish new sustainability protocols and procedures with clear benefits for the focal firm and the suppliers (Beske-Janssen et al., 2015; Golicic & Smith, 2013; Klassen & Vachon, 2003; Ni & Sun, 2018; Paulraj, 2011; Vachon & Klassen, 2006). One of the important aspects of SSCM is to study the effect of it on the focal firm's performance

as the decision-maker and leader in the process towards better sustainability throughout the supply chain since it could make SSCM an economically feasible option for practitioners (Eggert & Hartmann, 2022; Golicic & Smith, 2013; Ortas et al., 2014; Pagell & Shevchenko, 2014; Pagell & Wu, 2009; Svensson et al., 2018).

Stakeholders have a great impact on better sustainability practices throughout the supply chain. The pressure from different stakeholders like consumers (Österle et al., 2015), governments (Jadhav et al., 2019), or other active firms in the industry (Stindt, 2017) could result in developments in SSCM. Sustainable supply chain management controversies which could be defined as negative sustainability news about the focal firm or one of its suppliers could help to move towards better sustainability practices and accordingly financial performance (Jacobs & Singhal, 2017; Tamayo-Torres et al., 2019).

SSCM Controversies

The trend of outsourcing the manufacturing and production of many parts and products to developing countries in Asia, South America, and Africa, among world-class businesses in developed countries seeking more profits, had the downside of facing different controversies related to social, environmental, or governance issues, like a violation of environmental laws or employing child workers (Pagell et al., 2010; Qiang, 2015; Svensson, 2007).

This level of globalization in the manufacturing and production of goods has resulted in different social and environmental issues like many reports of bad working conditions for the suppliers of big names like Nike (Locke et al., 2007) which got a great level of public attention and questions regarding the responsibility of the focal firm. The role of the focal firm in solving

the sustainability incidents and issues of its suppliers is very important and also obvious since they can dictate policies and change their buying preferences and gradually make big improvements a reality (Anner et al., 2013). Moreover, managers in the focal firms have found themselves morally responsible to have a positive influence on the movement of all the actors involved in their supply chain management processes toward better governance, social, and environmental sustainability practices (Amaeshi et al., 2008).

SSCM controversies are disputes with stakeholders as the result of questionable social or environmental conducts of suppliers of the company and throughout its whole supply chain, like ill-treatment of workers by suppliers, providing unsuitable conditions for workers, polluting the environment, and bad footprints on nature (Tamayo-Torres et al., 2019).

Unilever for example is a famous multinational consumer goods company, headquartered in London and Rotterdam, which has faced SSCM controversies based on incident reports by Sustainalytics. The company has been involved in many social supply chain incidents. In one of them, according to the information from Sustainalytics, Amnesty International reports disclosed cases of labor abuse at Wilmar - one of the important palm oil suppliers of the company. Based on the reports, workers were obliged to work overtime with no compensation to achieve high goals and respond to demands, Discrimination towards women and exposing the workers to toxic substances were also other mentioned parts of the report. In another incident in September 2015, Unilever was involved in bad working conditions including lack of necessary sanitation, malnutrition, a potential case of child labor, and careless use of pesticides in tea farms in Assam, India. These incidents were related to McLeod Russel which was one of the suppliers of Unilever at that time. Child labor besides other violations intensifies the seriousness of this case for Unilever.

Nestle is a good example of environmental controversies in recent years. The name of this company and its suppliers can be repeatedly found in controversies related to deforestation and land clearing for developing palm plantations. In December 2016, Olam - one of its suppliers, was accused of disforestation for developing its operations in Gabon. IOI was another supplier of Nestle that the company ended its relationship with because its certification was suspended after environmental violations in the parts of Borneo that belong to Indonesia. There are many documents available from 2018 to 2020 reporting incidents related to Nestle's palm oil suppliers in Indonesia, Malaysia, and Papua New Guinea being cited for deforestation and burning lands in regions with sensitive ecosystems. Many other big names in the business world such as Starbucks, Apple, Nike, Mattel, and numerous others are struggling with sustainable supply chain management controversies and have plans to refine their sustainability policies and practices (Klassen & Vereecke, 2012; Kumar et al., 2012).

It's very important for a firm and its reputation to always pay attention to how the stakeholders see their legitimacy and perceive their actions regarding sustainability issues (Pollock & Rindova, 2017). News and media are one of the main sources of getting information about firms. Stakeholders' points of view and desires could be delivered to managers of the firm, also incidents related to a firm and its suppliers could be covered by news agencies, and investigative journalism is a great asset for the stakeholders to discover different aspects of a wrongdoing by a focal firm or throughout its supply chain (Bednar et al., 2012; Damberg et al., 2022; Pacheco & Dean, 2015; Zavyalova et al., 2012).

Stakeholders could be well informed about different negative environmental or social actions of the firm and its suppliers and its effect on guiding the investment decisions of the public have been studied in the strategic management literature (Pollock & Rindova, 2017). Also, the

effect of these news and media coverage on allocating organizational resources, board composition, and management compensation have been investigated in this literature (Bednar, 2012; Bednar et al., 2012). Mccombs & Shaw (1972) found that the news coverage about a firm's actions has an agenda-setting impact on the decision makings of the top managers and how the firm deals with different situations.

The news coverage of an incident throughout the supply chain of a firm attracts much more attention from different stakeholders than positive news (Sen & Bhattacharya, 2001) and helps reduce the information asymmetry between the focal firm and the customers and all other stakeholders (Dyck et al., 2008). The good news is that the negative media coverage and defamation provide a suitable situation for change, innovation, and further development (von Krogh et al., 2012). Knowing the suitable possible way to face these controversies and incidents throughout the supply chain and benefiting from this fertile ground of improvement is an important topic to consider both for managers and researchers (Hartmann, 2020; Ulmer et al., 2007).

A recent paper by Damberg et al. (2022), investigates the relationship between negative media coverage and sustainable supply chain management (SSCM) performance among US-based corporations. The authors argue that bad press could potentially have a positive effect on a company's SSCM practices, as it may motivate firms to improve their environmental and social practices to avoid negative media attention. According to their findings, bad sustainability news positively impacts SSCM, indicating that negative media attention can motivate companies to improve their environmental and social practices.

To study the efficacy of sustainability practices in this dissertation, I observe the relationship between them, and Tobin's Q which is a market-based measure, helpful to measure the financial performance of the firm in the long term (Flammer, 2013). This measure of firm

performance was first introduced by Brainard & Tobin,1968; and Tobin, 1969. A Tobin's Q lower than 1.0 exhibits improper use of resources since it shows value-creation of the company on the stock market is less than the value of its assets. Oppositely, Tobin's Q bigger than 1.0 shows the forward-looking market value is higher than its asset's worth today; In other words, the long-run equilibrium market value of the company is bigger than its substitution asset value which reveals an unmeasured source of value (Bharadwaj et al., 1999). Based on Chung & Pruitt (1994), Q is equal to the sum of the market value of equity, the book value of inventory, liquidating value of the preferred stock, the long-term debt, and net short-term debt, all divided by total assets. The difference between current assets and current liabilities gives us the net short-term debt.

The big advantage of Tobin's Q is that it is forward-looking. Moreover, it does not suffer from some well-known weaknesses of older accounting measures. Timing of unobservable cash flows or any manipulation of accounting measures from the management does not have any effect on this measure. Since all dimensions of performance are considered in this measure, it is a good tool to assess the decision-making impacts comprehensively. Using Tobin's Q which is based on the market value of the firm, is preferred over profitability as a short-term measure (Servaes & Tamayo, 2013). Today's profitability of a company can intentionally be sacrificed to open doors for investment in sustainability practices as the long-term interest of the firm (Servaes & Tamayo, 2013).

Stakeholder Theory

Stakeholders are the groups or individuals who influence or can be influenced by the movement of an organization toward its goals (Freeman,1984). Each stakeholder can affect the

firm performance (Parmar et al., 2010) and has different needs, goals, expectations, and also responsibilities (Clarkson, 1995). The externalities made by organizations have an impact on different internal and external parties (Freeman,1984). The externalities and the conflicts with stakeholders will result in more risk in the operations, a bad reputation, a negative effect on the current and future sales of the firm, and higher costs (Klassen & Vereecke, 2012). The response of the organizations to these controversies includes actions like implementing new strategies and systems to improve their sustainability performance very important to have a good reaction to these controversies (Aouadi & Marsat, 2018; Klassen & Vereecke, 2012). Firms know the importance of their brand and reputation and not only try not to encounter any controversy with stakeholders but also try to have prompt reactive strategies in case of any conflicting incident with a level of potential to become controversial to improve their stigmatized reputation (Fombrun 1996; Fombrun et al., 2000; Klassen & Vereecke, 2012). These improvements and the need for a fast response may result in acquiring the needed capabilities to make a competitive advantage (Hollos et al., 2012).

The resource-based view (RBV)

The resource-based view helps to observe firms in strategic dimensions (J. Barney, 1991; J. B. Barney, 1986). According to Barney (1991), and based on the RBV context, a resource should have four attributes: valuable, rare, inimitable, and non-substitutable. Resources are all the assets, processes, capabilities, information, and knowledge under the control of the firm to implement different strategies (J. Barney, 1991). A good indication of the competencies of a firm are capabilities that are extracted from business processes (Birkinshaw et al., 2008). Adding RBV to

the stakeholder theory provides us with a multi-theoretical tool to test the hypothesis in the sustainability management field in the context of operations (Sarkis et al., 2010).

The resource-based view of the firm is based on the arguments researchers had against the industrial organization view (Bain, 1959; Porter, 1980, Russo & Fouts, 1997) which gives all the credit for the success of a company to external factors (Dierickx & Cool, 1989; Prahalad & Hamel, 1997; Wernerfelt, 1984). According to RBV, organizations that have resources with good attributes have a competitive advantage and potentially can get superior outcomes (J. Barney, 1991; Grant, 1991; Roberts and Dowling, 2002).

Different Organizational Resources

Prior literature studies the effect of sustainability practices on firm performance while considering other resources and investments. Previous researchers also differentiate between value-creating and value-appropriating resources. The first type helps an organization to give rise to value in the market and is based on innovation, and the latter appropriates value from the market and other available resources (Joshi & Hanssens, 2010; Mizik & Jacobson, 2003). Mizik & Jacobson (2003) suggest that innovation is critical for value-creating resources. Because it enables firms to create new products and services and meet the changing needs and preferences of their customers. Joshi & Hanssens (2010) conducted a meta-analysis of 76 studies examining the relationship between sustainability practices and firm performance. The study found a positive relationship between sustainability practices and both financial and non-financial measures of firm performance, such as profitability, market value, and reputation. They considered sustainability practices as a value-creating resource. By reducing waste, conserving energy, and improving social

and environmental outcomes, companies could be able to differentiate themselves from competitors and create value for stakeholders.

R&D and advertising are two very important resources -as causal factors of the productivity of a firm- that have been studied in prior literature (e.g., McAlister et al., 2007; Srinivasan et al., 2011). The differentiation between value-creating and value-appropriating resources has been applied to various areas of research, including R&D and advertising. Researchers studied the impact of investments in R&D on firm performance (e.g., McAlister et al., 2007; Srinivasan et al., 2011).

Surroca et al. (2010) studied the relationship between financial performance and corporate responsibility considering the role of investments in innovation - like R&D investment- as an intangible resource besides human capital, reputation, and culture. The authors argue that investments in innovation, such as R&D investment, can be considered an intangible resource that contributes to a firm's overall performance. They also suggest that other intangible resources, such as human capital, reputation, and culture, can have a significant impact on a firm's financial performance.

R&D and advertising lead to value and are beneficial for firms in different ways. An organization can generate value with the help of R&D which opens doors for innovation and opportunities by finding state-of-the-art methods and new products (Mizik & Jacobson, 2003). On the opposite side, advertising gives the value-appropriating ability to the firm and helps it to secure its competing competencies with other firms and always have a competitive advantage (Lee & Bradlow, 2011; McAlister et al., 2007; Srinivasan et al., 2011). Advertising could be an important driver of brand loyalty and can help firms to differentiate their products and services, and this differentiation can enable firms to secure their competing competencies and maintain a

competitive advantage over time (McAlister et al., 2007). Advertising can help firms to make and communicate their own brand identity and stand out from their competitors, which can also strengthen the firm's ability to appropriate value from the market by building brand equity and customer loyalty (Srinivasan et al., 2011). Lee & Bradlow (2011) found that advertising can help firms to build a good reputation and help the firm to charge premium prices for their products and services, which can also help firms to appropriate value by capturing a larger share of consumer surplus. Recognizing the importance of these two different types of organizational resources, and their different strategic roles, I consider R&D and advertising while investigating the business value generated by the combination of sustainability practices and other available resources of the firm.

Sustainability and R&D

Firms try to incorporate more sustainability practices for differentiation strategies to obtain a competitive advantage (Hull & Rothenberg, 2008; Mackey et al., 2007; Siegel & Vitaliano, 2007). We cannot split different pillars of sustainability when considering firm performance (Harrison & Freeman, 1999; Moore, 2001). Firms also need to benefit from research and development practices to acquire competitive advantage (Hull & Rothenberg, 2008), and R&D investment has a positive impact on the long-term performance, productivity, and competitive advantage of the firm (Griliches, 1979; McWilliams & Siegel, 2000).

Incorporating sustainability practices can provide a competitive advantage by helping the firm differentiate itself from competitors, especially in industries where environmental concerns are increasingly important (Hull & Rothenberg, 2008). Firms can gain a competitive advantage by

adopting proactive environmental strategies such as waste reduction, increasing energy efficiency, and improving social and environmental outcomes (Hull & Rothenberg, 2008). Similarly, Mackey et al. (2007) emphasize the importance of sustainability practices in creating competitive advantage and argue that sustainable practices can improve reputation, customer loyalty, and customer willingness to pay for products and services. Siegel & Vitaliano (2007) examined the relationship between sustainability practices and firm performance and found that firms that adopt sustainable practices tend to have higher financial performance than those that do not, and suggest that sustainability practices can be used to gain competitive advantage by enhancing a firm's reputation and brand equity, which can contribute to higher customer loyalty. The findings of these studies highlight the potential of sustainability practices as a value-creating resource for firms. By adopting sustainable practices, firms can differentiate themselves from competitors and gain a competitive advantage, both through creating value in the market and appropriating value from available resources. R&D investment is also important to have a competitive advantage, improve long-term performance, and increase productivity, as investigated by Griliches (1979) and McWilliams & Siegel (2000).

Sustainability practices and policies as a resource would have constructive influences on the product and service development processes, and directly on the products themselves (Padgett & Galan, 2010). Padgett and Galan (2010) conducted a study to investigate the relationship between sustainability practices and product innovation in manufacturing firms and found that firms with sustainability practices were more likely to engage in product innovation and that the level of adoption of sustainability practices was positively related to the level of product innovation and suggest that firms that incorporate sustainability into their product and service development

processes are more likely to meet the evolving needs of consumers, create new markets, and differentiate themselves from competitors.

Prior literature found that R&D intensity will result in improved new products and also better processes (Hitt et al., 1996), and gain competitive advantage (Hull & Rothenberg, 2008). Hitt et al. (1996) found that higher R&D could result in increased efficiency and cost savings for the firm. According to Hull & Rothenberg (2008), firms that invest in sustainability practices are more likely to invest in R&D and sustainability practices can be a source of innovation, leading to the development of new products and processes, and ultimately, competitive advantage.

Buyers prefer to buy products from firms that consider environmental and social issues in their processes (Quazi & O'Brien, 2000). Customers are willing to pay a premium for environmentally friendly products (Quazi & O'Brien, 2000). Firms that engage in socially responsible activities are perceived as more attractive by customers and, as a result, tend to be more successful in the marketplace (Quazi & O'Brien, 2000).

Sustainability generates a reputation for firms, and this would have financial benefits for them (Lantos, 2001; Mcwilliams & Siegel, 2001a; Schnietz & Epstein, 2005). Firms that engage in corporate social responsibility (CSR) practices can build a strong reputation among stakeholders, which can lead to increased customer loyalty and improved financial performance (Lantos, 2001). CSR can help firms build strong relationships with stakeholders, such as customers, employees, and investors, which can lead to improved financial performance (Mcwilliams & Siegel, 2001a). According to Schnietz & Epstein (2005), CSR practices can lead to positive word-of-mouth communication, which can enhance a firm's reputation and lead to increased sales and profits.

According to Brammer & Pavelin (2006), firms need to modify their sustainability practices based on the industry they are in and the environment to respond well to their stakeholders. For instance, an industry with high R&D intensity normally has an entry barrier and is suitable for benefiting from product differentiation, economies of scale, and other advantages (Porter, 1979). Firms need to consider the specific characteristics of their industry and the environment in which they operate when developing sustainability practices and need to tailor their sustainability practices to their industry to ensure that they are responding well to the expectations of their stakeholders and maximizing their performance. (Brammer & Pavelin, 2006). Industries with high R&D intensity benefit from sustainability practices that focus on product differentiation and economies of scale and typically are industries with high entry barriers due to the high investment requirements to develop new products and technologies, making it difficult for new entrants to compete (Brammer & Pavelin, 2006).

Prior literature found a positive relationship between investments in R&D and the firm's market value (Cockburn & Griliches, 1987; R. Hall, 1993; Hirschey, 1982; Jaffe, 1986). Cockburn & Griliches (1987) found that R&D investment positively impacted the market value of firms in the pharmaceutical industry. R. Hall (1993) also found a positive relationship between R&D investment and market value for high-technology firms. Hirschey (1982) analyzed data from various industries and found a positive relationship between R&D investment and market value for firms with high levels of R&D intensity. Jaffe (1986) found a positive relationship between R&D intensity and the market value of firms in the biotechnology industry.

Firms that implement R&D would be able to magnify their productivity by innovating new products and processes (Ben-Zion & Kim, 1984; Guerard et al., 1987; B. H. Hall, 2005; Lichtenberg & Siegel, 1991; McWilliams & Siegel, 2000).

R&D can improve the firm's productivity by introducing new products and processes. Firms with higher R&D investment had higher sales growth and profitability (Ben-Zion & Kim, 1984; Guerard et al., 1987). R&D intensity is positively associated with productivity growth (B. H. Hall, 2005). R&D investment enhances the quality of existing products and leads to an increase in market share (Lichtenberg & Siegel, 1991). McWilliams & Siegel (2000) in their famous study investigated the relationship between CSR and firm performance and found that CSR activities, with R&D, positively affect financial performance. Prior literature also suggests observing the moderating role of R&D in the relationship between sustainability and firm performance to avoid spurious results (Han et al., 1998; Hull & Rothenberg, 2008).

Sustainability and Advertising

Prior literature suggests that sustainability activities have a positive impact on firm value and profitability (Berman et al., 1999). Berman et al. (1999) investigated the impact of corporate social performance (CSP) on firm financial performance, using a sample of 176 large US firms over four years and found that CSP has a positive impact on firm value and profitability, particularly for firms with a strong reputation for social responsibility. The relationship between CSP and financial performance is more pronounced for firms in industries with high social and environmental impact, such as oil, gas, and chemical companies and firms that prioritize CSP can benefit from increased market value, improved profitability, and reduced risks associated with social and environmental issues (Berman et al., 1999).

The studies on the relationship between sustainability practices and firm value are contradictory. Garcia-Castro et al. (2010), Martin Curran & Moran (2007), and Mcwilliams &

Siegel (2001) proposed that there is no significant association between corporate social responsibility (CSR) and financial performance., However, some researchers have discovered a positive relationship between CSR and financial performance (Aouadi & Marsat, 2018; Cai et al., 2011; Doh et al., 2010; Roman et al., 1999); In contrast, others such as López et al. (2007) and Marsat & Williams (2012) have found a negative relationship, or an indirect link between CSR and financial performance (Surroca et al., 2010).

Therefore, studying the best way of implementing these practices, finding out which kind of resource investments would have a positive effect on this relationship, and the more profitable contexts such as industries and environments and exploring them could provide valuable insights to help decision-makers. Although prior research suggests that sustainability practices can have a positive impact on firm value and profitability, the studies on this relationship are not always consistent. Some studies found a positive relationship between sustainability practices and firm value and profitability, while others found no significant relationship or even a negative relationship. This suggests that the implementation of sustainability practices may not always guarantee positive outcomes and that certain conditions may need to be met for these practices to be effective in creating value and improving profitability. To better understand this relationship, it is important to study the best way of implementing sustainability practices, including which types of resource investments are most effective in enhancing the relationship between sustainability and firm value. Also, it is very important to explore the contexts in which sustainability practices are most profitable, such as in certain industries or environments. By examining these factors, decision-makers can gain valuable insights into how to implement sustainability practices in a way that maximizes their benefits and creates a competitive advantage for their firms.

Surroca et al. (2010) found a positive influence of advertising intensity on increasing firm value supporting the theory that customers need to be aware of the firm's sustainability practices to reward it (Mcwilliams & Siegel, 2001; Sen & Bhattacharya, 2001). Surroca et al. (2010) investigated the relationship between advertising intensity, sustainability practices, and firm value and their finding is consistent with prior literature that suggests that sustainability practices generate a reputation for firms and have financial benefits for them and that consumers prefer to buy products from firms that consider environmental and social issues in their processes. Surroca et al. (2010) findings highlight the importance of communicating sustainability practices to customers through advertising to capture the value of sustainability investments. Customers have a more favorable attitude toward a company that engages in CSR activities, which in turn can positively influence their purchase behavior and ultimately lead to higher sales and profits for the company, and firms can use CSR activities as a marketing tool to enhance their reputation and gain competitive advantage (Sen & Bhattacharya, 2001). Prior studies have shown that communicating sustainability practices through advertising and marketing can positively affect consumer behavior. For example, a study by (Maignan & Ferrell, 2001) found that consumers were more likely to purchase products from companies that were perceived as socially responsible. Similarly, according to (Lii & Lee, 2012), consumer purchase intention is positively influenced by green advertising, and this effect is partially mediated by perceived brand sincerity.

It is important for companies to ensure that their sustainability claims in advertising are accurate and not perceived as "greenwashing. This can ultimately lead to negative perceptions of the company and negatively affect reputation which can lead to a decrease in customer loyalty and trust (Bansal & Roth, 2000; Brown & Dacin, 1997). The research in this field highlights the importance of transparency and accuracy in sustainability advertising for companies. Consumers

are becoming more aware and concerned about the environmental and social impact of their purchasing decisions. Companies that claim to have sustainable practices and advertise them to consumers must ensure that the claims are authentic and not misleading. Customers react negatively to companies that use false or exaggerated sustainability claims (Bansal & Roth, 2000; Brown & Dacin, 1997).Therefore, companies must ensure that their sustainability practices and advertising claims are authentic, transparent, and verified by third-party certifications, as this can enhance consumer trust and positively affect their reputation and financial performance. Incorporating sustainability practices can positively impact firm value and profitability, and communicating these practices using advertising can influence consumer behavior. However, companies must ensure that their sustainability claims are accurate to maintain a positive reputation.

Prior research has shown that the effectiveness of advertising sustainability practices is dependent on various factors such as the type of message, the target audience, and the medium used (Bhattacharya & Sen, 2003; Luchs et al., 2010). Advertisings that emphasize the social aspects of sustainability are more effective in increasing consumer loyalty and purchase intentions (Bhattacharya & Sen, 2003). Using visual cues such as symbols and images in sustainability advertising can increase its effectiveness (Luchs et al., 2010). Sustainability practices can positively impact firm value and profitability, and advertising can be used as a tool to promote these practices and improve the reputation of firms. However, the effectiveness of sustainability advertising campaigns is influenced by various factors and firms need to carefully consider these factors when designing their campaigns.

SSCM is the management of environmental, social, and economic sustainability in the supply chain. Advertising, on the other hand, is a way of promoting products or services to the

target audience. The relationship between SSCM and advertising can be crucial in enhancing sustainable business practices, brand reputation, and customer loyalty.

Touboulic & Walker (2015) explored the role of communication in SSCM and found that communication, including advertising, can help to promote transparency, build trust, and enhance stakeholder engagement in sustainable supply chain initiatives. The authors reviewed literature from different academic fields, including operations management, supply chain management, environmental management, and corporate social responsibility, to identify the key theories and concepts that have been used to study SSCM. Communication is a critical component of SSCM, as it helps to promote transparency, build trust, and enhance stakeholder engagement in sustainable supply chain initiatives (Touboulic & Walker, 2015). Firms can use communication, including advertising, to communicate their SSCM initiatives and engage with stakeholders, which can enhance their brand reputation and build customer loyalty (Touboulic & Walker, 2015).

Seuring & Müller (2008) investigated the relationship between environmental management and marketing and found that communication, including advertising, is a key component in the integration of environmental sustainability in marketing activities. Companies can use marketing as a tool to communicate their environmental sustainability initiatives to stakeholders and to enhance their brand reputation, and advertising is a key component in the integration of environmental sustainability (Seuring & Müller, 2008). Firms can use advertising to communicate their sustainability practices and to build a reputation. For example, companies can use advertisements to highlight their use of sustainable materials, their commitment to reducing waste and carbon emissions, or their support for environmental causes and by doing so, can build a positive image among stakeholders, which can enhance their reputation and build loyalty (Seuring & Müller, 2008). According to Seuring & Müller (2008), firms need to ensure that their advertising

messages are credible and transparent and that they align with their actual environmental sustainability practices, and this requires companies to have robust environmental sustainability practices and to monitor and report on their environmental performance to stakeholders.

Literature suggests that advertising can play a crucial role in enhancing the relationship between SSCM practices and brand image, loyalty, financial performance, CSR communication, and reputation. By effectively communicating their SSCM practices through advertising, firms can reap the benefits of enhanced sustainability practices and brand reputation. SSCM and advertising are two concepts that are increasingly interrelated in the business world.

Contingency View

Based on contingency theory, the context should be considered in managing resources (Lawrence & Lorsch, 1967; Thompson, 1967). Contingency theory is a management approach that emphasizes the importance of adapting management practices to fit the unique circumstances or context of a particular situation (Lawrence & Lorsch, 1967). The theory suggests that there is no one "best" way to manage resources or organize a company that will work in all situations. Instead, the most effective management practices will depend on a variety of factors, such as the nature of the work being done, the size of the organization, the culture of the organization, and the external environment in which the organization operates (Thompson, 1967). According to Lawrence & Lorsch (1967) organizations should match their management practices and structures to the unique demands of their environment. This means that different organizations will require different management approaches depending on the conditions in which they operate. For example, a small, entrepreneurial startup might need a flexible, informal management structure that can quickly

respond to changes in the market, while a large, bureaucratic corporation might need a more hierarchical and formalized structure to ensure consistency and stability across the organization.

One important contingency variable used by many researchers is how dynamic the industry environment is, or in other words, the industry environmental turbulence. Unlike a stable environment, there are no continuous advantages and many opportunities in a turbulent environment (Xue et al., 2012). Xue et al. (2012) conducted a comprehensive review of existing research on the relationship between environmental turbulence and organizational performance. They found that, overall, there is a positive relationship between environmental turbulence and organizational performance, but this relationship is complex and contingent on many factors. In a turbulent environment, organizations must be able to respond quickly and effectively to changes in the external environment to be able to capitalize on new opportunities, adapt to changing conditions, and remain competitive despite the challenges of the external environment (Xue et al., 2012).

Based on the characteristics of stable environments, value-appropriating activities are beneficial in such an environment. In other words, activities with a concentration on the current products are more profitable due to the low rate of change in the environment (Havakhor et al., 2019). Oppositely, since no opportunity is sustainable and advantages are not helpful for the firm in the long term (Xue et al., 2012), innovation is necessary. A turbulent environment brings incompetency in learning from current procedures and practices (Miller, 1987), while firms in such an environment could benefit from opportunities if they focus on innovation. (H. Li & Atuahene-Gima, 2001). Thus, value creation is more beneficial when turbulence increases in the environment and firms benefit from innovation and R&D activities (H. Li & Atuahene-Gima, 2001).

In a turbulent environment, organizations face many challenges that can make it difficult to learn from current procedures and practices. The uncertainty and unpredictability of a turbulent environment make it difficult for organizations to learn from their experiences, as a result, organizations may struggle to identify and adopt best practices, and may be more likely to repeat mistakes (Miller, 1987). Li & Atuahene-Gima (2001) suggest that firms in a turbulent environment can benefit from focusing on innovation and R&D activities. These activities can help organizations in adapting to changing market conditions. By developing new products, services, and processes, organizations can create value for their customers and differentiate themselves from their competitors. Value creation is particularly important in a turbulent environment because it can help organizations survive despite the challenges they face and by focusing on innovation and R&D, organizations can develop new capabilities and competencies that enable them to respond quickly and effectively to changes in the environment (H. Li & Atuahene-Gima, 2001). This response could include new business models, new technologies, or new partnerships.

The relationship between environmental turbulence and organizational learning is complex and dependent on many factors. While a turbulent environment can make it difficult for organizations to learn from current procedures and practices, it can also create opportunities for innovation and value creation. By focusing on these opportunities and investing in innovation and R&D, organizations can be a success in a rapidly changing environment.

A stable environment in comparison is suitable for increasing marketing practices of available products and making advertising investments more profitable for the firm (Mizik & Jacobson, 2003).

In a stable environment, organizations face fewer external threats and uncertainties, which makes it easier for them to plan and execute marketing strategies. A stable environment is

particularly suitable for increasing marketing practices of available products and making advertising investments more profitable for the firm (Mizik & Jacobson, 2003a). One reason for this is that in a stable environment, customer preferences and behaviors are more predictable, and this allows organizations to develop targeted marketing strategies that are more likely to resonate with their target audience. In addition, a stable environment provides organizations with more time and resources to invest in marketing research and analysis, which can help them better understand their customers and develop more effective marketing campaigns.

Firms that work in a stable industry environment can develop and maintain relationships with their customers who are relatively more loyal in a stable environment because they are less likely to be swayed by external factors such as changes in the economy or new competitors entering the market. This makes it easier for organizations to develop a strong reputation, which can further enhance the effectiveness of their marketing efforts. In a stable environment, advertising can have a longer effect and generate more consistent returns over time, which allows organizations to more easily measure the effectiveness of their advertising investments and make more informed decisions about how to allocate their marketing resources (Mizik & Jacobson, 2003b). While a turbulent environment may require a focus on innovation and R&D, a stable environment provides organizations with the opportunity to develop targeted marketing strategies and build long-term relationships with their customers, making advertising investments more profitable.

Contingency view is important in sustainability management studies because it allows researchers and practitioners to develop customized solutions to address the unique sustainability challenges faced by different organizations. By considering the specific context and circumstances of an organization, top managers can design and implement effective strategies that are most likely to achieve positive sustainability outcomes in all environmental, social, and economic dimensions.

Bansal (2005) examined the relationship between stakeholder pressure and environmental performance in the chemical industry and found that the type and level of stakeholder pressure varied depending on the specific issue being addressed such as emissions, waste disposal, or chemical usage and that this had an impact on the level of environmental performance achieved by firms in the industry. Bansal (2005) emphasized the importance of the contingency approach in sustainability, which involves identifying and understanding the specific factors that influence the relationship between stakeholder pressure and environmental performance in different organizational contexts, and by doing so, organizations can implement more effective sustainability practices that are tailored to their specific needs and circumstances, and that address the specific environmental issues that are most important to their stakeholders.

The contingency view is an important approach to SSCM because it recognizes the importance of context in shaping the sustainability challenges faced by organizations throughout their supply chain. It can help top managers of focal firms to identify and prioritize the sustainability practices that are most relevant and effective for their specific context. This approach acknowledges that sustainability is not a one-size-fits-all concept and that strategies that are effective in one context may not be as effective in another.

Pagell & Wu (2009) examined the relationship between sustainable supply chain management practices and firm performance, finding that the effectiveness of these practices was contingent on factors such as the complexity of the supply chain and the level of regulatory pressure. The authors analyzed 10 firms that were considered exemplars in SSCM practices and identified several contextual factors that influenced the effectiveness of these practices. One of the key findings of the study was that the effectiveness of SSCM practices was contingent on factors such as the complexity of the supply chain and the level of regulatory pressure (Pagell & Wu, 2009).

According to Pagell & Wu (2009), the effectiveness of SSCM practices is contingent on factors such as the firm's industry sector, its competitive position, and its internal organizational capabilities. For instance, firms in the automotive industry faced unique challenges in implementing SSCM practices, as they had to balance environmental performance with safety and performance requirements. Similarly, firms that were market leaders in their industry were more likely to implement SSCM practices to differentiate themselves from competitors and meet the expectations of stakeholders.

The mentioned studies show us the importance of the contingency approach in SSCM, which involves considering the specific contextual factors that influence their effectiveness in different organizational contexts. By doing so, firms can develop more effective SSCM strategies that are tailored to their specific needs and circumstances, and that address the unique challenges they face in managing sustainability across their supply chains.

The Relationship Between Sustainability and Firm Performance

Investigating the relationship between sustainability and firm performance, researchers have arrived at contradictory results. Garcia-Castro et al. (2010), Martin Curran & Moran (2007), and Mcwilliams & Siegel (2001) suggested a neutral link between CSR and financial performance, meanwhile, others found this relationship positive (Aouadi & Marsat, 2018; Cai et al., 2011; Doh et al., 2010; Roman et al., 1999); suggesting negative relationship (López et al., 2007; Marsat & Williams, 2012), or even found the link indirect (Surroca et al., 2010). The main issues in most of these studies were regarding finding the driving mechanisms of this relationship (Aouadi & Marsat, 2018).

To answer these contradictory results, many researchers studied the indirect relationship between sustainability and firm performance and the role of moderating and mediating variables (Surroca et al., 2010). Servaes & Tamayo (2013) measured consumer awareness with advertising expenditure as a mediator in the relationship between CSR and firm value. Aouadi & Marsat (2018) argued that advertising expenditure can be controlled by firms, therefore they focused on ESG controversies which firms do not have control over in media. They studied firm visibility by using Google search volume (GSV), analyst coverage, and social reputation.

This research follows the work done by Tamayo-Torres et al. (2019) who studied the relationship between sustainability (Measured as SSCM controversies) and firm value (Measured as Tobin's Q) by focusing on the ESG sustainability practices as mediators. They reported a positive relationship with governance, non-significant for the environment, and negative relation for social dimensions to performance. They found more SSCM controversies will result in better sustainability practices and the ESG benefits from these controversies two years later. The previous work did not consider the role of other variables in the relationship between sustainability and firm performance. I try to fill this gap and find a better answer to the contradictory results in different research on the relationship between sustainability and firm performance. A literature review of studies focusing on the link between sustainability and financial performance is presented in Table 1.

>>>Insert Table 1 here<<<

Sustainability practices are the actions taken by firms to improve their environmental, social, and economic performance. These practices can include reducing greenhouse gas emissions, using

sustainable materials and resources, improving labor practices, and engaging with stakeholders. Research has consistently found a positive relationship between sustainability practices and firm performance. For example, a study by (Zhu et al., 2012) found that sustainable supply chain practices had a positive impact on the firm financial performance.

Green Supply Chain Management (GSCM) which is a part of SSCM, has a positive impact on organizational improvement, which in turn leads to better financial performance (Zhu et al., 2012). GSCM innovation facilitates the adoption of new practices and technologies that improve environmental performance, enhance social responsibility, and increase economic competitiveness (Zhu et al., 2012). Firms with higher learning capabilities are more likely to benefit from GSCM innovation and achieve better organizational improvement (Zhu et al., 2012).

There has been a growing interest in the relationship between SSCM controversies, sustainability practices, and firm performance in recent years. This area of research is important because firms are under increasing pressure to improve their sustainability practices and demonstrate their commitment to sustainability to various stakeholders, including customers, investors, and regulators.

Several studies have investigated the relationship between SSCM controversies, sustainability practices, and firm performance. For example, a study by Pagell & Wu (2009) found that firms that implemented sustainability practices in their supply chains, such as green sourcing and product design, experienced better financial performance. However, the authors also note that firms need to carefully manage SSCM controversies, such as supplier non-compliance, to ensure the effectiveness of sustainability practices. Vachon & Klassen (2006), investigated the role of SSCM practices in improving firm performance in the Canadian manufacturing industry and found that SSCM practices had a positive effect on firm performance, and this relationship was moderated

by R&D investment. Specifically, the positive effect of SSCM practices on firm performance was stronger for firms that invested more in R&D. Dangelico & Pujari (2010) studied the role of advertising in the relationship between SSCM and performance and found that firms with higher levels of SSCM practices are more likely to engage in cause-related marketing campaigns and that this has a positive impact on their financial performance. They also found that this relationship would be stronger for firms that use more emotional appeals in their advertising campaigns.

These reviewed studies show that the relationship between SSCM controversies, sustainability practices, and firm performance is complex and multifaceted. The role of the industry environment, R&D, and advertising all play important roles in shaping these relationships and to fully understand the impact of SSCM practices on firm performance, it is important to take into account these contextual factors.

Surroca et al. (2010) found a positive influence of advertising intensity on increasing firm value, supporting the theory that customers need to be aware of the firm's sustainability practices to reward it. Communicating the firm's sustainable practices through advertising and marketing efforts can lead to a positive impact on the firm's financial performance (Surroca et al., 2010). Also, Sen & Bhattacharya (2001) suggested that communicating sustainability activities through advertising could improve consumer perception and positively impact the firm reputation and financial performance.

While more research is needed to explore the specific role of R&D and advertising in the relationship among SSCM controversies, sustainability practices, and firm performance in turbulent or stable industry environments, existing studies suggest that advertising can positively impact firm performance by increasing awareness and recognition of sustainability practices, particularly in turbulent industry environments.

As mentioned earlier, Pagell & Wu (2009) found that R&D can help companies to improve their understanding of sustainability issues and develop more effective strategies for addressing them. However, some studies suggest that R&D may not always have a positive moderating effect on the relationship between SSCM controversies and sustainability practices. For example, a study by Carter & Rogers (2008) found that while R&D can help companies to develop more sustainable products and processes, it may not be sufficient to address broader supply chain sustainability issues such as labor rights violations or environmental damage.

Although there is limited literature in the field of supply chain sustainability that specifically investigates the moderating effect of advertising on the relationship between SSCM controversies and sustainability practices, there are some studies that suggest that advertising can play a role in shaping consumers' perceptions of companies' sustainability practices. For instance, Luchs et al. (2010) found that while consumers may respond positively to advertisements that emphasize a company's sustainability practices, they are also skeptical of companies' claims and may not necessarily change their behavior based on these advertisements. Other factors, such as price and convenience, may have a greater impact on consumers' purchasing decisions (Luchs et al., 2010).

Auger et al. (2008) found that advertising environmental sustainability practices can positively influence consumer attitudes and purchase intentions toward sustainable products and could be a powerful tool for promoting sustainability practices and mitigating the negative effects of SSCM controversies.

While there is some evidence to suggest that advertising can play a role in shaping consumers' perceptions of a company's sustainability practices, the relationship between advertising, SSCM controversies, and sustainability practices is complex and may depend on a variety of factors.

Further research is needed to fully understand the role of advertising in promoting sustainable supply chain practices and mitigating the negative impacts of SSCM controversies.

Prior research suggests that environmental turbulence can have a moderating effect on the relationship between sustainability practices and firm performance. A study by Hahn & Kühnen (2013) investigated the adoption of sustainability practices in German firms and found that environmental turbulence positively influenced the adoption of sustainability practices and suggested that firms would be more likely to adopt sustainable practices in more uncertain and dynamic environments, where they face greater pressure to respond to changing stakeholder demands and market conditions. The impact of environmental management practices on operational performance is stronger in more dynamic environments, where the ability to anticipate and respond to changing environmental conditions was more critical for firms' survival (Klassen & McLaughlin, 1996).

After reviewing the literature, in the next chapter I discuss the relationship between sustainable supply chain management (SSCM) controversies and sustainability practices and their impact on firm's performance. I focus on analyzing the effect of advertising and R&D investment levels, as well as industry turbulence, on the correlation between SSCM controversies, sustainability practices, and financial performance of the company.

CHAPTER 3: RESEARCH MODEL AND HYPOTHESES

SSCM Controversies and Future Sustainability Practices

If SSCM behavior does not address stakeholders' interests, controversies arise, negatively affecting the firm's value (Aouadi & Marsat, 2018). According to stakeholder theory, controversies increase stakeholders' skepticism about the firm, decreasing its credibility (Aouadi & Marsat, 2018; Du et al., 2010; Godfrey et al., 2009). For instance, Krüger (2015) demonstrates that investors have negative responses to controversies, especially regarding concerns with employees, the environment, and communities. The firm should react by developing actions and programs to repair the reputation damaged by controversies. According to Klassen & Vereecke (2012), the critical challenge for sustainability in firms is to reduce uncertainty, improve responsiveness in the event of problems, and reduce the magnitude of any negative consequences. Fombrun et al. (2000) affirm that reputation capital is the primary reason to invest in sustainability. Controversies at an Apple supplier in China or due to Nike's working conditions have led these firms to react by implementing supplier audits to counteract public perception (Klassen & Vereecke, 2012). Firms' reactions must consider such issues as consumers' increasing awareness of sustainability issues and suppliers' sustainability preferences (Adebanjo et al., 2016). Sustainability actions and programs can reduce the damage caused by previous controversies in terms of reputation, sales figures, risks, and costs. Next, I describe the three ESG dimensions and hypothesize that they are valid options for organizations to improve their sustainability orientation in the wake of SSCM controversies.

First, environmental management enables the firm to recover from possible damage derived from SSCM controversies because stakeholders value environmentally friendly programs

greatly. Customers and other stakeholders have significantly increased their environmental expectations for the supply chain. As the demand for environmentally friendly products and willingness to pay a higher price for them gain importance (Altmann, 2015), firms are obliged to incorporate the environmental interests of customers and other stakeholders. Ageron et al. (2012) indicate that stakeholders such as government institutions or NGOs can require companies to meet specific conditions for SSCM.

Organizations that have faced significant controversies with their SSCM stakeholders may choose to implement sustainable environmental programs and actions to reduce present and future associated risks (e.g., reputation damages). For instance, firms can require suppliers to provide them with environmentally friendly materials (certified by the ISO 14001 standard) or to implement an Environment Management System (EMS) (de Giovanni, 2012; Mitra & Datta, 2014).

In recent years, customers have become more environmentally conscious, and they expect the same from the companies they do business with. As a result, firms are under pressure to incorporate environmentally friendly practices in their supply chain management to meet the growing demand for green products. Thus, implementing environmental sustainable practices can help firms improve their reputation, and result in mitigating the negative effects of SSCM controversies. Stakeholders such as government institutions and NGOs are playing an active role in shaping the environmental sustainability practices of companies and different industries. They can demand that companies meet specific conditions related to SSCM, such as implementing an Environment Management System or sourcing environmentally friendly materials. Firms that comply with these conditions are more likely to be seen as environmentally responsible, which can positively impact their reputation and customer loyalty. Companies that have faced SSCM

controversies may choose to implement sustainable environmental programs and actions to reduce present and future associated risks. Actions such as reducing energy consumption or minimizing waste help firms demonstrate their commitment to environmental sustainability and regain the trust of their stakeholders. Given the foregoing, I propose the following hypothesis:

H1a: SSCM controversies are positively related to following environmental sustainability practices.

Second, firms may activate social practices to reduce the negative impact of SSCM controversies. Consumers and society, in general, require the firms they buy from to have good social behavior, and they can boycott firms that do not comply (Altmann, 2015). Supply chain scandals due to labor exploitation, child labor, or deaths due to the collapse of buildings in Asian countries have negatively affected textile industry brands such as H&M and Zara. These examples lead firms to seek solutions to respond to stakeholder expectations and develop sustainability strategies to avoid further damage. Organizations may require their suppliers to meet a series of standards for working conditions and child labor (Luo & Zheng, 2013). Firms may also implement internal practices to improve employee motivation and satisfaction (Gualandris et al., 2014; Pagell & Gobeli, 2009) by enabling employees to work in a company with a clear social orientation (Sancha et al., 2016), reducing the negative impact of SSCM controversies.

Society requires companies to have good social behavior and can boycott firms that do not comply. Therefore, companies must develop sustainability strategies to respond to stakeholder expectations and avoid further damage. Consumers and society expect companies to act responsibly and promote fair labor practices, respect human rights, and ensure worker safety.

Companies that implement these practices can improve their reputation and brand image, leading to increased customer loyalty and market share. Focal firm's required standards for working conditions and child labor motivate firms to implement social sustainability practices to comply with these standards and meet stakeholder expectations.

Firms can also implement internal practices to improve employee motivation and satisfaction, such as offering training and development programs or providing work-life balance initiatives. These practices can create a positive work environment, enhance employee well-being, and reduce turnover rates, leading to increased productivity and organizational effectiveness. By doing so, companies can demonstrate their commitment to social responsibility and ethics, which can positively impact their reputation and brand image. I thus propose the next hypothesis:

H1b: SSCM controversies are positively related to following social sustainability practices.

Finally, a third potential strategy to minimize the damage from SSCM controversies involves the dimension of governance. Managers must avoid developing unethical practices such as bribery, corruption, or lack of independence in decision-making, any, or all of which can cause problems with stakeholders and compound the reputational damage derived from previous SSCM controversies. Unethical behavior can lead stakeholders to boycott firms (Altmann, 2015), as in the case of the recent charges brought against Volkswagen for the automobile pollution scandal. In 2009, Greenpeace denounced brands such as 'Adidas, Clarks, Nike, Reebok, and Timberland for sourcing leather from illegally deforested areas of Brazil, with the complicity of the Brazilian government, which was bankrolling the process (Vurro et al., 2009). To react to these controversies, firms often adopt codes to respond to or prevent reputational damage caused by the

perceptions of different stakeholder groups (Sobczak, 2006). Additional instances of these types of reactions include implementing measures to link executive pay with sustainability or establishing management strategies that meet the objectives of sustainable supply chain management (SSCM).

The relationship between SSCM controversies and governance sustainability practices can be explained in two ways. Firms may adopt governance sustainability practices as a way to prevent reputational damage caused by SSCM controversies. Such practices may include codes of conduct, sustainability reporting, and supply chain audits. These measures are designed to ensure that the company's supply chain is transparent, ethical, and environmentally responsible. By adopting these practices, firms can signal their commitment to sustainable supply chain management, thereby mitigating the risk of reputational damage. The other explanation is that SSCM controversies may drive firms to adopt governance sustainability practices to address the underlying causes of the controversies. For instance, a company may respond to allegations of labor violations in its supply chain by implementing more rigorous labor standards and monitoring mechanisms. Similarly, a company accused of environmental harm may adopt policies aimed at reducing its environmental footprint. In both cases, the adoption of governance sustainability practices is a direct response to the SSCM controversy, intending to address the root cause of the issue. Based on the foregoing, I propose the following hypothesis:

H1c: SSCM controversies are positively related to following governance sustainability practices.

The Role of Different Organizational Resources

Advertising Intensity, SSCM Controversies, and Sustainability Practices

According to Parmigiani et al., 2011, stakeholders recognize that the focal firm is responsible for its supply chain and managing it properly. Although firms are aware of these benefits, they may have false behaviors throughout their supply chain (Jasinenko et al., 2019). These behaviors or incidents also will result in controversies among stakeholders. The firm would have a reactive strategy and implement sustainability procedures and programs as a tool to retain its reputation and trust (Livesey & Kearins, 2002).

In recent years consumers and other stakeholders are stricter about the environmental pillar of sustainability and have more expectations not only for environmental-friendly products but also for the processes, and react to environmental incidents that happen in the supply chain of a company like deforestation news of Nestle's supplier in Africa (Tamayo-Torres et al., 2019). With this attitude in mind, consumers would be fine with higher price tags on these products (Altmann, 2015). Stakeholders may react to environmental controversies in the supply chain directly or indirectly with the help of an ally (Frooman, 1999). Non-governmental organizations and governments can also monitor firms to meet the environmental protocols in the whole supply chain (Ageron et al., 2012). Suppliers would face more firms asking them to produce environmental-friendly products which are ISO 14001 certified (Tamayo-Torres et al., 2019) or help them to establish an environmental management system (de Giovanni, 2012; Mitra & Datta, 2014).

After confronting social controversies in the supply chain such as using child labor, not providing safe working conditions for workers, etc., firms may respond by implementing social sustainability practices. Recent trends show consumers expect proper social actions from the firms

they buy their products from and may have a strict decision not to purchase products from firms with bad social behaviors at all (Altmann, 2015). Managers are aware of this expectation and try to find a way to implement better social sustainability practices strategically to keep the firm away from more issues in the future (Tamayo-Torres et al., 2019). Focal firms would implement social sustainability practices in their facilities which would result in more employee satisfaction (Gualandris et al., 2014; Pagell & Gobeli, 2009), and would also ask their suppliers to meet multiple standards related to the working environment, child labor, etc. (Luo & Zheng, 2013). All these strategies would be used to reduce the bad effect of SSCM controversies.

Corruption, bribery, and other potential controversies with stakeholders which are related to the governance aspects of sustainability throughout the supply chain would tarnish the reputation of the firm and result in boycotting the firm (Altmann, 2015; Tamayo-Torres et al., 2019). Firms react to these controversies by introducing conduct codes and implementing policies to achieve SSCM goals and developing procedures and decreasing the damage caused by lacking trust among stakeholders.

Sustainability is a strategic resource for firms. This investment can have advantages for firm performance since it has been found in the prior literature in strategy, marketing, and business ethics as a product attribute that is considered valuable by many consumers. Du et al., 2010 and multiple other researchers found that consumers need to be aware of the sustainability practices of the firm to appreciate them and react positively (Bhattacharya & Sen, 2004; Pomering & Dolnicar, 2009; Schuler & Cording, 2006; Sen & Bhattacharya, 2001c). Mcwilliams & Siegel, 2001 also suggested considering advertising correlation in the relationship between sustainability and firm performance, and that advertising the sustainability practices and achievements could inform consumers about sustainability practices of the firm. According to Servaes & Tamayo (2013), the

spending in advertising magnifies consumer awareness about all the activities of the firm which can include environmental, social, and governance sustainability practices. Advertising strengthens the information environment of the firm (Nelson, 1974) and customers would be more aware of the firm's actions in such an environment. Implemented sustainability practices, besides new products and processes would be one of those actions which could be viewed by potential or current customers (Servaes & Tamayo, 2013).

Our goal is to examine under which circumstances SSCM controversies may be good for future implementations of sustainability practices. Our focus in this section is studying the influence of a potential moderator on the stimulating effect of controversies on different dimensions of sustainability practices.

The information gap between the firm and its stakeholders would be reduced in the presence of good levels of advertising, which would increase the chance that customers and other stakeholders receive more information about the positive activities and achievements the company has (Servaes & Tamayo, 2013). SSCM controversies are bad sustainability news or incidents in the supply chain covered by the media. The effect of this negative public news would be on the stakeholders and mostly on customers who are the target of news agencies. Since I study SSCM controversies which are bad news related to sustainability issues or incidents in the supply chain, it would be helpful to study the effect of the general advertising intensity of the firm to see the influence of advertising intensity which is mostly focused on the company's achievements and in other words "good news" on the effect of "bad news" about the firm and incidents throughout its supply chain on stimulating future sustainability practices.

The above argument helps us to posit that the effect of SSCM controversies as an ingredient of sustainability on the firm's movement towards better sustainability practices in all three

dimensions of it (environmental, social, and governance), would be positively related to advertising intensity, and this advertising could be anything related to the firm that helps to increase consumer awareness and would not be limited to the media coverage of the sustainability practices as suggested by Mcwilliams & Siegel, 2000, 2001. This moderated relationship is shown in Figure 3.

>>>Insert Figure 3 here<<<

Advertising can serve as a tool to inform stakeholders about the positive sustainability practices of the firm and reduce the information gap between the firm and its stakeholders. The intensity of advertising refers to the level of investment a firm makes in promoting its products or services through various channels, such as television, print media, online platforms, and other forms of marketing communication. Advertising can influence the relationship between SSCM controversies and sustainability practices by mitigating the negative effects of negative publicity on a firm's reputation. SSCM controversies are typically reported in the media, which can create a negative perception of the firm among stakeholders, particularly consumers. However, if a firm invests in advertising, it can counteract this negative perception by highlighting its positive achievements and sustainability practices. By doing so, the firm can enhance the perception of its overall sustainability efforts. Advertising can also increase the visibility of a firm's sustainability practices and make them more salient to consumers. When a firm advertises its sustainability practices, it can inform consumers about its commitment to sustainability and the steps it is taking to improve its environmental, social, and governance performance. This, in turn, can create a positive image of the firm among consumers who value sustainability and motivate them to support the firm by purchasing its products or services. Advertising can help firms build and maintain

relationships with their stakeholders. By communicating its sustainability efforts through advertising, a firm can demonstrate its transparency and willingness to engage with stakeholders on sustainability issues. This can create a sense of trust and loyalty among stakeholders, which can be beneficial for the firm's long-term sustainability goals. The intensity of advertising can be a crucial factor in shaping the relationship between SSCM controversies and the adoption of future sustainability practices by a firm. By investing in advertising, a firm can mitigate the negative effects of negative publicity, increase the visibility of its sustainability practices, and build and maintain relationships with stakeholders. The above argument helped us to posit the following hypothesis:

H2: The positive effect of SSCM controversies on sustainability practices would be higher at higher levels of advertising.

R&D Intensity, SSCM Controversies, and Sustainability Practices

Research and development activities are linked to the innovative competencies of the firm (Anagnostopoulou & Levis, 2008). Firms that implement R&D are more capable to implement innovative processes, innovate new products, and state-of-the-art technologies, and present better ideas for competition in the market; Therefore, they would be able to magnify their productivity by innovating new products and processes (Ben-Zion & Kim, 1984; Guerard et al., 1987; B. H. Hall, 2005; Lichtenberg & Siegel, 1991; McWilliams & Siegel, 2000). Moreover, having high levels of R&D activities is a great competitive competency since it would be costly and hard for other firms to do what the firm with this capability does (Russo & Fouts, 1997; Sharma & Vredenburg, 1998). For instance, introducing new innovative technologies with a lower carbon footprint, or less usage of hazardous materials can result in new environmental-friendly products

(Shrivastava, 1995). Innovative companies and companies with vast investments in their R&D projects are much more capable of responding to sustainability controversies with stakeholders as fast as possible and alleviating the negative effects of those controversies. An instance from the real world that serves as a good example is the situation that occurred within the supply chain of the 3M corporation. There were a series of occurrences involving flawed batches of adhesives that were spoiling other batches in the same container, causing an increase in the amount of hazardous waste. As a solution, the 3M R&D department worked on process innovation to modify their transportation process and implemented more frequent quality tests at various stages of the supply chain for new batches. The outcome was a decrease in hazardous waste by 10 tons (Porter & Van Der Linde, 2017; Surroca et al., 2010). The rise of the electric car industry is a prime example of how proactive strategic planning and innovation can be beneficial. The industry is driven by the need to quickly develop new technologies to effectively address any negative news or incidents that may arise throughout the supply chain.

Prior literature suggests observing the moderating role of R&D in studying sustainability to avoid spurious results (Han et al., 1998; Hull & Rothenberg, 2008). This strategic organizational resource would help the firm to respond better to negative incidents in its supply chain that cause sustainable supply chain management controversies. In this section of Chapter 3, I aim to explore the circumstances under which controversies in Sustainable Supply Chain Management (SSCM) can have a positive impact on future sustainability practices, ultimately leading to benefits.

R&D investments enable firms to innovate new products, processes, and technologies. These innovations can help firms address SSCM controversies by finding new ways to reduce their environmental impact, improve social and labor conditions, and enhance their governance practices. Firms with high levels of R&D investments have the resources and capabilities to

respond quickly to SSCM controversies. The 3M case mentioned earlier shows how the firm's R&D department was able to modify its transportation process and implement more rapid quality tests in response to SSCM controversies. This kind of rapid response can help firms mitigate the negative effects of SSCM controversies and improve their sustainability practices. Firms with high levels of R&D investments have a competitive advantage over their rivals, as they can offer more innovative and sustainable products and processes. This competitive advantage can motivate firms to invest more in sustainability practices, as they seek to differentiate themselves from their competitors. Sustainability practices require long-term investments and commitments, and R&D investments can support firms' long-term sustainability goals. By investing in R&D, firms can develop new technologies and processes that not only address current SSCM controversies but also contribute to their long-term sustainability objectives. SSCM controversies often involve a wide range of stakeholders, including customers, suppliers, NGOs, and the government. Firms with high levels of R&D investments have the resources and capabilities to engage with these stakeholders and address their concerns. This engagement can help firms build trust and credibility with their stakeholders, which can in turn enhance their sustainability practices. The above argument helped us to posit the following hypothesis:

H3: The positive effect of SSCM controversies on sustainability practices would be higher at higher levels of R&D investments.

The Role of Environmental Turbulence

To address Tamayo-Torres et al. (2019) suggestion of considering contextual factors that influence sustainability and performance, I use the contingency view and examine the impact of environmental turbulence as a key contingency factor. In the following two sections, our primary

objective is to test the hypothesis that the positive effect of the interaction between SSCM controversies and advertising investments decreases as the level of environmental turbulence in a firm's industry increases. Additionally, I seek to determine whether the positive effect of the interaction between SSCM controversies and R&D investments increases in a more turbulent industry environment.

Environmental Turbulence, Advertising Intensity, SSCM Controversies, and Sustainability Practices

According to contingency theory, the context should be considered in managing resources (Lawrence & Lorsch, 1967; Thompson, 1967). A good fit between the endogenous variables of an organization and exogenous context variables will result in better performance (e.g., Lawrence & Lorsch, 1967; Thompson 1967). A socially responsible behavior would have different effects on performance according to the environment the firm is in (Goll & Rasheed, 2004). Market dynamism has been used by multiple researchers as a moderator in the link between different organizational characteristics and performance (Homburg & Pflesser, 2000; Hult et al., 2007; Jaworski & Kohli, 1993; Lichtenthaler, 2009; Slater & Narver, 1994).

Environmental turbulence, also known as the level of turbulence in the industry environment, is a key contingency variable that is widely used by researchers in the sustainability literature (Wiengarten et al., 2012; Koh et al., 2012). It refers to the degree of unpredictability and instability caused by one or more sudden changes (Dess & Beard, 1984; Goll & Rasheed, 2004).

In stable environments, value-appropriating activities tend to be more beneficial. This means that activities that focus on the current products are more profitable due to the low rate of

change in the environment(Havakhor et al., 2019). A stable environment is also conducive to increasing marketing practices for existing products and making advertising investments more profitable for the firm (Mizik & Jacobson, 2003).

In a dynamic environment, advertising can be less effective in influencing consumer behavior and increasing sales because consumers may prioritize other factors such as product quality, price, and brand reputation (Dawar & Lei, 2009). Additionally, in a turbulent environment, firms may need to allocate resources toward adapting to changes and maintaining competitiveness, which could result in reduced advertising investments (O'Cass & Ngo, 2007). Thus, the positive effect of advertising on sustainability practices may be weakened in a turbulent environment. Firms operating in industries with higher environmental turbulence may face greater pressure from stakeholders to adopt sustainable practices. However, this pressure may also create challenges for firms in terms of resource allocation and decision-making (Havakhor et al., 2019). Therefore, the relationship between SSCM controversies and sustainability practices, and the moderating effect of advertising would be more complex in a turbulent environment. Firms operating in stable environments may benefit from higher advertising investments to promote their sustainability practices, while those operating in turbulent environments may need to adopt more adaptive strategies and allocate resources differently. Based on these descriptions, I propose the following hypothesis:

H4: The moderating effect of advertising on the relationship between SSCM controversies and sustainability practices is weaker in a turbulent environment.

Environmental Turbulence, R&D Intensity, SSCM Controversies, and Sustainability Practices

In contrast to a stable environment, a turbulent environment does not offer continuous advantages and presents many uncertainties. As the advantages that may arise are often short-lived, innovation becomes imperative (Xue et al., 2012b). In a turbulent environment, it becomes difficult for firms to learn from current practices and procedures (Miller, 1987). However, firms operating in such an environment can benefit from opportunities by prioritizing innovation (H. Li & Atuahene-Gima, 2001). Therefore, as environmental turbulence increases, firms are more likely to benefit from value creation through innovation and R&D activities (H. Li & Atuahene-Gima, 2001).

In a turbulent environment, it is challenging to predict future demand and market conditions. As a result, continuous innovation is necessary to identify and capitalize on emerging opportunities. R&D activities enable firms to create new products, processes, and technologies that can help them adapt to changing circumstances. A turbulent environment makes it difficult for firms to learn from their current procedures and practices. In such an environment, innovation can help firms break away from established routines and adopt new practices that can improve their competitiveness. By investing in R&D, firms can develop new knowledge, skills, and capabilities that can enhance their ability to respond to environmental changes and develop sustainable practices. R&D can help firms create new value propositions, improve their products and services, and differentiate themselves from their competitors. In a turbulent environment, innovation can be a source of sustained competitive advantage, and R&D can play a critical role in this regard. By investing in R&D, firms can develop new knowledge and capabilities that can help them respond to environmental changes, capitalize on emerging opportunities, and create

sustainable practices that can improve their competitiveness. The above argument helped us to posit the following hypothesis which is depicted in Figure 3:

H5: The moderating effect of R&D on the relationship between SSCM controversies and sustainability practices is stronger in a turbulent environment.

SSCM Controversies and Firm's Financial Performance

Implementing sustainability through the supply chain not only has the economic benefits of ensuring long-term survival but also would facilitate good relations with strategic suppliers (Parmigiani et al., 2011; Reuter et al., 2010). As discussed before, multiple studies on the relationship between sustainability and firm performance had contradictory results. I try to address the need and find a mechanism that affects this relationship by positing hypotheses based on basic theories on the link between controversies through the supply chain and the firm performance.

The stakeholder theory provides a framework for linking a firm's financial performance to its sustainability practices and potential controversies (Jiao, 2010). Organizations can attain long-term success by adhering to a system of social norms and values and taking appropriate actions that help them establish a perception of legitimacy (Aouadi & Marsat, 2018; Suchman, 1995). Confronting different controversies and the bad news around them challenges the legitimacy of the firm (Palazzo & Scherer, 2006). This will make the stakeholders aware of the sustainability controversies and will harm the reputation of the organization (Donaldson & Preston, 1995; Du et al., 2011; Maignan & Ferrell, 2004).

According to these mentioned theories, I anticipate a negative effect of sustainability controversies on firm performance (Adams, 2002; C. Fombrun & Shanley, 1990; Orlitzky, 2013;

Weigelt & Camerer, 1988). Studies based on empirical evidence suggest that a firm engaging in actions that are deemed socially irresponsible can lead to a decline in its stock price (Frooman, 1997; Johnson, 2003).

Klassen & McLaughlin (1996) also studied negative and positive sustainability news and found a negative relation between bad news and the market value of the firm. This negative news has a significant effect on the investors' response (Krüger, 2015). Furthermore, firms that face negative sustainability news or controversies tend to experience a loss in market share (Kang & Kim, 2013).

When a firm faces controversies, its reputation can suffer considerably, leading the firm to implement sustainability practices to rebuild its image (Becker-Olsen et al., 2006). If a firm has multiple controversies with its stakeholders, its performance may decrease due to the negative reactions of stakeholders. This can result in reduced trust between stakeholders and the firm, declining sales, strained relationships with suppliers of rare and strategic materials, and government penalties.

Stakeholder theory suggests that organizations must act in accordance with social norms and values to achieve legitimacy and long-term success. Sustainability controversies challenge the legitimacy of a firm, leading stakeholders to become aware of these issues and harm the reputation of the organization. This negative perception can lead to a decrease in sales, a lack of trust, and other negative outcomes.

Negative sustainability news has a significant effect on investors' responses, resulting in a decrease in the market value of the firm. Moreover, firms confronted with bad sustainability news or controversies may lose market share and encounter a decrease in their financial performance

(Gong et al., 2019; Klassen & McLaughlin, 1996). Firms should aim to avoid sustainability controversies and implement sustainable practices throughout their supply chain to ensure their long-term success and positive reputation among stakeholders. I thus propose the following hypothesis:

H6: SSCM controversies directly and negatively impact a firm's financial performance.

SSCM Controversies, sustainability practices, and Environmental Turbulence

According to Parmigiani et al. (2011), stakeholders recognize that the focal firm is responsible for its supply chain and managing it properly. Implementing sustainability practices would help firms to gain reputation and trust which would result in competitive advantage (Birindelli et al., 2015; Donaldson & Preston, 1995; Franceschelli et al., 2018). Although firms are aware of these benefits, they may have false behaviors throughout their supply chain (Jasinenko et al., 2019). These behaviors or incidents also will result in controversies among stakeholders. The firm would have a reactive strategy and implement sustainability procedures and programs as a tool to retain its reputation and trust (Livesey & Kearins, 2002). Moreover, if the firm has a history of sustainability practices based on a proactive strategy, then when any controversy happens consumers would be more lenient, and the firm's reputation would be less in danger (Klein & Dawar, 2004).

In recent years, consumers and other stakeholders have become more demanding about all aspects of sustainability. They expect not only environmentally friendly products but also sustainable processes and are responsive to incidents that occur in a company's supply chain, such

as the deforestation caused by Nestle's supplier in Africa (Tamayo-Torres et al., 2019). Given this mindset, consumers would be willing to accept higher prices for these products (Altmann, 2015).

According to Frooman (1999), stakeholders can react to environmental controversies in the supply chain either directly or indirectly with the help of an ally. Ageron et al. (2012) suggest that NGOs and governments can also monitor firms to ensure that they meet the required protocols throughout the supply chain. Furthermore, suppliers can expect more requests from firms to produce environmentally friendly products, which are ISO 14001 certified (Tamayo-Torres et al., 2019) or assist them in establishing an environmental management system (de Giovanni, 2012; Mitra & Datta, 2014). Finally, being recognized as a responsible firm would strengthen the relationships between the firm and its customers, employees, suppliers, and investors (Delmas, 2001; Delmas & Montiel, 2008; Parmar et al., 2010; Freeman, 1984).

Managers are cognizant of the emerging trend of customers' sustainability expectations and aim to implement sustainable practices strategically to prevent potential issues in the future (Tamayo-Torres et al., 2019). These focal firms may implement social sustainability practices within their facilities, which can result in increased employee satisfaction (Gualandris et al., 2014; Pagell & Gobeli, 2009). Additionally, they may require their suppliers to adhere to various standards related to the working environment, child labor, and other factors (Luo & Zheng, 2013). These approaches are intended to mitigate the adverse effects of SSCM controversies. Firms that implement these sustainability practices will gain a good reputation among their stakeholders and as stated before would have lower risks when confronting a negative social incident through their supply chain.

Moreover, the governance aspect of sustainability in the supply chain, such as corruption and bribery, can lead to controversies with stakeholders and harm the reputation of a firm,

potentially resulting in boycotts (Altmann, 2015; Tamayo-Torres et al., 2019). To address these issues, firms may establish conduct codes, implement policies to achieve SSCM goals and develop procedures to restore trust with stakeholders and mitigate the damage caused by controversies (Sobczak, 2006b; Tamayo-Torres et al., 2019).

The focal firm must employ various measures to convince supply chain members and stakeholders to incorporate sustainability objectives into their profit objectives (J. Hall et al., 2012). This transition to a more comprehensive objective, beyond just financial gain, is difficult to accomplish for all members of the supply chain and requires new practices and significant efforts. However, the focal firm's SSCM actions and their impact on other supply chain members can be effective, even in industries with turbulent environments (Silvestre, 2015). The effectiveness of the focal firm's SSCM leadership can be hindered by sustainability-related incidents that receive significant media coverage, such as corruption or child labor. Therefore, there is a need to examine the effectiveness of the focal firm's SSCM leadership in both stable and turbulent environments, particularly in today's global supply chains that span different continents and include developing countries with less consideration for sustainability than world-class focal firms.

Environmental turbulence refers to the level of uncertainty and changes in the external environment. In turbulent environments, firms must deal with sudden changes in regulations, customer preferences, and technological advancements. Therefore, it can be more challenging for firms to implement sustainability practices and manage their supply chain properly. Moreover, SSCM controversies can arise due to several reasons, such as non-compliance with environmental regulations, unethical practices by suppliers, or lack of transparency in the supply chain. In

turbulent environments, firms may face more SSCM controversies, as they must deal with sudden changes and uncertainties.

Moreover, implementing sustainability practices can be costly for firms, and in turbulent environments, firms may have to invest more in adapting to sudden changes. Therefore, they may have fewer resources to invest in sustainability practices, resulting in a weaker relationship between SSCM controversies and sustainability practices. Environmental turbulence can also affect stakeholders' attitudes toward sustainability practices. For example, in a stable environment, stakeholders may have more trust in firms that have a history of sustainability practices, and therefore, such firms may have a better reputation. However, in a turbulent environment, stakeholders may be more reactive to SSCM controversies, and firms may have to invest more in managing their reputation, rather than implementing sustainability practices. An additional point to take into account is that in turbulent environments, firms may also face more trade-offs between sustainability practices and other business objectives. For example, they may have to prioritize short-term profitability over long-term sustainability goals due to sudden changes in the market.

Collaboration and sustainability integrity in supply chain management of an industry environment with high levels of turbulence is harder than for firms working in a stable environment and this contextual element hinders the movements towards a sustainable supply chain and better performance in ESG dimensions (Silvestre, 2015). As depicted in Figure 4, I posit the following hypotheses:

H7: *The relationship of SSCM controversies with sustainability practices is moderated by environmental turbulence. Specifically, this relationship is weaker for firms in more turbulent industry environments.*

Sustainability Practices, Financial Performance, and Environmental Turbulence

Prior literature found a positive effect of investing in sustainability on firm performance (Bird et al., 2007; Franceschelli et al., 2019; Margolis et al., 2012). In recent times, the demands of consumers and other stakeholders for sustainability have become increasingly strict, particularly in terms of environmental considerations. They now require more than just eco-friendly products and expect companies to implement sustainable processes. Furthermore, they expect prompt action from companies in response to environmental incidents that occur within their supply chain. An example of this is the news about deforestation linked to Nestle's supplier in Africa (Tamayo-Torres et al., 2019). As a result of this shift in attitude, consumers have become more willing to pay higher prices for sustainable products (Altmann, 2015).

By implementing sustainability practices in their supply chain, firms can comply with these regulations and gain the trust of their stakeholders. Sustainability practices can also lead to cost savings for firms. For example, reducing waste and energy consumption can result in lower production costs and better efficiency (Sarkis et al., 2010). Moreover, by working closely with suppliers and other stakeholders to implement sustainable practices, firms can build long-term relationships that result in mutual benefits and cost savings (Pagell & Wu, 2009).

Although there are conflicting results from empirical studies regarding the relationship between social sustainability and firm performance (e.g. Erhemjamts et al., 2013; Margolis & Walsh, 2003), many researchers have found that investing in social practices has a positive impact on firm performance (Tamayo-Torres et al., 2019). Like environmental sustainability practices, implementing social sustainability practices can have a positive impact on consumers who

prioritize these issues and are willing to pay a premium for products with a reduced negative social impact (Baker & Sinkula, 2005; Graff Zivin & Small, 2015). Porter & Van Der Linde (1995) argue that taking social issues into account when developing new processes can provide firms with competitive advantages, such as access to cutting-edge technologies that can enhance firm performance. In addition, firms that implement sustainable practices can earn a positive reputation among their stakeholders and as previously mentioned, may face lower risks when addressing negative social incidents within their supply chain.

Firms that prioritize sustainability practices can differentiate themselves from their competitors and build a strong brand image that resonates with consumers (Eccles et al., 2014). This can lead to increased customer loyalty, higher sales, and better financial performance for the firm. Social media and other digital platforms have made it easier for consumers and other stakeholders to share information about firms' sustainability practices and controversies. By implementing sustainable practices in their supply chain, firms can control their narrative and demonstrate their commitment to sustainability, which can help them manage their reputation and avoid negative publicity (Sarkis et al., 2010). The above argument helped us to posit the following hypothesis:

H8: *The implementation of Sustainability practices has a positive impact on firm performance.*

According to various studies, considering sustainability and integrating it into strategic decision-making can have a positive impact on a company's long-term performance (Mcwilliams & Siegel, 2001b; Melo & Garrido-Morgado, 2012). Furthermore, it could lead to future growth for the firm (C. J. Fombrun et al., 2000). The implementation of governance sustainability practices can also influence the market value of the firm (Michelon et al., 2013).

Environmental turbulence is a contextual element that could affect the implementation and effectiveness of sustainability practices in a supply chain. In a more turbulent environment, firms may face more challenges related to resources, regulations, competition, and market demands that could hinder their efforts toward sustainability practices (Silvestre, 2015). These challenges could make it harder for firms to implement sustainability practices and obtain the desired outcomes, which could weaken the relationship between sustainability practices and financial performance.

The level of environmental turbulence could affect the expectations and behaviors of stakeholders toward sustainability practices. In a more turbulent environment, stakeholders may have more diverse and conflicting views on sustainability practices, and their expectations may change more rapidly and unpredictably than in a stable environment (Silvestre, 2015). Firms that operate in a turbulent environment may face more pressure to adapt to these changing expectations and may have to allocate more resources to manage stakeholders' demands. This could reduce the resources and attention that firms could devote to sustainability practices, which could weaken the relationship between sustainability practices and financial performance.

The effectiveness of sustainability practices may depend on the level of turbulence in the different dimensions of the environment, such as political, economic, social, and technological factors. For instance, a firm that implements sustainability practices to reduce its environmental impact may face challenges in a turbulent political environment where regulations and policies change frequently, and stakeholders' expectations vary widely (Parmigiani et al., 2011). Similarly, a firm that implements sustainability practices to improve its social impact may face challenges in a turbulent economic environment where labor conditions, human rights, and social norms vary widely across regions and countries. Therefore, the relationship between sustainability practices

and financial performance may depend on the specific dimensions of environmental turbulence that affect the firm's operations and stakeholders.

The level of environmental turbulence may affect the competitive advantage that firms could gain from sustainability practices. In a stable environment, firms that implement sustainability practices may differentiate themselves from competitors, attract more customers and investors, and enhance their reputation and trustworthiness (Birindelli et al., 2015). However, in a turbulent environment, these advantages may be harder to sustain, and firms may have to invest more resources in adapting to changing conditions and stakeholders' demands (Silvestre, 2015). This could reduce the competitive advantage that firms could gain from sustainability practices, which could weaken the relationship between sustainability practices and financial performance.

Collaboration and sustainability integrity in supply chain management of an industry environment with high levels of turbulence is harder than for firms working in a stable environment and this contextual element hinders the movements towards a sustainable supply chain and better performance in ESG dimensions (Silvestre, 2015). As depicted in Figure 4, I posit the following hypotheses:

H9: *The relationship of sustainability practices with firm performance is moderated by environmental turbulence. Specifically, this relationship is weaker for firms in more turbulent industry environments.*

>>>Insert Figure 4 here<<<

Following a thorough review of the research model and hypotheses in this dissertation, in the upcoming chapter, I provide details on the data sources, dataset, measures, methods, and models used to test the hypotheses presented in this dissertation.

CHAPTER 4: METHODS

I use a longitudinal sample of more than 600 firms observed over more than a decade and collected from three well-recognized archival sources to test the proposed hypotheses. Thus, the present research offers an improvement on previous studies that had smaller and limited samples which made it impossible for researchers to examine all the aspects of sustainability and their focus was only on the environmental dimension and also improves studies that used cross-sectional data, surveys or methods like structural equation modeling to estimate measurements and models.

Data Sources and Used Dataset

The original sample in our study is formed by merging the sustainability data from the Sustainalytics and Refinitiv (formerly Asset4) databases, and financial data from COMPUSTAT. The final dataset is a combination of SSCM controversies from the Sustainalytics, and sustainability ratings from Refinitiv from 2009 to 2019, supplemented with COMPUSTAT data from 2005 to 2019. The additional years were needed to calculate the sales volatility of the industry each firm is working in using a rolling regression with a five-year window to measure environmental turbulence. Following previous research (Servaes & Tamayo, 2013), I only merged nonfinancial firms since some of our variables of interest were hugely different for financial firms. I excluded firms that are not present in the North American region, and private firms because of the unavailable stock market information for them. All the observations for all the needed variables in our model with missing data in all the databases were excluded, resulting in a sample of 610 firms, and a total of 5,625 firm-year observations. Industries with more than 10 firms in the sample include manufacturing (291), services (103), transportation and public utilities (85), retail trade

(53), mining (50), and wholesale trade (21). The information of the frequencies of different industries in this dissertation is provided in Table 2.

>>>Insert Table 2 here<<<

Sustainalytics is a leading ESG research, data, and rating firm. with more than 25 years of experience in collecting data and developing solutions for industry and academia to help them consider the importance of sustainability in policies and practices. It has 16 offices worldwide and more than 350 analysts with different expertise in 40 different industries. Sustainalytics evaluates the level of the contribution each firm has in an incident related to environmental, social, or governance dimensions of sustainability. This database provides specific data and information related to different stakeholders (community, customers, employees, suppliers, etc.) instead of concentrating on single firms. In the present study, I used the data provided by this database with a focus on the suppliers as one of the very important stakeholders of the company.

Refinitiv (formerly Asset4) is famous for premier ESG data. Historical ESG data based on more than 70 key performance indicators calculated from more than 400 data points as well as their data sources, such as annual reports, NGO websites, and CSR reports are provided in this database. These categories are grouped in each of the three ESG dimensions. For instance, the environmental pillar has resource use, emissions, and innovation categories. Social pillar categories include workforce, human rights, community, and product responsibility. The governance pillar consists of management, shareholders, and CSR strategy categories.

Measures

To measure SSCM controversies, I use three different indicators from the Sustainalytics database used by prior research (Tamayo-Torres et al., 2019). These three different indicators are first, controversies with stakeholders related to social incidents in the firm's supply chain, such as strikes in the suppliers' facilities, lack of labor standards, lack of safety standards throughout the supply chain, and child labor usage by the suppliers, second, the controversies that happen because of operations, product and service incidents, like lack of policies for the way suppliers, deal with waste management procedures, or air or water pollutions related to the productions in the supply chain, and third, the controversies related to environmental incidents in the supply chain of the focal firms and the environmental effects of their suppliers such as extraordinary emissions, and deforestation.

Controversies are public news stories based on problematic sustainability conduct collected from a vast variety of news, NGO reports, Human Rights Watch, trade unions, and many more associations (Aouadi & Marsat, 2018). To measure SSCM controversies, following Aouadi and Marsat, 2018, I use the raw values in the Sustainalytics database for each of the three indicators and construct a dummy variable (1 for the presence of any SSCM controversies, and 0 for firms with no controversies).

The measures for environmental, social, and governance sustainability indices were obtained using the scores in the Refinitiv database. Refinitiv computes more than 400 company-level ESG measures and selects a subset of 178 most relevant data points to strengthen the overall firm analysis and scoring process. Measures are based on data availability, materiality, and industry relevance. A mix of 10 categories makes the final score- a reflection of the firm's

sustainability performance based on publicly reported information. Firms with more incidents and controversies in their supply chain get lower values in the Sustainalytics database.

R&D Investment is calculated using Compustat data as the ratio of R&D to sales (Servaes & Tamayo, 2013). Advertising Investment is measured using Compustat data as the ratio of advertising to sales (Servaes & Tamayo, 2013).

Following Keats and Hitt (1988), I use the industry's sales volatility to measure environmental turbulence. I measure the sales volatility of each four-digit SIC industry by calculating the total sales of each industry and then regressing the natural logarithm of that value against an index variable of years for a five-year window of [t,t-4]. Then the antilog of the standard error of the regression coefficient is used for measuring the volatility in sales for the industry of each firm in our sample. Since environmental turbulence and turbulence refer to volatility and difficulty of a firm in predicting changes in the environment (Keats & Hitt, 1988), the standard error of the regression coefficient can give us an estimation of the level of difficulty to predict the rate of improvement in sales for the industry to which a firm belongs. I measure firm size using the log of the number of employees in millions. Table 3 and Table 4 show the summary statistics and correlation matrix and the significance and magnitude of the variables of the study respectively.

>>>Insert Table 3 here<<<

>>>Insert Table 4 here<<<

Firm Performance is measured using Tobin's Q ratio (Aouadi & Marsat, 2018; Bharadwaj et al., 1999; Servaes & Tamayo, 2013). Based on Chung & Pruitt (1994) measure of Tobin's Q, Q

= (market value of equity + book value of inventories + liquidating value of preferred stock + long-term debt + net short-term debt) / total assets. Net short-term debt is measured as the difference between current assets and current liabilities.

Model Specifications

SSCM Controversies and Sustainability Practices

To evaluate the interdependencies between our independent variables I studied their interactions (Brynjolfsson, 2012). I added size as the firm-level control based on the literature (Aouadi & Marsat, 2018; Soytas et al., 2019). I also control for year-fixed effects and firm and industry fixed effects with firm, industry (using initial industry categories of SIC), and year dummy variables.

Garcia-Castro et al., 2010 and Soytas et al. (2019) relate the contradictory results of studies on sustainability to endogeneity issues and they suggest ways to deal with this issue. I lag the controversies variable in our research to reduce the bias resulting from endogeneity (Garcia-Castro et al., 2010; Luo and Bhattacharya, 2006). I use Akaike (1974) information criterion and (Schwarz, 1978) Bayesian information criterion as measures of model fit. These two information criteria help us to compare models with different lags. In general, the model with a smaller Akaike information criterion (AIC) fits the data better than the one with a larger AIC. As with the AIC, a smaller Bayesian information criterion (BIC) shows a better-fitting model. The AIC and BIC for the 5-year lag between SSCM controversies and sustainability practices are the smallest and show a better fit than any other lag smaller than that between these two variables. This is in line with Tamayo-Torres et al., 2019 suggestion of analyzing the impact of SSCM controversies on different

dimensions of sustainability practices over long periods to compensate for the costs related to social or governance programs longer than 3 to 5 years. Other researchers lagged controversies by two years (Hart and Ahuja 1996; Callan and Thomas 2009) and suggested lagging controversies by more than two years (Tamayo-Torres, 2019). The lag between independent and dependent variables will reduce the chance of bias as the consequence of reverse causality and endogeneity (Luo & Bhattacharya, 2006; Rust et al., 2002; Tamayo-Torres et al., 2019). Equation 1 has all the direct effects and two-way interactions to test our hypotheses 1 to 3 and is as follows, with subscripts $i, j, and\ t$ representing firm, industry, and year, respectively:

$$Sustainability_{\ i,j,t} = \beta_0 + \beta_1 Controversies_{i,j,t-5} + \beta_2\ Advertising_{i,j,t-5} + \beta_3 R\&D_{i,j,t-5} + \beta_4\ Controversies_{i,t-5} * Advertising_{i,t-5} + \beta_5 Controversies_{i,t-5} * R\&D_{i,j,t-5} + \beta_6\ Size_{i,j,t-5} + \alpha_i + \alpha_j + \alpha_t + e_{i,t} \quad (1)$$

Estimation

First, I standardize all the variables of the model before making the interaction terms to minimize possible multicollinearity (Aiken and West, 1991; Cohen et al., 2003). Because I use panel data, I test for heteroskedasticity and autocorrelation. The modified Wald test for heteroskedasticity in the fixed effect regression model shows the presence of heteroskedasticity ($P<0.001$). Heteroskedasticity-consistent standard errors are used to allow the fitting of a model that does contain heteroskedastic residuals. According to the diagnostics tests, I use Huber/White/sandwich estimator to make sure that the standard errors are based on the robust variance estimators and correct this issue in the model.

I use a series of regression equations to test the impact of sustainability practices as the dependent variable and report the results in Table 5. Model 1 includes the main effects of SSCM

controversies, advertising, and R&D on environmental, social, and governance sustainability. Model 2 includes the hypothesized two-way interactions between resource investments and SSCM controversies.

Split-Sample Analysis

I observed the currently available sample for a high or low level of environmental turbulence to study the moderating effect of advertising and R&D investments on the relationship between SSCM controversies and each dimension of sustainability. For instance, I can study the influence of the level of environmental turbulence in the firm industry on a condition when the two-way interaction between controversies and advertising is positively or negatively related to governance, social, or environmental sustainability practices. Imagine a scenario where the interaction between SSCM controversies and advertising is positive for any level of controversies, and the magnitude of this positive interaction would be significantly larger with an increase in the environmental turbulence of the industry in which the firm works in it; or a situation in which the interaction between SSCM controversies and advertising is positive with low levels of environmental dynamism, and negative in environments with high turbulence, with significant difference between these two-way interactions for the both high or low level of controversies. These situations are where a split-sample analysis would help to observe everything better and more clearly.

Model 3 is the analysis of the firms in low turbulent industry environments. I used model 4 to analyze the firms with high levels of turbulence in their industry environment. I split the sample based on the median of the environmental turbulence. All the firms within a situation with

environmental turbulence higher than the median of the values of the environmental turbulence are categorized as firms with high environmental turbulence. Other firms that work in industries with turbulence below the median are grouped as low-environmental turbulence firms.

Using this model, I could compare the coefficients of all the two-way interactions in a situation when the firms are in low or high levels of industry environmental turbulence and these comparisons are shown in models 3 and 4.

>>>Insert Table 5 here<<<

Sustainability Practices and Firm Performance

To evaluate the relationship between SSCM controversies and sustainability and the moderating effect of environmental turbulence on this relationship I used OLS regression for testing this effect on each separate dimension of sustainability. I add size as the firm-level control based on the literature (Aouadi & Marsat, 2018; Soytas et al., 2019). I also control for year-fixed effects and firm and industry fixed effects with firm, industry (using initial industry categories of SIC), and year dummy variables.

Soytas et al., (2019) suggest having a lag between the predictors and the target variable to alleviate endogeneity issues which results in contradictory results in studies on sustainability. I lag the controversies variable in our research to reduce the bias resulting from endogeneity (Garcia-Castro et al., 2010; Luo and Bhattacharya, 2006). I use Akaike's (1974) information criterion and Schwarz's (1978) Bayesian information criterion as measures of model fit. These two information criteria help us to compare models with different lags. In general, the model with a smaller AIC fits the data better than the one with a larger AIC. As with the AIC, a smaller BIC shows a better-

fitting model. The AIC and BIC for the 5-year lag between SSCM controversies and sustainability practices are the smallest and show a better fit than any other lag smaller than that between these two variables. This is in line with Tamayo-Torres et al., 2019 suggestion of analyzing the impact of SSCM controversies on different dimensions of sustainability practices over long periods to compensate for the costs related to social or governance programs longer than 3 to 5 years. Other researchers lagged controversies by two years (Hart and Ahuja 1996; Callan and Thomas 2009) and suggested lagging controversies by more than two years (Tamayo-Torres, 2019). The lag between independent and dependent variables will reduce the chance of bias as the consequence of reverse causality and endogeneity (Tamayo-Torres, 2019; Luo and Bhattacharya 2006; Rust, Moorman, and Dickson 2002).

In the first step, I test the direct effect of SSCM controversies on governance sustainability practices in the presence of environmental turbulence as a moderator. Equation 2 shows this relationship and is as follows, with subscripts $i, j, and\ t$ representing firm, industry, and year, respectively:

$$Governance\ Sustainability_{\ i,j,t} = \beta_0 + \beta_1 Controversies_{i,j,t-5} + \beta_2 Environmental\ Turbulence_{i,j,t-5} + \beta_3\ Controversies_{i,t-5} * Environmental\ Turbulence_{i,j,t-5} + \beta_4\ Size_{i,j,t-5} + \alpha_i + \alpha_j + \alpha_t + e_{i,t} \quad (2)$$

In the second step, I test the direct effect of SSCM controversies on social sustainability practices in the presence of environmental turbulence as a moderator. Equation 3 is as follows, with subscripts $i, j, and\ t$ representing firm, industry, and year, respectively:

$$Social\ Sustainability_{\ i,j,t} = \beta_0 + \beta_1 Controversies_{i,j,t-5} + \beta_2 Environmental\ Turbulence_{i,j,t-5} + \beta_3\ Controversies_{i,t-5} * Environmental\ Turbulence_{i,j,t-5} + \beta_4\ Size_{i,j,t-5} + \alpha_i + \alpha_j + \alpha_t + e_{i,t} \quad (3)$$

In the last step, I test the direct effect of SSCM controversies on environmental sustainability practices in the presence of environmental turbulence as a moderator. Equation 4 is as follows, with subscripts $i, j, and\ t$ representing firm, industry, and year, respectively:

$$Environemntal\ Sustainability_{\ i,j,t} = \beta_0 + \beta_1 Controversies_{i,j,t-5} + \beta_2 Environmental\ Turbulence_{i,j,t-5} + \beta_3\ Controversies_{i,t-5} * Environmental\ Turbulence_{i,j,t-5} + \beta_4\ Size_{i,j,t-5} + \alpha_i + \alpha_j + \alpha_t + e_{i,t} \quad (4)$$

To study the indirect relationship between SSCM controversies and firm financial performance, I also test the direct effect of sustainability practices on firm performance. I use OLS regression for testing this effect on each separate dimension of sustainability. I added size as the firm-level control based on the literature (Aouadi & Marsat, 2018; Soytas et al., 2019). I also control for year-fixed effects and firm and industry fixed effects with firm, industry (using initial industry categories of SIC), and year dummy variables. Equation 5 shows this relationship and is as follows, with subscripts $i, j, and\ t$ representing firm, industry, and year, respectively.

$$TBQ_{i,j,t} = \beta_0 + \beta_1 Governance\ Sustainability_{i,j,t-1} + \beta_2 Environmental\ Turbulence_{i,j,t-1} + \beta_3\ Governance\ Sustainability_{i,j,t-1} * Environmental\ Turbulence_{i,j,t-1} + \beta_4 SSCM\ Controversies_{i,j,t-6} + \beta_5\ Size_{i,j,t-1} + \alpha_i + \alpha_j + \alpha_t + e_{i,t} \quad (5)$$

In the following, I test the direct effect of social sustainability practices on the firm's performance in the presence of environmental turbulence as a moderator. Equation 6 is as follows, with subscripts $i, j, and\ t$ representing firm, industry, and year, respectively.

$$TBQ_{i,j,t} = \beta_0 + \beta_1 Social\ sustainability_{i,j,t-1} + \beta_2 Environmental\ Turbulence_{i,j,t-1} + \beta_3\ Social\ sustainability_{i,j,t-1} * Environmental\ Turbulence_{i,j,t-1} + \beta_4 SSCM\ Controversies_{i,j,t-6} + \beta_5\ Size_{i,j,t-1} + \alpha_i + \alpha_j + \alpha_t + e_{i,t} \quad (6)$$

In the next step, I test the direct effect of environmental sustainability practices on the firm's performance in the presence of environmental turbulence as a moderator. Equation 7 shows

this relationship and is as follows, with subscripts $i, j, and\ t$ representing firm, industry, and year, respectively. I report the results of these analyses in Table 6.

$$TBQ_{i,j,t} = \beta_0 + \beta_1 Environmental\ sustainability_{i,j,t-1} + \beta_2 Environmental\ Turbulence_{i,j,t-1} + \beta_3\ Environmental\ sustainability_{i,j,t-1} * Environmental\ Turbulence_{i,j,t-1} + \beta_4 SSCM\ Controversies_{i,j,t-6} + \beta_5\ Size_{i,j,t-1} + \alpha_i + \alpha_j + \alpha_t + e_{i,t} \quad (7)$$

>>>Insert Table 6 here<<<

In the upcoming chapter, I present the findings from our analysis regarding the direct and indirect effect of SSCM controversies on sustainability practices in both stable and turbulent industry environments, as well as the effects of such controversies on a firm's performance.

CHAPTER 5: RESULTS

The current chapter presents the results of the analysis conducted for both parts of this dissertation. I begin by discussing our findings related to the correlation between SSCM controversies and sustainability practices, and then proceed to discuss the findings regarding the influence of both SSCM controversies and sustainability practices on firm performance.

The Effect of SSCM Controversies on Sustainability Practices

Direct Effect

As seen in Table 5, our findings show a positive and significant relationship between SSCM controversies and social sustainability practices ($\beta = 0.052$, $p = 0.01$), and a positive and significant relationship between SSCM controversies and environmental sustainability practices ($\beta = 0.056$, $p = 0.001$). There is also a positive relationship between SSCM controversies and the governance dimension of sustainability practices ($\beta = 0.054$, $p = 0.05$). Thus, the results support Hypotheses H1a, H1b, and H1c. Our findings are in line with the findings of the previous study (Tamayo-Torres et al., 2019) for all three dimensions of sustainability.

>>>Insert Table 5 here<<<

Moderating Effects

The effect of advertising on the relationship between SSCM controversies and social sustainability practices is positive and significant ($\beta = 0.024$, $p = 0.05$) and supports our second hypothesis (H2) for the social dimension of sustainability. This moderating effect is also positive and significant for the relationship between SSCM controversies and environmental sustainability practices ($\beta = 0.038$, $p = 0.05$) hence, supporting the second hypothesis (H2) for the environmental dimension of sustainability practices. The data show that advertising investments have a negative moderating effect on the relationship between SSCM controversies and governance sustainability practices, but this effect is not significant at the 0.1 level.

Our data do not indicate any significant positive effect of R&D on the relationship between SSCM controversies and governance and social sustainability practices, but this moderating effect is positive and significant for the relationship between SSCM controversies and the environmental

dimension of sustainability practices (β = .088, p =0.1), and supports hypothesis 3 for the environmental sustainability.

Low level of Environmental Turbulence (Stable Environment)

Our findings show a positive and significant relationship between SSCM controversies and social sustainability practices (β = 0.063, p =0.001), and a positive and significant relationship between SSCM controversies and environmental sustainability practices (β = 0.077, p =0.05) for the firms in industries with low levels of environmental turbulence. There is also a positive relationship between SSCM controversies that happen for the firms in stable industry environments and the governance dimension of sustainability practices (β = 0.012) but this effect is not significant at the 0.1 level.

The effect of advertising on the relationship between SSCM controversies and governance sustainability practices is not significant for firms in stable industry environments. This moderating effect is positive and significant for the relationship between SSCM controversies and social sustainability practices for firms in a stable environment (β = 0.029, p =0.1). The data show that advertising investments have a negative moderating effect on the relationship between SSCM controversies and environmental sustainability practices for these firms, but this effect is not significant at the 0.1 level.

Investment in R&D does not have any moderating effect on the relationship between SSCM controversies and governance, social, and environmental sustainability for firms in stable industry environments.

High level of Environmental Turbulence (Turbulent Environment)

Our findings show a positive and significant relationship between SSCM controversies and social sustainability practices ($\beta = 0.172$, $p = 0.001$), and a negative and significant relationship between SSCM controversies and environmental sustainability practices ($\beta = -.312$, $p = 0.05$) for the firms in industries with high levels of environmental turbulence. There is also a negative relationship between SSCM controversies that happen for the firms in turbulent industry environments and the governance dimension of sustainability practices ($\beta = -0.276$) but this effect is not significant at the 0.1 level.

The effect of advertising on the relationship between SSCM controversies, governance, and social sustainability practices is negative for the firms in a turbulent environment, with only one significant effect on the social dimension ($\beta = -0.026$, $p = 0.1$).Thus H4 is supported only for social sustainability.

The effect of R&D on the relationship between SSCM controversies and social sustainability practices is not significant for firms in turbulent industry environments. This moderating effect is positive and significant for the relationship between SSCM controversies and governance sustainability practices for firms in a turbulent environment ($\beta = 1.165$, $p = 0.001$) supporting hypothesis 5 for governance sustainability practices. The data show that R&D investments have a positive and significant moderating effect on the relationship between SSCM controversies and environmental sustainability practices for these firms ($\beta = 0.683$, $p = 0.05$).Thus, H5 is supported for this dimension of sustainability.

Tables 5a, 5b, and 5c present the results of the main analysis in this research for governance, social, and environmental sustainability respectively, utilizing OLS estimation within Stata 17. I use a series of regressions to test the effect on each dimension of sustainability as dependent variables (Models I to IV) considering the firm, industry, and time-fixed effects using

dummy variables. Model I includes the main effects of SSCM controversies, R&D, and advertising. Model II includes the two-way interactions between SSCM controversies and investments in advertising and R&D and is used to test hypotheses 2 and 3 of this study. I conduct the split-sample analysis to study the firms in stable environments (model III) and firms in turbulent environments (model IV) and used the environmental turbulence median to split the sample.

After testing the significance of the differences in stable and turbulent environments, our findings show that the moderating effect of advertising on the relationship between SSCM controversies and social sustainability practices is significantly different for stable and turbulent environments (*p-value* = 0.0173).

For a better interpretation of the two-way interactions in stable and turbulent environments, I use interaction plots. The effects of the interactions could be compared to each other for low and high turbulence in the industry environment. The interaction between SSCM controversies and advertising has a significant and positive effect in stable environments ($\beta = 0.029$, $p = 0.1$), but a significant and negative effect in a turbulent environment, and as mentioned above this difference is significant with p-value = 0.0173.

Moreover, although not hypothesized in our study, it is interesting to mention that our results show the effect of SSCM controversies on environmental sustainability practices is different in different environments. As depicted in Figure 6, this relationship is positive and significant for firms that work in a stable environment ($\beta = 0.077$, $p = 0.05$), and negative and significant for a turbulent environment ($\beta = -0.312$, $p = 0.05$) but this difference is not significant.

>>>**Insert Figure 6 here**<<<

Furthermore, our results show that the magnitude of the positive effect of SSCM controversies on social sustainability practices is significantly different (P-Value = 0.0142) in different environments. As shown in Figure 7, this relationship is positive and significant for firms that work in a stable environment (β = 0.063, p =0.001), and again positive and significant but bigger for a turbulent environment (β = 0.172, p =0.001).

>>>**Insert Figure 7 here**<<<

The Effect of SSCM Controversies on Performance

As depicted in Table 6, our results in this model show a significant positive effect of SSCM controversies on governance sustainability practices ($\beta_1 = 1.644, p < 0.1$). Also, although environmental turbulence itself has a negative and significant effect on the governance dimension of sustainability ($\beta_2 = -3.564. p < 0.001$), there is no significant effect of the interaction of controversies and environmental turbulence, or in other words, the moderating effect of environmental turbulence in this relationship.

>>>**Insert Table 6 here**<<<

Our results also show a positive and significant effect of SSCM controversies on future social sustainability practices ($\beta_1 = 1.309, p < 0.1$). Also, like the previous model, although environmental turbulence itself has a negative and significant effect on the governance dimension of sustainability ($\beta_2 = -4.613. p < 0.001$), there is no significant effect of the interaction of

controversies and environmental turbulence. In the other words, the moderating effect of environmental turbulence in this relationship is not supported.

I find a positive and significant effect of SSCM controversies on future environmental sustainability practices ($\beta_1 = 0.371, p < 0.1$). The direct effect of environmental turbulence on environmental sustainability practices is negative and significant ($\beta_2 = -3.791. p < 0.001$). The moderating effect of environmental turbulence on the relationship between SSCM controversies and environmental sustainability practices is significant and negative ($\beta_3 = -0.314, p < 0.01$). This result shows that although SSCM controversies have positive effects on the movement towards better environmental sustainability practices, this positive effect would be lower in a turbulent environment or could even flip as the environmental turbulence increases. Thus, H7 is supported for environmental sustainability practices. As also mentioned for the other equations with interactions in this study, to minimize the potential impact of collinearity that could occur due to the inclusion of interaction terms, I adjusted the variables by centering them around their mean value.

A positive and significant effect of governance sustainability practices on performance ($\beta_1 = 0.925, p < 0.001$) is shown in the results. Moreover, the moderating effect of environmental turbulence on the relationship between governance sustainability practices and a firm's financial performance is significant but negative ($\beta_3 = -0.041, p < 0.001$). This result shows that although governance sustainability practices have positive effects on better financial performance, this positive effect would be lower in a turbulent environment. Thus, H9 is supported for governance sustainability practices.

Our results show a positive and significant effect of social sustainability practices on performance ($\beta_1 = 1.040, p < 0.001$). The moderating effect of environmental turbulence on the

relationship between social sustainability practices and a firm's financial performance is significant and negative ($\beta_3 = -0.041, p < 0.001$). This result shows that although social sustainability practices have positive effects on better financial performance, this positive effect would be lower in a turbulent environment. Thus, H9 is supported for social sustainability practices.

The results also show a positive and significant effect of environmental sustainability practices on performance ($\beta_1 = 1.549, p < 0.01$). The moderating effect of environmental turbulence on the relationship between environmental sustainability practices and a firm's financial performance is significant and negative ($\beta_3 = -1.052, p < 0.001$). This result shows that although environmental sustainability practices have positive effects on better financial performance, this positive effect would be lower in a turbulent environment. Thus, H9 is also supported for environmental sustainability practices. I mean-centered the variables to reduce any potential collinearity from the introduction of interaction terms. The results using fixed effect panel regression are shown in Table 6.

Additional Analysis

To further study the effect of controversies on sustainability practices at different levels of SSCM controversies I fixed Environmental Turbulence at the 10th percentile (low), 50th percentile (medium), and 90th percentile (high), and used a bootstrap method to analyze this relationship. Given equation 8, I can write equation 9 which is the partial derivative of it to estimate the effect of SSCM controversies on different dimensions of sustainability practices.

$$Sustainability_{\ i,j,t} = \beta_0 + \beta_1 SSCM\ Controversies_{i,j,t-5} + \beta_2\ Advertising_{i,j,t-5} + \beta_3 R\&D_{i,j,t-5} + \beta_4\ Environmental\ Turbulence + \beta_5 SSCM\ Controversies_{i,t-5} * Environmental\ Turbulence + \beta_6\ Size_{i,j,t-5} + \alpha_i + \alpha_j + \alpha_t + e_{i,t} \quad (8)$$

I write the following partial derivative to estimate the effect of SSCM controversies on different dimensions of sustainability practices.

$$\frac{\partial\ Sustainability}{\partial\ Controversies} = \widehat{\beta_1} + \widehat{\beta_4} Environmental\ Turbulence \quad (9)$$

Where $\widehat{\beta_1}$ shows the direct effect of controversies on sustainability practices. Moreover, I expect that SSCM controversies to have an indirect impact on sustainability practices ($\widehat{\beta_4}$), depending on the level of environmental turbulence in the industry. To further evaluate these effects, I estimated the impact of SSCM controversies on sustainability practices at various percentiles of turbulence (i.e., 90th, 50th, and 10th), where lower percentiles represent less turbulent industry environments. I computed standard errors using the bootstrapping method from Efron (1979) which involves resampling the data to generate a large number of bootstrap samples, estimating the effect sizes for each sample, and then computing the standard errors based on the distribution of the estimates. The estimates and their standard errors were then used to compute the p-values and determine the significance levels of the results. Table 7 depicts the influence of SSCM controversies on sustainability practices.

>>>Insert Table 7 here<<<

As the results indicate, environmental turbulence negatively moderates the relationship between SSCM Controversies and governance and environmental sustainability practices. In other words, firms have less motive in implementing governance and environmental sustainability practices after facing incidents in their supply chains and controversies if they belong to a turbulent

industry environment. Also, firms in stable environments would get a higher positive impact from the shock they experienced after facing SSCM controversies on their environmental sustainability practices. Although SSCM controversies will have positive effects on social sustainability in both stable and turbulent environments, the magnitude of this positive effect is higher for firms in stable environments. These results confirm that firms need to be aware of the potential impact of SSCM controversies on sustainability practices and that they should consider the level of environmental turbulence when designing their reactive or proactive SSCM strategies.

I also tested our model for potential reverse causality effects. To explore the presence of any causality effect in our findings in this research, I used the Granger causality test (Granger,1969). The results show a pattern of results that is in line with the view that SSCM controversies Granger-causes sustainability practices, rather than the other way around. For example, I find a significant and positive impact of the SSCM controversies that happened between the company and its stakeholders 5 years ago on governance (0.08, $p < 0.05$), social(0.06, $p < 0.01$), and environmental (0.06, $p < 0.01$) sustainability practices, whereas 5-year-lagged sustainability practices show no significant impact on SSCM controversies.

In addition to the above analysis, I also conducted some supplementary tests and used alternative measures and methods. The additional checks also demonstrated the robustness of the results in the main analysis.

In the main analysis, I used a fixed-effects model. I control for year-fixed effects and firm and industry fixed effects with firm, industry (using initial industry categories of SIC), and year dummy variables. Garcia-Castro et al., 2010 and Soytas et al., 2019 relate the contradictory results of studies on sustainability to endogeneity issues and they suggest ways to deal with this issue. I lag the controversies variable in our research to reduce the bias resulting from endogeneity (Garcia-

Castro et al., 2010; Luo and Bhattacharya, 2006). By using firm and industry fixed effects I control for the time-invariant and unobservable heterogeneity among the firms and industries in the sample. Moreover, I used year dummy variables to control for big shocks and trends in the economy in all models. As another robustness check, I also estimated all models controlling for random effects and the results were structurally identical.

Alternative Measures of Firm Performance

This part of our study aims to increase the accuracy of our findings. I do this by considering two other measures of a company's market value besides the used Tobin's Q formula. By using these alternative measures, I want to confirm if my results remain consistent regardless of the valuation method used. The first measure I use is the alternative Q ratio, which was used by Aouadi & Marsat (2018). The second measure I use is the market-to-book ratio, which is commonly used as a substitute for Tobin's Q (Aouadi & Marsat, 2018; Edmans, 2011).

I perform the analysis again for Model IV in Table 6, but this time I use the alternative Q ratio (Model A) and market-to-book ratio (Model B) as the dependent variables. I present the outcomes of this analysis in Table 8. The outcomes of our study are consistent regardless of whether I use the new Tobin’s Q or market-to-book ratio as the dependent variables for market valuation proxies. In other words, both measures yield the same results.

>>>Insert Table 8 here<<<

After reviewing the results of the analyses presented in this chapter, I will delve further into the managerial implications in the concluding chapter of this dissertation. By presenting various examples of real-world cases and industries, our aim is to assist managers in devising effective SSCM strategies and gaining a better comprehension of the role that sustainability and different organizational resources play in the supply chain.

CHAPTER 6: DISCUSSION AND IMPLICATIONS

The present dissertation is a research study on the impact of SSCM controversies on different dimensions of sustainability practices and firm performance. I find that SSCM controversies have different impacts on sustainability and firm performance in the presence of different strategic resources and environmental conditions. This study identifies R&D and advertising as two strategic resources that affect the relationship between SSCM controversies and sustainability practices differently. Our findings also suggest that in a turbulent environment, firms should focus on value-creating resources such as R&D to improve governance and environmental sustainability practices, while in a stable environment, firms should focus on value-appropriating resources such as advertising to improve social sustainability practices. I conclude that only a substantive reaction to SSCM controversies can reduce stakeholder concerns and rebuild reputation and trust. Finally, I report a positive and significant interaction effect between SSCM controversies and R&D investments on governance and environmental sustainability in a turbulent environment and a negative interaction effect between SSCM controversies and advertising on the social dimension of sustainability in a turbulent environment, while the effect of this interaction is positive and significant on social sustainability.

Our findings in the present research advance the few previous research studies in the literature that examine the effect of controversies throughout the supply chain and their influence on the sustainability and performance of the firm. The impacts of controversies on sustainability practices and firm performance have generally been considered only through direct effects, and the contradictory results show the need to study the role of other organizational and contextual variables. This study confirms the previous findings and the positive relationship between SSCM controversies and future sustainability practices. The need to study this interesting relationship thoroughly has led to calls for examining the intertwined relationships among SSCM controversies, some of the important organizational resources, and environmental uncertainty. Specifically, I show that the effect of SSCM controversies on sustainability practices would be different in the presence of R&D and advertising as two different organizational resources studied well in the strategic management literature and conceptualized in value-creating and value-appropriating capabilities respectively (Mizik & Jacobson, 2003). Our findings contribute to these arguments by proposing and empirically showing that SSCM controversies have different impacts on sustainability and firm performance in the presence of different strategic resources and different environmental conditions.

The Impact of SSCM Controversies on Sustainability for firms in Turbulent Environments Role of R&D (Alcoholic Beverage & Automotive Industries)

Consistent with our expectations, the results show the interaction between SSCM controversies and R&D on governance sustainability practices has a positive significant effect in a turbulent environment and no significant effect on this dimension of sustainability in a stable environment. Moreover, the interaction between SSCM controversies and R&D has a positive

significant effect on environmental sustainability in turbulent environments. Furthermore, the results show the interaction between SSCM controversies and advertising on social sustainability practices has a positive significant effect in a stable environment and no significant effect on this dimension of sustainability in a turbulent industry environment. Our theoretical development explains the effect of environmental turbulence on the interaction of SSCM controversies with R&D and advertising in influencing sustainability practices. For instance, in turbulent environments, if the company faces controversies throughout its supply chain, additional R&D investment would be beneficial because R&D and its value-creating effects would be an important asset for the firm to move towards better governance and environmental sustainability practices. Moreover, in a stable environment, if the company faces SSCM controversies, additional advertising would be beneficial because advertising and its value-appropriating effects would be helpful for the firm to move towards better social sustainability practices. As managers are more aware of the effect of each of these resources on the relationship between SSCM controversies and each dimension of sustainability, they could prioritize their reactive strategies for responding to the controversies with stakeholders based on the predicted results on each dimension based on their needs and the industry they are active in it. Alcoholic drink companies that once were experiencing a stable industry environment are dealing with a turbulent market environment in recent years. Packaging and bundling innovations needed for responding to different customers with different tastes and budgets, various alcohol content beverages, introducing products specific to women, and customers with different religions and many other factors have made this industry environment turbulent. This is a big industry with a promising future that even during the COVID-19 period and the global economic slump had positive financial trends, and its market was equal to 515.2 billion USD in 2019. The industry is highly competitive and constantly evolving due to

changing consumer preferences, government regulations, and social and cultural trends. Additionally, there has been growing scrutiny of the industry's environmental and social impact, which has led to more SSCM controversies and increased pressure from stakeholders to adopt more sustainable practices. All these factors contribute to an overall environment of uncertainty and volatility, which makes it difficult for companies in the alcoholic beverage industry to predict and respond to changes in the market. Besides providing tasty and flavorful products to market, alcoholic drink companies grow their needed crops themselves or buy them from suppliers located all around the world. Suppose stakeholders are informed by the news that the activities of one of the big multinational alcoholic drink companies with many suppliers in South America and East Europe resulted in deforestation, or since the process of making alcoholic drinks needs water to be used in heating and cooling systems, records show its supplier contaminated the water in an area. For example, in 2017, Diageo, currently the fourth largest company in the alcoholic beverages industry, faced SSCM controversies related to human rights abuses and environmental damage at its sugarcane plantations in Latin America. The company was accused of providing bad working conditions for sugarcane workers and as well as creating land and water pollution.

After the media coverage of these incidents, controversies among stakeholders are expected. According to the findings, these controversies would motivate the firms to consider sustainability in their operations more than before and would have a positive effect on the sustainability practices of the firm in the future. Our findings help the manager of this multinational corporation and others in the same situation and give a guideline to them to focus on specific organizational resources. According to our findings, the effect of R&D on the relationship between SSCM controversies and governance and environmental sustainability practices is positive and significant for firms in a turbulent environment, therefore the suggestion for the manager of the

alcoholic drink company would be to invest more in research and development activities and other similar value-creating resources to have better governance and environmental sustainability practices.

Since the effect of advertising on the relationship between SSCM controversies and social sustainability practices is negative for the firms in a turbulent environment, then, it would be wise not to focus merely on investments in value-appropriating resources like advertising. According to agenda-setting theory, reactions won't have a relieving influence on the way stakeholders think about the firm unless they are considerable and substantive (Walgrave & Van Aelst, 2006). Therefore, senior managers will add substantive actions to their commitments about sustainability after an incident because they are aware that stakeholders are observing their promises and are well-informed by huge media coverage about the incident and the reactions and commitments after it, and their company is in danger of facing lower financial performance. Only a substantive reaction Such as focusing more on value-creating activities like investing in research and development rather than value-appropriating organizational resources like advertising to convince the stakeholders that we are committed to change.

Our results indicate a very small and non-significant interaction effect between SSCM controversies and R&D investments on governance and environmental sustainability in a stable environment and a negative interaction effect between SSCM controversies and advertising on the social dimension of sustainability in a turbulent environment. These interactions may be interpreted as follows.

As mentioned earlier, lower environmental turbulence reduces the benefits of value creation. Since R&D enables value creation, high investments in this organizational resource would enhance the value-creating capabilities of the firm. R&D focuses on creating value by

developing new environmental-friendly products and new greener processes and operations and modern equipment. Sustainability could benefit from several of these activities, but if the company is performing in a stable environment and market where there is not much need for change and products do not change much, increasing R&D investments as a reactive strategy for companies facing SSCM controversies would result in wasting resources. Although the financial aspects of this way of using organizational resources are beyond the scope of this study at this point, it could be predicted that the marginal benefits from additional investment in R&D would not match the associated costs, leading to inefficient utilization of R&D and depressing financial performance of the firm.

Furthermore, as also mentioned earlier, value appropriation would be less beneficial in turbulent environments. Since investing in advertising enables value-appropriation, high investments in this organizational resource would enhance the value-appropriating capabilities of the firm. Advertising tries to appropriate value from existing products and identify the target segment of the products and the behavior of the aimed target. Therefore, it ameliorates the blackened image of the company among its potential customers and sends an appropriate message to buy to the potential buyers. Advertising would be a helpful asset for firms with SSCM controversies, but if used in a fast-changing market, the benefits obtained from it might lag behind the changes and therefore, the marginal benefits from additional investments in advertising would be lower than the associated costs, negatively influencing the financial performance.

One of the very important and big industries with a turbulent environment is the automotive industry. Auto manufacturers need to constantly advance their technologies not only in their operations and manufacturing facilities and systems but also in their products. Electric cars have been able to challenge the conventional car manufacturers and the success of Tesla as a pioneer

manufacturer of electric and autonomous cars forced big names in the industry to adapt themselves to these new trends and respond to the increasing demand for products that are equipped with these new and modern technologies. The high level of competition in the automotive industry makes changes inevitable for all the world-class firms in this industry and this trend has been developing what technological features consumers want in their cars. Moreover, the magnitude of the automotive industry makes it vulnerable to economic and political situations like recessions, natural disasters throughout the supply chain all around the world, wars, and governments' regulation and policy decisions. Therefore, while I can find periods of stability, the automotive industry environment is generally considered turbulent.

Volkswagen the current biggest auto manufacturer in the world is an example of a firm that works in a turbulent industry environment and experienced several sustainable supply chain management controversies in recent years. In 2015 VW auto-manufacturing group faced an emissions scandal related to cheatings in its emissions tests. The consequences of that scandal were not merely related to losses as huge as billions of dollars in the firm's revenue as the result of numerous fines. the incident highlighted sustainable supply chain management and the required practices for achieving its ethical goals. Moreover, it showed the importance of transparency in operations.

Volkswagen also faced sustainable supply chain management controversies related to sourcing conflict minerals needed in the manufacturing of its products. Using conflict minerals is one of the famous sources of SSCM controversies in the automotive industry. Minerals including gold, tantalum, tungsten, and tin have different usages in the production of vehicles specifically in manufacturing electronic components such as needed electronic boards, batteries, and sensors. These minerals could be sourced from groups and underground organizations that are human rights

abusers, or violence supporters. Therefore, implementing responsible sourcing policies is critical for automotive manufacturers to avoid sustainable supply chain management controversies with their stakeholders. Volkswagen's response to these controversies was to invest more in R&D to find alternative materials without the negative issues associated with conflict minerals by developing a comprehensive program. One of the achievements of this program was establishing closed-loop supply chain management strategies and using recycled tungsten to produce a new tungsten carbide, resulting in minimizing the need for new tungsten possibly sourced from areas of the world that are affected by conflicts. Moreover, by focusing and investing more in R&D, VW introduced the "Think Blue. Factory" environmental program. The focus of this holistic program was on restructuring the passenger car manufacturing facilities to be 25% more environmentally friendly by improving energy consumption rates and efficiency and reducing emissions. The eco-friendly use of resources in Volkswagen factories all around the world helped the big automotive manufacturer to receive the National Energy Globe Award. R&D had a leading role in reducing energy and water consumption, CO2 emissions, as well as waste in this German firm. For instance, identifying and implementing new energy consumption processes and technologies, such as energy-efficient lighting and heat recovery systems was not achievable without R&D. Besides, Volkswagen ameliorated its relationships with its suppliers and helped them become a more responsible source for the company by providing systems, processes, and technologies to them to improve working conditions throughout its supply chain, and reduce environmental impacts, resulting in transforming its suppliers to manufacturers that see sustainability and ethical standards as a priority.

According to our results in this dissertation, investing in R&D would be a good reaction for the top managers in firms that work in turbulent industry environments like the automotive

industry. The effect of R&D on the relationship between SSCM controversies and governance sustainability practices is positive and significant for firms in a turbulent environment. The data also show that R&D investments have a positive and significant moderating effect on the relationship between SSCM controversies and environmental sustainability practices for these firms. Therefore, based on the results of our study, VW's decision-makers chose the best strategy which was focusing on R&D and providing substantive reactions to those big environmental and social incidents and the worldwide controversies associated with them. Top managers in this company responded well to the sustainability concerns of their stakeholders and effectively tried to ameliorate the tarnished trust by substantive reactive strategies, as part of a greater policy to build up VW's reputation as a responsible firm.

The Impact of SSCM Controversies on Sustainability for firms in Stable Environments Role of Advertising (H&M and Nestle Cases)

In this section, I discuss the impact of SSCM controversies on sustainability for firms in stable environments and the role of advertising in addressing such issues. I provide real-world examples that show how companies, such as Nestle, H&M, Apple, and Unilever, have faced sustainability controversies and implemented various initiatives to address them, including the use of advertising. Finally, based on our findings, I describe the significance of advertising and its effectiveness as a tool to address SSCM controversies in stable industry environments.

As mentioned in the introduction chapter, Nestle, which is a big multinational name in the food and beverage industry, known for its stable environment, has faced SSCM controversies related to using child labor in its cocoa supply chain. Implementing the "Cocoa Plan" to improve the livelihoods of cocoa farmers and eliminate child labor was one of the reactive strategies.

Another big name in the list of our examples is Apple, which faced criticism for the working conditions in its supply chain located in China where Apple products are assembled. Apple used different strategies such as the Supplier Code of Conduct and Supplier Responsibility Report to address this issue. In chapter 1, I described the controversies that Unilever, which is a consumer goods company, experienced for deforestation in the palm oil industry. The company's response was to implement the Sustainable Palm Oil Sourcing Policy, which aims to eliminate deforestation from Unilever's palm oil supply chain. H&M, a famous fashion retailer, and another example of a firm that works in a stable industry environment has a history of SSCM controversies related to labor rights abuses such as low wages and poor working conditions in its supply chain.

In all these examples, those world-class firms faced criticisms, allegations, and controversies related to their supply chain practices. Their solutions to address these issues were to implement various initiatives to improve sustainability performance, engage with suppliers, and build trust with stakeholders. Reviewing these cases reveals that advertising has been always one of the main tools for their managers and has played a big role in dealing with SSCM controversies and all their associated hassles in stable industry environments. Using advertising firms could be able to communicate their commitment to sustainability in general, SSCM, and responsible supply chain practices, which can help build trust with stakeholders. The level of trust is even more important in some stable industries such as healthcare or insurance. When Nike faced SSCM controversies related to using of sweatshop labor and other labor practices in the 1990s, the company improved its labor conditions without hesitation and established the Fair Labor Association and its own comprehensive Code of Conduct. Besides that, Nike also did not neglect the important role of advertising and launched a marketing campaign called "Nike Better World" and started promoting its sustainability efforts, including improving labor conditions in its supply

chain. The "Water for Life" marketing campaign from Coca-Cola which the company launched after receiving criticisms for its water stewardship practices, particularly in water-scarce regions, to promote its water stewardship initiatives and improve water efficiency in its operations is another example of using advertising as a reactive strategy to incidents throughout the supply chain.

All these real-world cases illustrate how companies in stable industries have faced sustainability controversies and implemented reactive strategies, including the use of advertising to promote their sustainability efforts to address them. This is in line with our findings and supports the argument that advertising as a value-appropriating organizational resource can play an important role in dealing with SSCM controversies in stable industry environments, as it can make stakeholders aware of sustainability initiatives. According to our results in this dissertation, investing in advertising would be a good reaction for the top managers in firms that work in a stable industry environment like apparel companies. After testing the significance of the differences in stable and turbulent environments, our findings show that the moderating effect of advertising on the relationship between SSCM controversies and social sustainability practices is significantly different for stable and turbulent environments. The interaction between SSCM controversies and advertising has a significant and positive effect in stable environments, but a significant and negative effect in a turbulent environment, and as mentioned above this difference is significant with p-value = 0.0173.

H&M is another example of a firm in a stable industry environment that has used advertising to address its SSCM controversies and promote its sustainability practices. Launching the "Bring It On," marketing campaign to highlight the company's sustainability efforts throughout its supply chain was one of the many advertising tools used by this firm. The "Bring It On"

campaign included advertisements that illustrated the use of sustainable materials such as organic cotton and recycled polyester by the company and highlighted the company's efforts to reduce its environmental impact. Responsible sourcing efforts were also one of the focused advertising areas, providing information about improved working conditions and fair labor practices throughout the supply chain. H&M has also launched other marketing campaigns to promote its movements toward better sustainability practices. The "Conscious Collection" line of clothing made from sustainable materials, and the "Close the Loop" campaign, which encouraged consumers to recycle their old clothes and get generous discounts are among them.

Many other real-world examples demonstrate the importance of investing in advertising as a reactive strategy to address SSCM controversies. Nestle (as a company that works in a stable industry environment) has used advertising and launched various marketing campaigns as a tool to address SSCM controversies and promote its movement towards higher levels of sustainability practices. The company launched the "Choose Nestle Cocoa Plan" campaign, to promote Nestle's efforts to reduce child labor in its cocoa supply chain. The campaign had different social media advertisements, in-store promotions, and marketing materials. The company has also used advertising to promote its other sustainability practices, such as reductions in plastic waste and improve water stewardship. The "Nestle Pure Life - Less Plastic" campaign was one of them, which encourages consumers to reduce their plastic waste by using refillable water bottles.

In conclusion, SSCM controversies can occur in any industry. Firms in stable industry environments should implement substantive initiatives to address them, including the use of advertising as a tool to build trust with stakeholders and increase awareness of sustainability practices. This study found that advertising plays a significant role in dealing with SSCM controversies in stable industry environments, where it has a positive effect on the relationship

between SSCM controversies and social sustainability practices. The examples of H&M and Nestle show how advertising can be used as a reactive strategy to incidents throughout supply chains. Companies in stable industries, such as apparel companies, should invest in advertising to address SSCM controversies and promote their sustainability initiatives.

The effect of SSCM controversies and environmental turbulence on sustainability practices and financial performance

In this section of chapter 6, I investigate the effect of SSCM controversies and environmental turbulence on the sustainability practices and financial performance of firms. Our results show that SSCM controversies have a positive effect on governance, social, and environmental sustainability practices, indicating that firms are more likely to move towards and engage in sustainability after being faced with SSCM controversies. However, environmental turbulence has a negative effect on sustainability practices, implying that firms that work in turbulent industry environments may have difficulties implementing sustainability practices.

Regarding the moderating effect of environmental turbulence, our results in this dissertation indicate that the negative effect of environmental turbulence on governance and social sustainability practices is not significantly affected by SSCM controversies. However, the moderating effect of environmental turbulence on the relationship between SSCM controversies and future environmental sustainability practices is significant and negative, meaning that the positive effect of SSCM controversies on environmental sustainability practices is reduced in turbulent environments.

Furthermore, the results of this study show that governance, social, and environmental sustainability practices have a positive effect on financial performance, indicating that firms that engage in sustainable practices are more likely to have better financial performance. However, the moderating effect of environmental turbulence on the relationship between sustainability practices and financial performance is significant and negative, suggesting that the positive effect of sustainability practices on financial performance is reduced in turbulent industry environments.

The findings of the present study have important implications for both researchers and practitioners:

- In line with the literature in the field, our study highlights the importance of SSCM controversies in increasing sustainability practices among firms. Policymakers and practitioners can use the controversies related to Supply Chain Sustainability Management (SSCM) as a tool to encourage firms to engage in sustainability practices. SSCM controversies may include issues such as social and environmental concerns related to the supply chain, ethical concerns about the sourcing of raw materials, labor practices, and human rights abuses. By highlighting these controversies including social and environmental concerns related to the supply chain, ethical concerns about the sourcing of raw materials, labor practices, and human rights abuses, policymakers and practitioners can create awareness among firms and motivate them to move towards higher sustainability levels or persuade them by implementing regulations, guidelines, and standards that encourage sustainable supply chain practices to improve their reputation, meet stakeholders' expectations, and comply with regulatory requirements. They can help firms comprehend the importance of sustainability not only in the core company but also

throughout their supply chain and encourage them to implement more sustainability practices in their supply chains all around the world.

Moreover, by helping to reduce the environmental turbulence, policymakers and governments could enable firms to achieve better sustainability practices and financial performance.

The present dissertation also found that environmental turbulence has a negative impact on the governance dimension of sustainability, and its moderating effect on the relationship between sustainability practices and financial performance is significant and negative. This implies that firms need to be aware of the impact of environmental turbulence on their sustainability practices and financial performance.

- The results of this dissertation emphasize the challenges that firms face in implementing sustainability practices in turbulent environments. Firms and policymakers need to consider these challenges when facilitating, developing, and implementing sustainability strategies.
- The present study highlights the positive impact of sustainability practices on financial performance, indicating that sustainability practices should not be viewed as a cost but as an investment that can contribute to the long-term financial success of firms.
- The results of the present study also show that although sustainability practices have positive effects on better financial performance, the positive effect would be lower in a turbulent environment. This implies that firms, governments, and policymakers need to develop strategies that help to reduce environmental

turbulence to maintain their sustainability practices and financial performance. This also suggests that firms operating in turbulent environments need to be more proactive in their sustainability practices to mitigate the negative impact of environmental turbulence on their financial performance.

One example of a real-world case that aligns with these results is Nike's sustainability efforts. Nike has faced several SSCM controversies in the past, including accusations of sweatshop labor and environmental degradation caused by its manufacturing practices. Nike's response was to implement various sustainability initiatives, including the development of more sustainable materials and manufacturing processes and a commitment to renewable energy.

After facing these SSCM controversies, the company made significant progress in improving its sustainability performance. Nike has been able to reduce its carbon emissions by 30% since 2015, and according to its sustainability report, 99% of Nike's shoes now meet the company's sustainable chemistry standards. This led to the development of its sustainable supply chain management program, which has since become a core part of Nike's business strategy. These efforts have had a positive impact on Nike's financial performance, as consumers increasingly value sustainability and are more likely to support companies that prioritize sustainability and environmental and social responsibility.

The athletic footwear and apparel industry is highly competitive and dynamic, with frequent changes in consumer preferences, technological advancements, and global economic conditions. The industry is characterized by a high level of innovation, where companies are constantly introducing new products and improving their existing offerings. This can create instability and unpredictability. In addition, this industry environment is influenced by various external factors such as government regulations, supply chain disruptions, and geopolitical

tensions. These factors created further turbulence and uncertainty for Nike and its competitors. Thus, environmental turbulence negatively moderated the positive relationship between Nike's sustainability efforts and its financial performance, as the company faced challenges in adapting to these changes while maintaining its sustainability commitments.

Walker & Brammer (2012) investigated the impact of environmental turbulence on corporate social responsibility (CSR) practices and found that firms facing high levels of environmental turbulence were more likely to engage in CSR practices than firms in stable environments. This finding differs from the results of the study presented here, which found that environmental turbulence has a negative impact on sustainability practices and their impact on financial performance.

The oil and gas industry's response to the COVID-19 pandemic is a recent real-world case that illustrates the impact of environmental turbulence on sustainability practices and firm performance. The pandemic led to a significant decrease in demand for oil and gas, and firms in this industry faced a highly turbulent environment. After facing higher levels of environmental turbulence, many oil and gas firms cut back on their sustainability practices to reduce costs and maintain their financial performance. For example, a report by Carbon Tracker in May 2020 found that 11 out of 20 oil and gas firms analyzed reduced their environmental spending in response to the raised difficulties of the pandemic. Therefore, the negative impact of environmental turbulence on sustainability practices and their impact on financial performance, as found in the study presented here, can be observed in real-world cases such as the oil and gas industry's response to the COVID-19 pandemic.

Another case in the oil and gas industry is the oil spill disaster caused by the Deepwater Horizon explosion in 2010. The SSCM controversies and also environmental turbulence resulting

from the disaster, such as lawsuits, regulatory penalties, and negative media coverage, had a significant negative impact on BP's sustainability practices and financial performance. After the disaster, BP faced intense scrutiny and criticism from stakeholders regarding their sustainability practices, particularly their environmental management practices. The company was subjected to numerous lawsuits, regulatory investigations, and penalties, leading to substantial financial losses. The disaster also damaged the company's reputation, resulting in declining customer trust, and a negative impact on the company's stock price.

BP reacted to the SSCM controversies associated with this incident very fast. The company was under pressure to make significant changes to its sustainability practices and adopt more proactive environmental strategies to mitigate the negative impact of the disaster on its financial performance. However, its efforts were hampered by the ongoing environmental turbulence, leading to continued financial losses and reputational damage. This case highlights how environmental turbulence can hurt sustainability practices and their impact on financial performance, particularly when companies are not adequately prepared to substantively respond to the SSCM controversies and manage the risks associated with environmental disasters or social incidents. It also emphasizes the importance of proactive environmental strategies as a substantive response to the controversies, acceptable by stakeholders, in mitigating the negative impact of environmental turbulence on a company's sustainability practices and financial performance.

Our findings of the study on the effect of SSCM controversies on sustainability practices and financial performance are mostly consistent with the results of previous research in this area. I reviewed all of them in the literature review chapter of this dissertation. As an example, a study by (Sarkis et al., 2011) found that SSCM practices positively impact a firm's financial and operational performance. In line with our findings, the findings of these studies also suggest that

firms can improve their financial performance by developing and implementing sustainable supply chain practices.

This dissertation also highlights the importance of environmental turbulence in moderating the relationship between sustainability practices and financial performance. This finding is also consistent with the results of previous studies. For example, Seuring & Müller (2008) found that the impact of sustainable supply chain management practices on financial performance is influenced by external factors such as market turbulence and competitive intensity.

In summary, the findings of the present dissertation on the effect of SSCM controversies on sustainability practices and financial performance mostly align with previous research in the field of sustainability and supply chain management. Specifically, this dissertation highlights the importance of SSCM controversies in driving sustainability practices and the need for firms to be aware of the impact of environmental turbulence on their sustainability practices and financial performance.

A summary of the managerial implications of this study:

Our findings in the present research highlight the potential impacts of SSCM controversies on sustainability practices and firm performance in the presence of different strategic resources and environmental conditions. Firms should focus on identifying the most effective strategic organizational resources to address SSCM controversies based on their specific situation. Managers should consider the potential impact of SSCM controversies on their sustainability practices and firm performance and address the incidents throughout their supply chain effectively. They should evaluate their organizational resources and capabilities to determine which resources

are most valuable in mitigating the impact of SSCM controversies. In a turbulent environment, firms should focus on value-creating resources such as R&D to improve governance and environmental sustainability practices, while in a stable environment, firms should focus on value-appropriating resources such as advertising to improve social sustainability practices. Moreover, I emphasize that only a substantive reaction to SSCM controversies can reduce stakeholder concerns and rebuild reputation and trust.

The results of the present study show that SSCM controversies have a positive impact on all dimensions of sustainability practices, and environmental turbulence has a negative effect on this relationship. I also found that sustainability practices have a positive impact on financial performance, but the positive effect would be lower in a turbulent environment. The managerial implications of this study are:

- Natural or man-made environmental and social incidents always could happen in the global supply chain of any firm in any type of industry and environment. Policymakers can use these SSCM controversies as a tool to encourage firms to move towards better sustainability practices. They can help firms comprehend the importance of sustainability, implement more sustainability practices in their supply chains, and develop regulations, guidelines, and standards that encourage sustainable supply chain practices.
- Focal firms and policymakers need to know the importance of environmental turbulence and consider the potential challenges in implementing sustainability practices in turbulent environments when facilitating, developing, and implementing sustainability strategies.
- As emphasized in other studies in this field, engaging in sustainability practices should be viewed as a long-term investment that can result in better financial performance in the future.

- Firms that work in turbulent industry environments should be aware of the negative impact of this contingency factor on the positive impact of SSCM controversies on sustainability practices and firm performance, and proactively develop their sustainability practices to mitigate this negative environmental effect on their financial performance.
- The COVID-19 pandemic showed us that no industry could experience a permanent stable environment. Therefore, firms working in regularly stable environments should also be prepared for dealing with the difficulties of a temporary turbulent environment and consider proactive strategies in implementing their sustainability practices and their engagement with sustainability throughout the supply chain.

Limitations and Future Research Directions:

I used merely archival data in this study to predict and test the hypotheses. This kind of data has its limits based on its nature. To get better and more comprehensive findings and insights, other methods of data collection, such as interviews with managers, doing survey studies of top-level managers, especially in the supply chain management and operations management field could be applied. Moreover, different resources and investments could have an impact on the firm performance over different periods. Another important limitation is our sample of firms. Our sample consists of publicly traded firms available in Compustat and Thomson Reuters ASSET4 and does not include smaller firms. This hurts generalizing our findings to other firms. Therefore, future research could use other data collection methods and different resources.

Another important limitation of our study is that it does not account for the effects of the COVID-19 pandemic on firm performance. The pandemic has disrupted many industries and

supply chains, leading to temporary turbulent industry environments and unprecedented challenges for businesses. Therefore, the relationships between the variables I studied may have changed or been affected by the pandemic in ways that I did not measure or anticipate. Unfortunately, because of data access limitations, and our type of contract with the Sustainalytics database, I could not add the data from the pandemic period to this dissertation. Future research may consider the impact of COVID-19 on firm performance and investigate how this recent pandemic affected the relationships between the variables I studied.

Moreover, instead of general sustainability indicators, I can measure SSCM performance indicators in the Rifinitiv database and study the impact of SSCM controversies on the social and environmental dimensions of sustainable supply chain management separately. With such a model I can study the different effects of SSCM controversies on environmental or social aspects of SSCM and this would give us a better insight into the impact of SSCM controversies on sustainability and firm performance.

According to Geng et al. (2017), the adoption of sustainability practices would be facilitated by paying more attention to the factors of human and organizational behavior. Besides, to address conflicting findings in the literature regarding the relationships between SSCM controversies, sustainability practices, and performance, it is suggested that indirect relationships be investigated. Future research may include these factors in SSCM research to better address the needs in literature. The following are some of these factors:

- Employee training and education: Ensuring that employees across the supply chain have the knowledge and skills to respond effectively to disruptions and contribute to building resilience.

•Communication and collaboration: Fostering effective communication and collaboration within and across organizations in the supply chain, which can improve responsiveness and adaptability to changing circumstances.

•Regulatory compliance: Ensuring compliance with relevant regulations and standards can help minimize risks and improve resilience across the supply chain.

•Transparency and visibility: Improving transparency and visibility across the supply chain can help organizations identify potential disruptions and respond proactively.

Studies often struggle to fully integrate these two concepts and further exploration may be needed to provide greater clarity and establish a shared foundation for future research, as suggested by Negri et al. (2021). Future research may investigate the trade-offs and synergies that exist between resiliency, sustainable supply chain management, and SSCM controversies . This would have significant managerial implications in this area. By providing a better understanding of how the integration of resiliency and sustainability will impact supply chains, managers can make better decisions and investments (Negri et al., 2021).

As previously noted, our study relied solely on archival data to test and validate our hypotheses, which has inherent limitations. To obtain more robust and comprehensive insights, alternative data collection methods could be employed. Further research could involve conducting studies within organizations to gain a better understanding of their perspectives on sustainable supply chains and SSCM controversies, as well as identifying current practices and measures in use. In this context, case studies would be valuable for identifying best practices and exploring new directions for future research (Negri et al., 2021).

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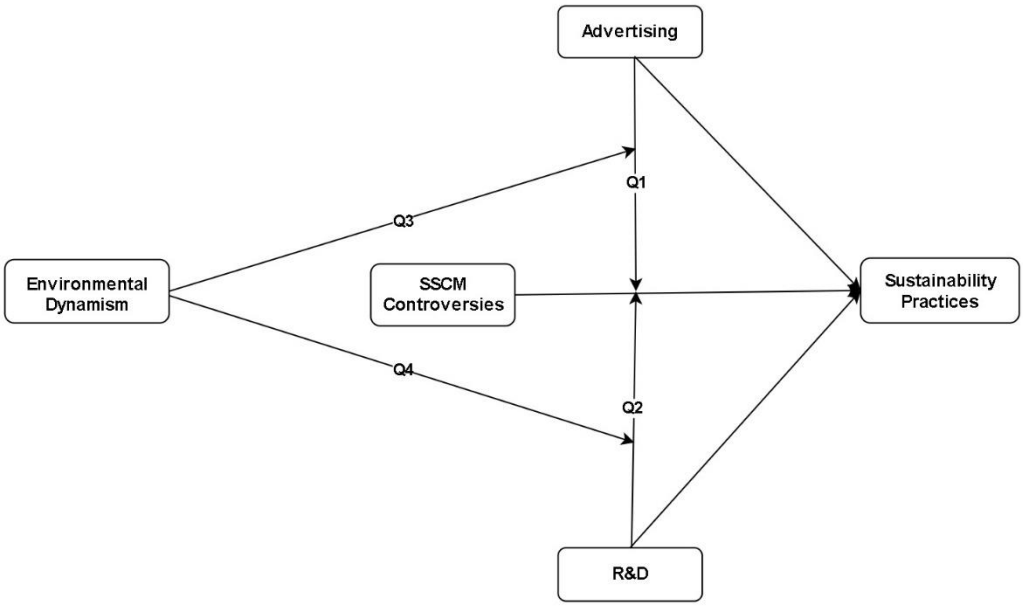

***Figure 1*: Research Questions and Model**

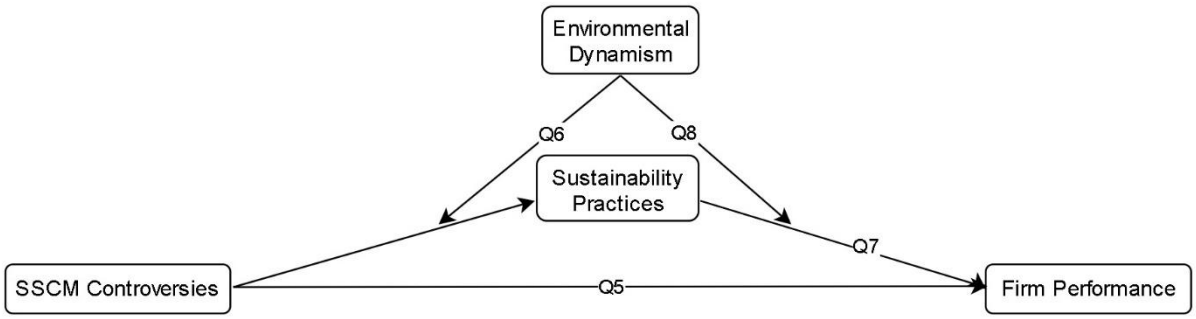

***Figure 2*: Research Model of the Extension**

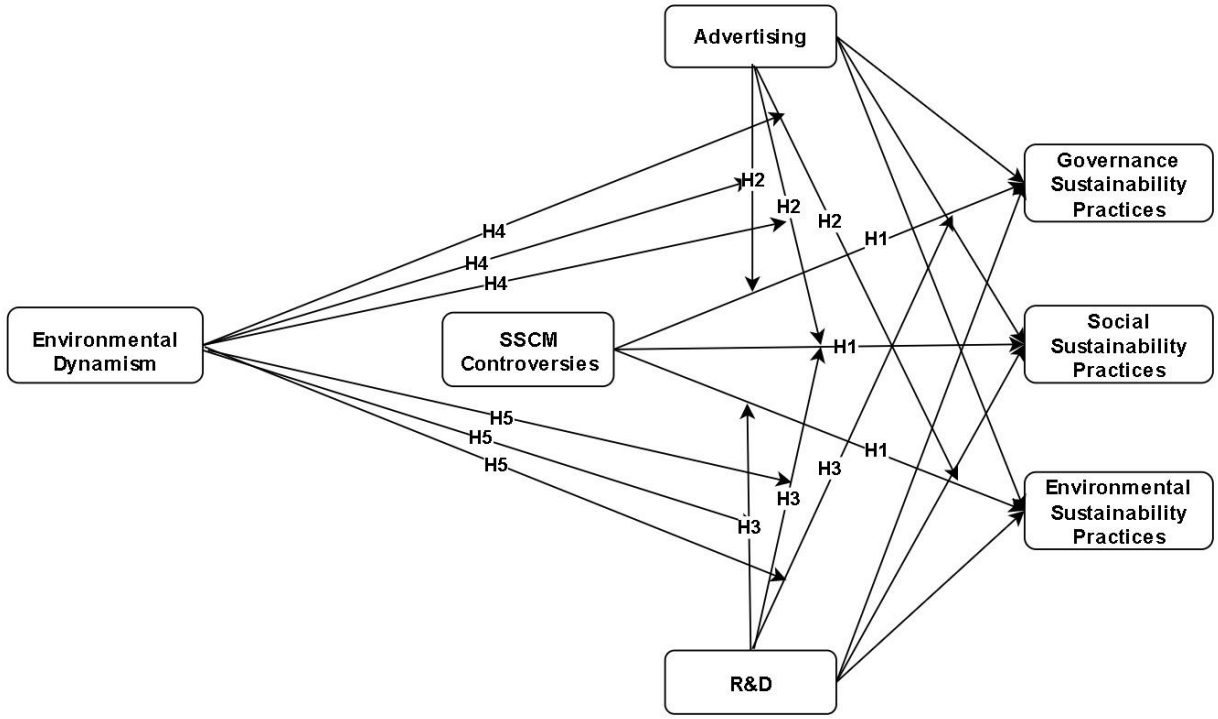

***Figure 3*: Theoretical Model and Hypotheses**

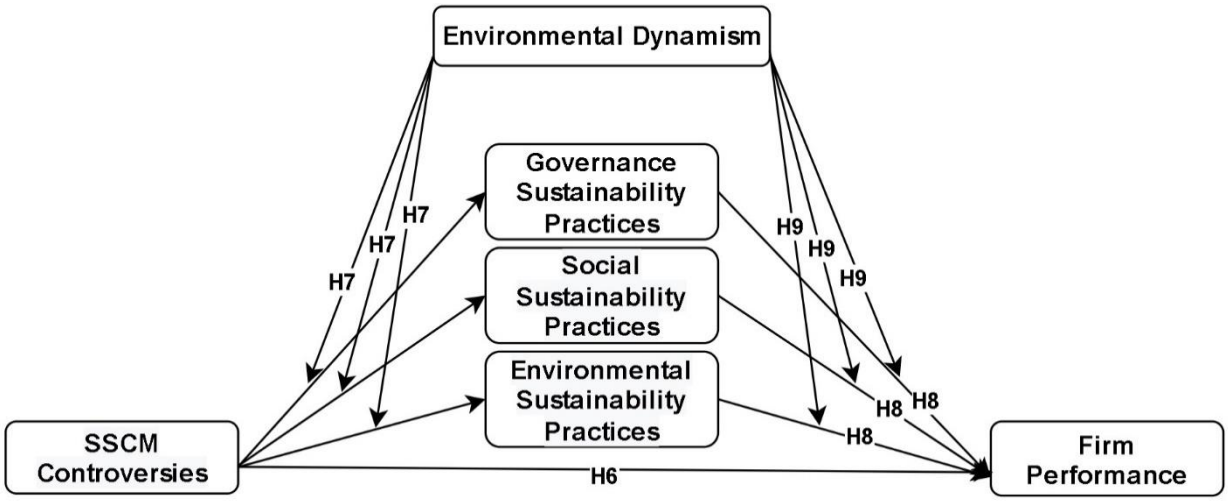

***Figure 4*: Theoretical Model of the Extension**

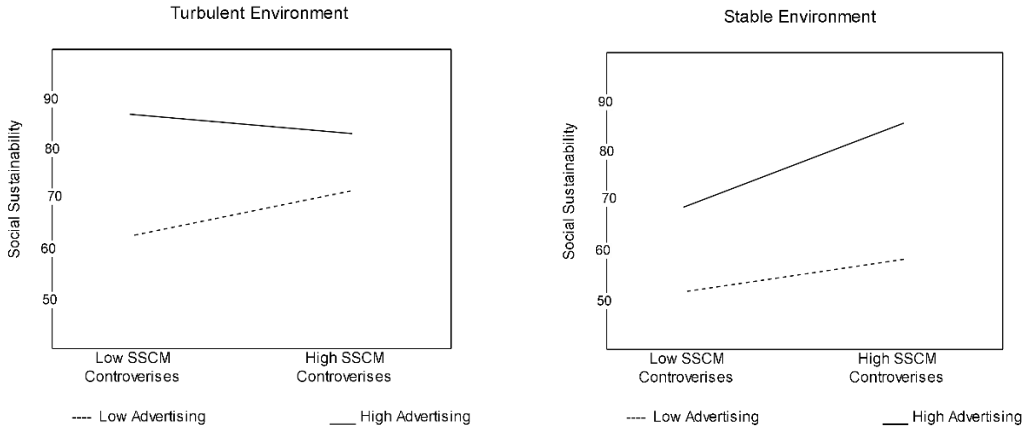

***Figure 5*: SSCM Controversies * Advertising in Stable and Turbulent Environments**

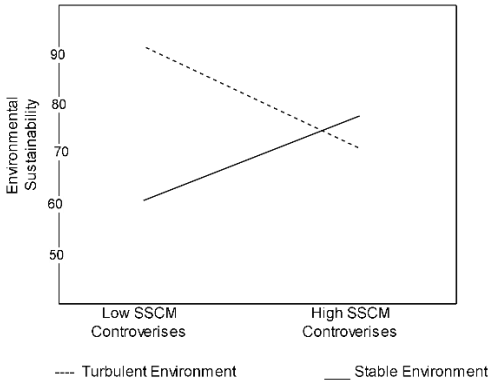

***Figure 6*: Effect of SSCM controversies on Environmental Sustainability**

In Stable and Turbulent Environments

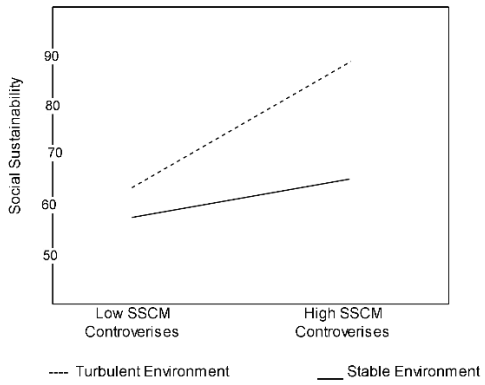

***Figure 7*: Effect of SSCM controversies on Social Sustainability in Stable and Turbulent Environments**

Table 1: Review of Studies with Focus on the Link Between Sustainability and Financial Performance

Publication	**Period of Analyzed Data**	**Sample size**	**Dependent Variable**	**Independent Variable**	**Firm performance findings**	**Operationalization of the Independent variable / Database**
Aras et al. (2010)	2005–2007	40 firms	Accounting based CFP	Corporate social responsibility	Inconclusive findings	Content analysis of corporate reports
Aouadi and Marsat (2016)	2002–2011	518 firms	Tobin's Q and ROA	Stakeholder relationships (community relations, diversity, employee relations, environment, product dimensions)	Positive relationship. Good stakeholder relationships stimulate better financial performance, especially in poorly performing firms.	KLD Research and Analytics, Inc.
Bush and Hoffmann (2011)	2006–2007	174	Accounting based CFP	Environmental responsibility	Inconclusive findings	Composite measure constructed with survey
Cai, Jo, and Pan (2011)	1995–2009	475 firms	Tobin's Q	Strength and concern, activity in community, diversity, employee relations, environment, product quality	Positive relationship. CSR engagement of firms in controversial industries positively affect firm value.	KLD's Stats database
Choi and Wang (2009)	1991–2001	518 firms included in S&P 500 and the DSI 400	Tobin's Q and ROA	Tobin's Q and ROA	Positive relationship. Good stakeholder relationships stimulate better financial performance, especially in poorly performing firms.	KLD Research and Analytics, Inc.
Callan and Thomas (2009)	2005	441	Market based/ Accounting based CFP	Corporate social responsibility	Positive relationship.	KLD social performance ratings
Chang and Kuo (2008)	2003–2005	311	Accounting based CFP	Sustainability	Positive relationship.	Composite measure constructed with survey

Eccles et al. (2014)	1993–2009	675	Market based/ Accounting based CFP	Sustainability	Positive relationship.	Thomson Reuters ASSET4
Garcia-Castro et al. (2010)	1991–2005	658 firms	ROE, ROA, Tobin's Q, MVA	Employee relations, customer/product issues, community relations, diversity issues, environmental issues	Neutral. Some results found in previous research change and some are even reversed when endogeneity is taken into account properly.	KLD database
Konar and Cohen (2001)	1989	321	Market based CFP	Environmental responsibility	Positive relationship.	Environmental law suits, emissions of toxic chemicals
Lee et al. (2009)	1998–2002	8511 Firm-Year	Market based/ Accounting based CFP	Corporate social responsibility	No direct relationship between CSP and CFP	DJ Global sustainability index binary variable
Lee et al. (2015)	2003–2010	362	Market based/ Accounting based CFP	Environmental responsibility	Positive relationship	CO2 emissions and environmental R&D Investment from Environmental Report Plaza
Lo and Sheu (2007)	1999–2002	349	Market based: CFP	Sustainability	Positive relationship	DJ sustainability index- binary variable
López et al. (2007)	1998–2004	110	Accounting based CFP	Sustainability	Negative Relationship	Dow Jones Sustainability Index
Lourenco et al. (2012)	2007–2010	418	Market based: CFP	Sustainability	Positive relationship	DJ sustainability index- binary variable
Makni et al. (2009)	2004–2005	153	Market based/ Accounting based CFP	Corporate social responsibility	Inconclusive findings	KLD social performance ratings
Marti et al. (2015)	2007–2010	153	Market based/ Accounting based CFP	Sustainability	Positive relationship	Stoxx Europe Sustainability Index binary variable
Montabon et al. (2007)		45	Accounting based CFP	Environmental responsibility	Positive relationship	Content analysis of corporate reports
Surroca et al. (2010)	2002–2004	599	Tobin's Q	Corporate responsibility performance, firm's intangible resources	No direct Relationship. No direct relationship, merely an indirect relationship mediated by the firm's intangible resources	Sustainalytics database
Wagner and Blom (2011)	1998–2006	497	Market based CFP	Sustainability	Positive (negative) link for financially good (poor) performing firms	Composite measure constructed with Survey
Wang and Choi (2013)	1995–2000	622	Market based CFP	Corporate social responsibility	Positive relationship. Mediated by consistency in sustainability and knowledge intensity	KLD social performance ratings
Yadav et al. (2017)	2011–2013	382	Accounting based CFP	Environmental responsibility	Moderately significant positive relationship	Newsweek's green rankings

Table 2: Different Industries in Our Sample and Their Frequencies

Industry (Four-digit SIC industries)	Frequency (%)	C. Frequency (%)
Manufacturing	47.47	47.47
Services	16.57	64.04
Transportation and public utilities	14.76	78.79
Retail trade	8.76	87.56
Mining &	8.20	95.75
Wholesale trade	3.52	99.27
Construction	0.53	99.80
Public Administration	0.20	100.00

Table 3: Summary Statistics

N = 5625	***Mean***	***Standard Deviation***	***Minimum***	***Maximum***
SSCM Controversies	0.316	0.465	0.000	1.000
Governance Sustainability	54.140	21.561	7.400	93.600
Social Sustainability	49.513	21.852	9.762	93.945
Environmental Sustainability	39.936	28.499	0.000	91.375
R&D intensity	0.039	0.083	0.000	0.615
Advertising intensity	0.011	0.024	0.000	0.124
Environmental Turbulence	1.026	0.026	1.000	1.442
Tobin's Q	2.234	1.578	0.002	10.986
Size	37.971	63.068	0.145	368.00

Table 4: Correlation Matrix

This table shows the significance and magnitude of the correlation between the variables of the study. The numbers in the table are the Pearson correlation coefficients, and the asterisks show the significance of the correlation. Resource/Investment intensity measures are calculated as ratios of sales for each firm-year observation.

		1	2	3	4	5	6	7	8
1	Controversies	1							
2	Governance Sustainability	0.235***	1						
3	Social Sustainability	0.274***	0.433***	1					
4	Environmental Sustainability	0.349***	0.468***	0.752***	1				
5	R&D	0.196***	-0.117***	0.096***	-0.044***	1			
6	Advertising	0.053***	-0.090***	0.102***	0.042**	0.036**	1		
7	Size	0.215***	0.166***	0.381***	0.350***	-0.1222***	0.076***	1	
8	Environmental Turbulence	0.029*	-0.040**	-0.133***	-0.089***	-0.094***	-0.131***	-0.148***	1

**p < 0.05; **p < 0.01; ***p < 0.001.*

Table 5

Table 5- a: Analysis Results for Governance Sustainability

The model is estimated using OLS.
The standard error of each coefficient is reported between parentheses.

	Model 1	*Model 2*	*Model 3*	*Model 4*
DV= Governance Sustainability Practices	*Direct*	*Two-way*	*Stable*	*Turbulent*
SSCM Controversies	.058*	.054*	0.012	-.276
	(.032)	(.033)	(.051)	(.275)
Advertising	-.031	-.028	-.016*	-.300
	(.055)	(.055)	(.087)	(.376)
R&D	-.034	-.034	-209**	-.416
	(.066)	(.066)	(.097)	(.365)
Controversies*Advertising		-.032	-.002	-.015
		(.030)	(.037)	(.091)
Controversies*R&D		-.029	.020	1.165**
		(.046)	(.080)	(.632)
Size	.236***	.240***	.182*	.389
	(.085)	(.085)	(.109)	(.380)
Firm Fixed Effect	*	*	*	*
Industry Fixed Effect	*	*	*	*
Year Fixed Effect	*	*	*	*
Observations	2,688	2,688	1,298	1,390
$\boldsymbol{Adj\ R^2}$	0.056	0.057	0.106	0.035

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.*

Table 5- b: Analysis Results for Social Sustainability

The model is estimated using OLS.
The standard error of each coefficient is reported between parentheses.

	Model 1	*Model 2*	*Model 3*	*Model 4*
DV= Social Sustainability Practices	*Direct*	*Two-way*	*Stable*	*Turbulent*
SSCM Controversies	.056**	.052**	.063***	.172***
Advertising	.177***	.179***	.256***	-.065
	(.050)	(.042)	(.065)	(.234)
R&D	-.035	-.035	.028	-.347
	(.050)	(.050)	(.072)	(.227)
Controversies* Advertising		.024**	.029*	-.026*
		(.023)	(027)	(.056)
Controversies*R&D		-.023	.014	.266
		(.035)	(.060)	(.394)
Size	.465***	.469	.258***	.860***
	(.065)	(.065)	(.082)	(.237)
Firm Fixed Effect	*	*	*	*
Industry Fixed Effect	*	*	*	*
Year Fixed Effect	*	*	*	*
Observations	2,688	2,688	1,298	1,390
$\boldsymbol{Adj\ R^2}$	0.147	0.145	0.107	0.017

$*p < 0.05$; $**p < 0.01$; $***p < 0.001$.

Table 5- c: Analysis Results for Environmental Sustainability

The model is estimated using OLS.
The standard error of each coefficient is reported between parentheses.

	Model 1	*Model 2*	*Model 3*	*Model 4*
DV= Environmental Sustainability Practices	*Direct*	*Two-way*	*Stable*	*Turbulent*
SSCM Controversies	.056***	.056***	.077**	-.312**
	(.021)	(.022)	(.035)	(.149)
Advertising	.063*	.067*	.160***	-.127
	(.037)	(.037)	(.060)	(.204)
R&D	.028	.031	.093*	-.197
	(.057)	(.044)	(.067)	(.198)
Controversies* Advertising		.038**	-.014	-.042
		(.020)	(.025)	(.049)
Controversies*R&D		.088*	.007	.683**
		(.030)	(.055)	(.344)
Size	.339***	.342***	.246***	.458**
	(.057)	(.057)	(.076)	(.207)
Firm Fixed Effect	*	*	*	*
Industry Fixed Effect	*	*	*	*
Year Fixed Effect	*	*	*	*
Observations	2,688	2,688	1,298	1,390
$\boldsymbol{Adj\ R^2}$	0.117	0.136	0.075	0.019

**p < 0.05; **p < 0.01; ***p < 0.001.*

Table 6:Mediation Analysis Results

The model is estimated using OLS.
The standard error of each coefficient is reported between parentheses.

	Model I			Model II			Model III	Model IV
	Governance	**Social**	**Environmental**	**Governance**	**Social**	**Environmental**	**Performance**	**Performance**
SSCM Controversies	1.334** (1.007)	1.387* (.620)	.444** (.169)	1.644* (1.095)	1.309* (.829)	.371* (.731)		-1.398 (1.218)
Environmental Turbulence				-3.564*** (.709)	-4.613*** (.537)	-3.791*** (.474)		-2.564 *** (.719)
Controversies * EnvTurb				1.650 (1.065)	-1.229 (.806)	-.314** (.711)		
Governance							.892*** (.336)	.925*** (.235)
Social							.943** (.435)	1.040*** (.254)
Environmental							1.549*** (.339)	1.549** (.384)
Governance * EnvTurb								-.041*** (.0107)
Social * EnvTurb								-.041** (.011)
Environmental * EnvTurb								-1.052*** (.013)
Size	0.022*** (0.001)	0.049** (0.022)	0.096*** (0.017)	0.021** (0.001)	0.043** (0.018)	0.097*** (0.016)	0.002* (0.001)	0.002* (0.001)
Firm fixed effect	*	*	*	*	*	*	*	*
Industry fixed effect	*	*	*	*	*	*	*	*
Year fixed effect	*	*	*	*	*	*	*	*
Observations	2,688	2,688	2,688	2,688	2,688	2,688	5,000	5,000
$Adj\ R^2$	0.114	0.150	0.140	0.115	0.153	0.141	0.119	0.119

**p < 0.05; **p < 0.01; ***p < 0.001. ... EnvTurb = Environmental Turbulence*

Table 7: The Influence of SSCM Controversies on Sustainability Practices.

Environmental Turbulence	Controversies > Governance	Controversies > Social	Controversies > Environmental
90th percentile	-0.215	0.074***	β = -0.401**
50th percentile	0.029*	0.039**	0.072***
10th percentile	0.021	0.108***	β = 0.068**
Observations	2688	2688	2688
**p < 0.1; **p < 0.05; ***p < 0.01.*			

Table 8: Mediation Analysis Results: Evidence from Different Firm Performance Measures

The model is estimated using OLS.
The standard error of each coefficient is reported between parentheses.

	Model A	**Model B**
	Performance (Alternative Tobin's Q)	**Performance (Market-to-book Ratio)**
SSCM Controversies	-.993 (0.172)	-2.712 (.237)
Environmental Turbulence	-1.812*** (.144)	-1.019*** (.185)
Governance	.498*** (.231)	.187*** (.074)
Social	.555** (.160)	.222** (.081)
Environmental	.876*** (.122)	.310*** (.162)
Gov * EnvTurb	-.315*** (.345)	-.212** (.090)
Soc * EnvTurb	-.442* (.347)	-.187** (.059)
Env * EnvTurb	-.720*** (.085)	-.483*** (.439)
Size	.053** (.213)	.079*** (.022)
Firm fixed effect	*	*
Industry fixed effect	*	*
Year fixed effect	*	*
Observations	5,229	5,357
$\boldsymbol{Adj\ R^2}$	0.214	0.198

**p < 0.05; **p < 0.01; ***p < 0.001.*

Table 9: Results of Tested Hypotheses

Hypothesis	Result
H1a: SSCM controversies are positively related to following environmental sustainability practices.	*Supported*
H1b: SSCM controversies are positively related to following social sustainability practices.	*Supported*
H1c: SSCM controversies are positively related to following governance sustainability practices.	*Supported*
H2: The positive effect of SSCM controversies on sustainability practices would be higher at higher levels of advertising.	*Supported for social and environmental sustainability*
H3: The positive effect of SSCM controversies on sustainability practices would be higher at higher levels of R&D investments.	*Supported for environmental sustainability*
H4: The moderating effect of advertising on the relationship between SSCM controversies and sustainability practices is weaker in a turbulent environment.	*Supported for social sustainability*
H5: The moderating effect of R&D on the relationship between SSCM controversies and sustainability practices is stronger in a turbulent environment.	*Supported for governance and environmental sustainability*
H6: SSCM controversies directly and negatively impact the firm's financial performance.	*Not Supported*
H7: The relationship of SSCM controversies with sustainability practices is moderated by environmental turbulence. Specifically, this relationship is weaker for firms in more turbulent industry environments.	*Supported for environmental sustainability*
H8: The implementation of Sustainability practices has a positive impact on firm performance.	*Supported for governance, social, and environmental sustainability*
H9: The relationship of sustainability practices with firm performance is moderated by environmental turbulence. Specifically, this relationship is weaker for firms in more turbulent industry environments.	*Supported for governance, social, and environmental sustainability*