

# Motives and Performance Outcomes of Sustainable Supply Chain Management Practices: A Multi-theoretical Perspective

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**Abstract** Many researchers believe the tremendous industrial development over the past two centuries is unsustainable because it has led to unintended ecological deterioration. Despite the ever-growing attention sustainable supply-chain management (SSCM) has received, most SSCM research and models look at the consequences, rather than the antecedents or motives of such responsible practices. The few studies that explore corporate motives have remained largely qualitative, and large-scale empirical analyses are scarce. Drawing on multiple theories and combining supply-chain and business ethics literature, we purport that instrumental, relational, and moral motives are behind a firm's engagement in SSCM practices. Specifically, we examine the links between corporate motives, SSCM practices, and firm performance. Using a sample of 259 supply-chain firms in Germany, we empirically test five hypothesized relationships. Our results reveal that relational and moral motives are key drivers, and that firms exhibiting high levels of moral obligations tend to

outperform those primarily driven by amoral considerations. Findings of this study contribute to multiple literatures espousing sustainability management and can help policy makers, stakeholder groups, and scholars develop more robust strategies for encouraging firms to practice SSCM.

**Keywords** Motives · Environmental sustainability · Supply-chain management · Firm performance

## Introduction

The remarkable industrial development of the last two centuries has resulted in tremendous prosperity (Shrivastava 1995). Many researchers believe such rapid development, however, is *unsustainable* as it has led to unintended ecological deterioration including industrial accidents, ozone depletion, and global warming. The recent global economic crisis has also accelerated the need for sustainable growth because greener economy could create prosperity from better utilization of natural resources insofar as “to meet the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987).

For many environmental activists, the idea of sustainable development appears to be an oxymoron since development seems to entail environmental degradation. In the context of business, supply-chain managers must not only rethink their roles, but also reevaluate their actions as supply-chain activities play a key role in a firm's total environmental impact (Handfield et al. 2005; Isaksson et al. 2010). In fact, companies today are under constant pressure as their stakeholders, including customers, regulatory bodies, NGOs, and even their own employees, are

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increasingly demanding the effective management of the environmental impacts of their supply chains (Tate et al. 2010; Carter and Easton 2011).

Sustainable supply-chain management (SSCM) comprises a firm's internal practices, such as sustainable product and process design, as well as external practices, such as supplier and customer collaboration, which are taken to make its supply chain more sustainable in terms of all three dimensions of the triple bottom line (Pagell and Wu 2009; Seuring and Muller 2008). However, to keep the study parsimonious, we specifically focus on the environmental and economic dimension of sustainability in this paper.

However, if the *raison d'être* for business entities is to maximize shareholder wealth, then it does not come as a surprise that firms would be driven to achieve this goal through actions that are even environmentally, socially, or economically irresponsible as long as those actions can go undetected (Campbell 2007). Examples of irresponsible acts such as poisoning the environment, deceiving customers, exploiting employees, and skimping on product quality and safety throughout the supply chain have all been well documented in the literature (e.g., Vogel 1992; Roe 2003). On the other hand, while some corporations, in their pursuit of profit, strive to benefit themselves at the expenses of other stakeholders, many corporations go to great lengths to do just the opposite (Campbell 2007; Hoffman and Haigh 2011). This is in line with the notion of corporate social responsibility (CSR) that firms have a duty to society that goes well beyond profit maximization, and that firms should also engage in initiatives that benefit other stakeholders even if those activities reduce firm profits (Swanson 1999; Paine 2002; Jennings 2013). It should be noted that some scholars, however, have also argued that firms should not engage in CSR initiatives at the expense of profits (e.g., Davis 1973; Porter and Kramer 2006).

In light of contrasting viewpoints, it is appealing to explore why a firm would ever engage in sustainable supply-chain management (SSCM), given the goal of profit maximization. Is it because SSCM can actually benefit the firm (instrumental motives) or is it because SSCM can help address the interests of multiple stakeholders (relational motives)? And can firms be inspired to practice SSCM simply because they are convinced that it is the right thing to do (moral motives)? What's more intriguing would be to discern whether performance outcomes differ for firms practicing SSCM with different motives. For example, is financial performance expected to be better for firms that are primarily motivated by self-serving interests? Do firms that follow moral motives perform worse than those whose acts are highly motivated by their economic self-interest? Although several conceptual papers have investigated the conditions in which firms would go green or behave in socially responsible ways (e.g., Bansal and Roth 2000;

Campbell 2007), a systematic empirical investigation remains scarce. Likewise, in the field of cleaner production (e.g., Fresner 1998; Kjaerheim 2005), the motives and their effects on corporate performance have been largely unexplored.

Answering these questions can make several valuable contributions to the literature. Specifically, this paper examines what motivates a firm to engage in SSCM practices along with the impacts of the different motives and SSCM practices on the firm's environmental as well as financial performances. Such an empirical investigation could help in establishing the extent to which various motives contribute to firms' engagement in SSCM. In addition, it would also document the extent to which different motives and SSCM practices affect firms' performance outcomes.

## Conceptual Framework and Hypotheses

Following the famous essay "The social responsibility of business is to increase profit" (Friedman 1970), the conception and scope of CSR have been vividly discussed over the past few decades including whether CSR has to be purely altruistic or if it can be self-serving. Broadly defined, CSR may mean different things to different people in different places and at different times. CSR behavior could mean (1) treating the community well with respect to ensuring not to foul the ecosystem and natural environment, (2) treating employees well in terms of wages, benefits, gender/racial diversity, workplace safety, human rights, and making philanthropic contributions, (3) treating customers well in terms of product quality, truth in advertising, pricing, etc. Conceived as a company's discretionary involvement in business practices that further economic, societal, and environmental well-being, CSR means all of the above to some contemporary scholars (e.g., Du et al. 2011; Aguinis and Glavas 2012; Blome and Paulraj 2013; Vlachos et al. 2013).

According to Carter and Easton (2011), the conceptualization and management of environmental and social issues has evolved from standalone approaches to the concept and practice of SSCM. It is important to note that SSCM, however, can be misused for symbolic greenwashing purposes that are not in line with the firm's CSR (e.g., use of code of conducts that do not impact behavior, publishing of sustainability reports that mirror performance that was not achieved) (Laufer 2003; Delmas and Burbano 2011; Parguel et al. 2011). Therefore, in this study, we target substantial SSCM actions that can contribute to the firm's CSR, and, in doing so, we make certain that our conceptualization of SSCM is in line with the notion of CSR. For the sake of parsimony, we focus only on the environmental aspects of SSCM practices.

In identifying the underlying dimensions of SSCM practices, an extensive review of the supply-chain literature has directed our attention to both internal initiatives within the focal firm and collaborative efforts with external supply-chain partners. To improve sustainability performance, special attention must be paid to product and process design that minimizes the negative environmental impacts of a firm's products throughout their life cycles. Furthermore, as competition shifts from a firm to a supply-chain level, sustainable efforts across organizational boundaries become essential. Grounded on extant literature, our SSCM construct therefore incorporates four first order factors of sustainable product design, process design, and sustainability collaboration with suppliers as well as customers (Zhu and Sarkis 2004; Vachon and Klassen 2006; Carter and Easton 2011; De Giovanni 2012; Hojmosse and Adrien-Kirby 2012; Morali and Searcy 2013; de Jong et al. 2014). The rationale and theoretical support for the four key practices are further articulated in “SSCM Practices and Firm Performance” section.

### Social Responsibility and Sustainable Supply Chain Management Practices

As the nature of many business relations is changing from firms producing goods within wholly owned facilities to firms engaging in supply chains partners, the notion of CSR is also transforming. No longer is CSR the domain of an individual firm; it is the purview of supply chains (Andersen and Skjoett-Larsen 2009). As such, media and activists have become adept at holding supply-chain organizations responsible for their environmental impact, even if the impact is caused by their supply-chain partners. SSCM practices have thus been pushed further and further to the forefront. The proliferation of social media, due in part to globalization and the expansion of information and communication technologies, has multiplied the reach of activists. Worse yet, activists and media may target the most successful or visible corporations to draw attention to issue, even if those firms in fact may not have much impact on the problem at hand. For example, Nestlé, the world's largest supplier of bottled water, has been targeted for its access to fresh water, even though its bottled water sales consume just 0.0008 % of the world's fresh water supply, compared to the inefficient agricultural irrigation, which uses 70 % of the world's water supply each year (Porter and Kramer 2006).

Reports of firms that exhibit environmentally or socially irresponsible behavior have not been lacking. These “unsustainable” supply-chain practices consist of harming the environment, cheating the government, exploiting employees, and deceiving customers (e.g., Vogel 1992;

Roe 2003). On the other hand, many corporations would go great lengths to engage in socially responsible supply-chain activities such as reducing their environmental impact, treating their workers and customers decently, and abiding by the law (Seelos and Mair 2005; Campbell 2007; Wu and Pagell 2011). Furthermore, focal firms must also make sure that their supply-chain partners, including lower-tier suppliers, live up to their CSR standards. SSCM is hence a critical lynchpin as a firm cannot fulfill CSR standards unless its entire supply chain complies with the standards.

### Sustainable Supply Chain Management Practices and Competitive Advantage

Some researchers have argued that socially responsible initiatives, such as SSCM, can result in additional costs including setting up environmental friendly policies, employee training, and community development (e.g., McWilliams and Siegel 2001). These additional costs can then give firms a competitive disadvantage. In contrast, an increasing number of studies have found environmental responsiveness to be positively related to firm performance, because green supply-chain practices can help boost employee morale, enhance customer goodwill, and improve relationships with stakeholders like (1) government agencies which reduce regulatory costs and (2) investors which lead to increased investment in these firms (McGuire et al. 1988; Arya and Zhang 2009; Sarkis et al. 2011).

SSCM practices can also result in improved brand image and firm reputation among stakeholders (Maigman and Ferrell 2004). A valuable complement to a differentiation strategy, a strategic CSR implementation of SSCM enhances the value of a firm's reputation and its brand, thereby contributing to the firm's sustainable competitive advantage (McWilliams and Siegel 2011). According to the tenets of resource-based view (RBV), a positive reputation among stakeholders can be a source of competitive advantage that leads to improved firm performance (Barney 2012). Drawing on the dynamic capabilities of the firm, a substream of the RBV, researchers advise that the green supplier management capabilities embedded in SSCM practices are a critical source of competitive advantage, as these capabilities are path dependent and particularly valuable when supply-chain organizations are receptive to external stakeholder pressure (Reuter et al. 2010). Furthermore, in a rigorous meta-analysis of the relationships among environmental responsiveness, social responsiveness, and corporate financial performance, researchers have found that environmental responsiveness tends to be associated with better corporate financial performance (Orlitzky et al. 2003).

## Conceptual Model and Hypotheses

The organizational justice literature has recently witnessed a move from models focusing on instrumental motives to models that consider principled moral motives of organizational actors (Cropanzano et al. 2003). Based on the tenets of multiple needs theory, researchers have proposed a more powerful framework including morality-based motives to allow for simultaneous investigation of the complex network of factors. Grounded on the extant literature (e.g., Aguilera et al. 2007), this study purports that there are three motives that could drive firms to pursue SSCM practices: *instrumental* (driven by self-interest), *relational* (concerned with relationships among group members), and *moral* (concerned with ethical standards and moral principles). When examined from the purview of business ethics literature, these three motives are grounded on various fundamental conceptions of business ethics that focus on moral actions: ethical egoism, utilitarianism, and virtue ethics. Ethical egoism is a normative theory in which the main assumption of which is that an action is ethical if its consequences benefit the doer, whereas in utilitarianism, the doer should treat oneself with no higher regard than others. Furthermore, the central view of utilitarianism is that moral action should maximize the sum of utility (often defined as happiness) for those affected by the action (Mill 2007). Contrary to consequential theories of egoism and utilitarianism that determine morality based on the outcomes of actions, virtue ethics centers on the character and virtues of subjects which influence their behavior (Hursthouse 2013). According to this theory, a person is morally good if this person possesses certain virtues like honesty or compassion. Thus, in virtue ethics, the focus is on “being” instead of “doing.” Certainly, none of these moral theories can claim to be the “right” moral theory, and it is not our intention to prejudge any of these theories to be dominant over others.

Figure 1 depicts our conceptual model linking the three motives with SSCM practices and firm performance. First, grounded on CSR and business ethics, this model rests on the premise that firms engage in responsible initiatives like SSCM practices with various extrinsic and intrinsic motives. According to collaborative advantage (Kanter 1994; Dyer 2000) and relational view (Dyer and Singh 1998; Chen et al. 2004), these SSCM practices, including product and process innovations (Isaksson et al. 2010) and collaboration with supply-chain partners, can then become a set of dynamic capabilities. Since these capabilities are socially created, complex, path dependent, and difficult to imitate, they can be a source of competitive advantage that leads to improved firm performance.

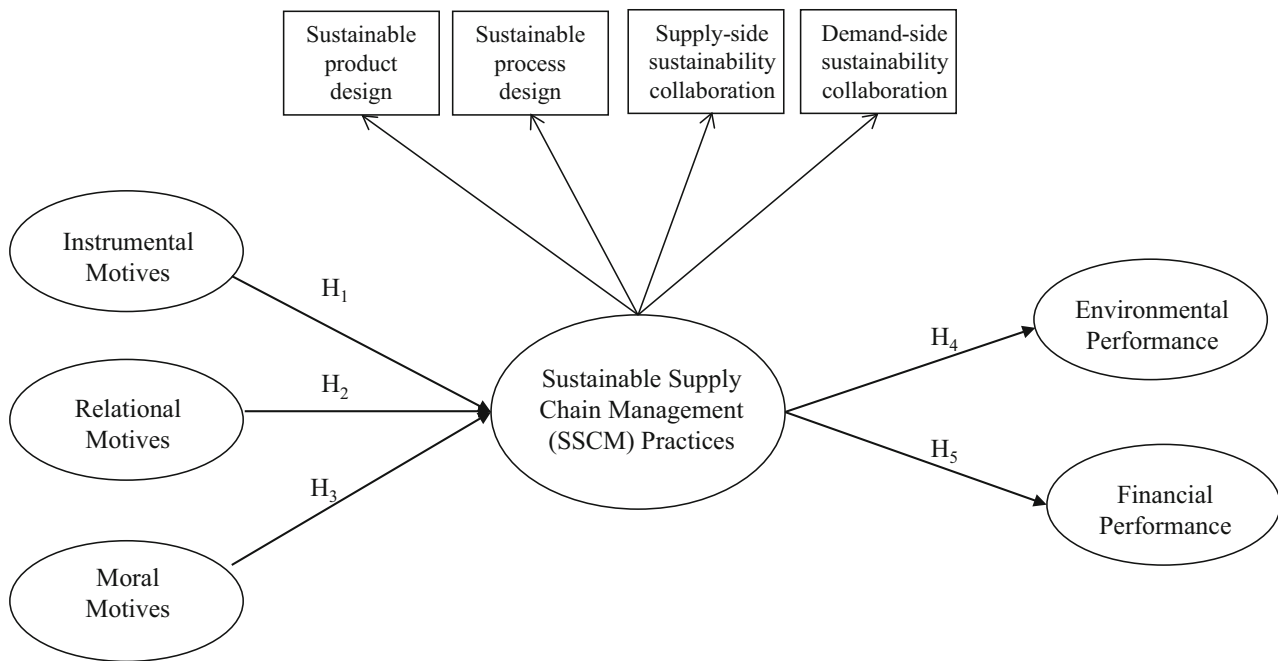
## Instrumental Motives and SSCM Practices

Corporate social responsibility theorists have asserted that firms will engage in responsible initiatives such as SSCM when these practices align with their *instrumental* interests of enhancing shareholder value (Reinhardt et al. 2008), preempting bad publicity, and increasing firm competitiveness, such as by protecting a firm’s reputation (Bansal and Clelland 2004; McWilliams and Siegel 2011) and profitability so that managers can raise their compensation packages, which are usually tied to profitability (Aguilera et al. 2007).

To the extent that self-interest is generally the first and the foremost motive, several researchers contend that firms should focus on environmental practices that are good for economic performance (e.g., Carter and Rogers 2008), and that if a practice has a negative impact on economic performance, it is not sustainable regardless how beneficial it is for the environment (Siegel 2009). In fact, in the extant SSCM literature, there is broad and implicit acceptance that profits are the ultimate gage of supply-chain performance, prompting some researchers to go so far as arguing that the question of “does sustainability pay?” is the wrong question moving forward, and thus “research in sustainable supply chain management should have no future” (Pagell and Shevchenko 2014). The prevalence and dominance of the instrumental motives for SSCM practices seems undoubtedly undeniable.

In light of business ethics, instrumental motives represent a type of consequentialism, wherein responsibility is determined solely based on the weighing of the consequences of actions (Anscombe 1958). If the positive consequences of actions are greater than the negative consequences, then the actions are favorable and morally proper. One central form of consequentialism is ethical egoism. Under the ethical egoism assumption, SSCM practices would be favored if there is a net positive benefit for the focal firm.

Positive benefits of SSCM initiatives can influence the willingness of managers to implement such practices. When firms design products and processes following sustainability guidelines, they might trim cost by reducing waste of materials and energy. Apart from generating extra investments from shareholders, firms might also expect SSCM to enhance employee morale, external publicity, and goodwill. Even though we do not claim that SSCM practices guarantee additional benefits, firms with self-serving motives may adopt SSCM to fulfill their instrumental motivations. Given the dispersed and complex nature of today’s supply chains, firms will also need to collaborate with suppliers and customers to achieve their instrumental



**Fig. 1** A proposed model of SSCM motives and performance

goals. As a supply chain can never be more sustainable than its weakest link, firms cannot consistently generate economic gains unless they align sustainable practices with the entire supply chain through proper external collaborations (Blome et al. 2014).

In summary, self-interest-driven *instrumental* motives as a key driver for organizational SSCM efforts are collectively supported by the extant SSCM literature and the basis of ethical egoism. Thus, we propose the following hypothesis:

**H1** Instrumental motives will likely have a positive effect on a firm's SSCM practices.

#### *Relational Motives and SSCM Practices*

An organization's relational motives for responsible efforts such as SSCM practices can be observed through the lens of a stakeholder theory of the firm (Freeman 1984; Clarkson 1995; Rowley and Moldoveanu 2003; Easley and Lenox 2006). Accounting for the diversity of stakeholder interests (not just shareholder interests), stakeholder theory posits that firms will act to make certain the well-being of the different groups engaged in a relationship with the firm. In the context of SSCM practices, a supply-chain organization often has to meet the needs and demands of its diverse stakeholders who might have little interest in the organization's economic performance. Furthermore, since corporations are embedded in a broad set of economic and political institutions, they need to establish social

legitimacy to survive. Legitimacy is a relational motive since it concerns with how a firm's actions are perceived by others. Thus, firms in a given industry have relational motives to practice SSCM so as to be seen as legitimate by complying with stakeholder norms (Aguilera et al. 2007).

Relational motives reflect business ethics that starkly contrast with the ethical underpinnings of instrumental motives or ethical egoism and instead follow the theory of utilitarianism. According to utilitarianism, actors should decide on the action that produces the most good. Therefore, firms should be attuned to promoting the interests of different stakeholders such as customers (e.g., offering environmentally friendly products), suppliers (e.g., using nontoxic materials), employees (e.g., providing environmental training), and government and environment groups (e.g., reducing noncompliance), and not merely seek short-term shareholder returns (Aguilera et al. 2007; Sarkis et al. 2010). Since governments, employees, and activist groups are also important in SSCM, firms' reactive responses to these stakeholders have been amply documented in the literature (e.g., Buysse and Verbeke 2003; Delmas and Toffel 2008). Therefore, in this study, we focus our attention on a firm's proactive sustainability responses to customers and competitors, the two most dominant players.

Examining how external pressures influence a firm to adopt organizational practices, institutional theory suggests that, in addition to the coercive pressures mentioned above, *normative* and *mimetic* are two other forms of isomorphic drivers (DiMaggio and Powell 1983; Scott 1994). Social requirements from the customer base and market and their



growing environmental expectation can form the primary normative pressure for firms to practice SSCM. When consumers share common environmental concerns, are organized in networks, and have the capacity to influence corporate image in the name of society's collective good, they are likely to push the firm to engage in SSCM (Lee and Klassen 2008). Furthermore, supply-chain organizations may also be pressed to mimic or follow the actions of successful competitors so as to catch up with or surpass the competition (Corbett 2006; Sarkis et al. 2011; Hofer et al. 2012). Imitation plays a considerable role for firms in developed countries such as Canada, France, and Germany (Aerts et al. 2006) as well as in developing countries such as China (Zhu et al. 2013) when it comes to implementing SSCM-related practices. A recent thematic analysis on corporate CSR reports of select top 100 global companies also reveals that competitive pressure is the foremost driving force behind environmental strategy development (Tate et al. 2010).

With the ever growing savvy of customers, companies that create and deliver value to customers through the provision of "more sustainable" products stand to benefit considerably. To the extent that firms would pursue SSCM practices to maximize the utility of stakeholders, firms must give priority to the needs and wants of their customers. In doing so, firms can enhance their customer base. In addition, differentiation from competition—from a customer's viewpoint—will also improve, thereby jointly leading to sustainable competitive advantage (Gulati 2007; Lado et al. 2011). Scholars have extolled the virtues of customer focus as it provides a basis for developing and fostering supply-chain relational capabilities including collaboration with supply-chain partners in order to create and deliver strategic value to customers and other stakeholders (Chen et al. 2004; Kahn et al. 2006). In light of stakeholder interests and competitive pressures, we propose the following:

**H2** Relational motives will likely have a positive effect on a firm's SSCM practices.

### *Moral Motives and SSCM Practices*

So far, our review and discussion on extant SSCM literature suggest that engagement in SSCM practices are initiated to acquire benefit to the firm or as a result of a reciprocity arrangement (e.g., to attain a positive reputation), and not due to higher-order values. Scholars in business ethics and organizational justice, however, advocate that in addition to the instrumental and relational motives, morality-based motives play a critical role in the actions taken by supply-chain organizations (Carroll 1991; Aguilera et al. 2007), and that every aspect of value creation within business, a deeply human institution, is

embedded with moral complexity (Fernando and Almeida 2012). Moral motives for corporate sustainability are anchored in the notion that businesses have an ethical duty to make a positive contribution to the environment and society and create a better world for the future (Hahn and Scheermesser 2006; Bronn and Vidaver-Cohen 2009). Thus, moral motives differ from relational motives in that morally inspired supply-chain firms practice SSCM due to their intrinsic higher-order values and/or genuine concern for the environment, but not because of the need to fend off external pressures or to appease multiple stakeholders (i.e., extrinsic motives). An intrinsic motivation is the will to adhere to a certain moral norm because it is desirable for itself; it is an end in itself. An extrinsic motivation, by contrast, is the will to perform a certain act or to obey a norm so as to realize another end (i.e., goods of second intent).

As stated above, deontological ethics posits that firms indeed have duties and moral obligations to act responsibly. More specifically, Graafland and Van De Ven (2006) state that many companies have a business culture committed to certain principles that hold sustainability initiatives to be a moral "duty" of the firm. Since SSCM practices or projects may prove costly to a firm, the firm may choose not to engage in environmental stewardship if it does not have a strong sense of moral "duty," because economic benefit is not imminent. Therefore, Etzioni (1988) argues that the deontological motive is more essential than economic motive in the continued pursuit of corporate sustainability, especially in times of economic hardship.

Consistent with extant literature (Etzioni 1988; Carroll 1991; Graafland and Van De Ven 2006; Aguilera et al. 2007), moral motives in this paper reflect not only deontological ethics (Bowie 1999) but also virtue ethics (Solomon 1992). *Organizational virtuousness* scholars have suggested that some virtuous firms choose to engage in responsible initiatives such as SSCM practices simply because it is the right thing to do, a moral motive, irrespective of reciprocity or self-interest, and that virtuousness does not stand in opposition to concepts of social responsibility, or citizenship, or ethics, but rather it extends beyond them (Cameron et al. 2004; Bright et al. 2006). Specifically, virtuousness could lead to better care for the environment because (1) classical interpersonal virtues such as benevolence or loyalty might be extended to the environment and nonhuman beings to maintain biodiversity (Cafaro and Sandler 2005; Hull 2005; Sandler 2009), and (2) "protecting" or "not-exploiting" the environment might lead to "eudemonia" due to the harmonious relationship with the environment (Bina and Vaz 2011). Following this theory and taking the stance that supply-chain managers have a moral "duty" to proactively question how their actions impinge on the stability and integrity of the supply-chain ecosystem, *organizational environmental*

*virtuousness* integrates the notion of environmental management and organizational virtuousness to engender a positive means of self-regulation by which organizations may engage in SSCM practices (Hoffman and Haigh 2011; Sadler-Smith 2013).

Empirical evidence confirms that most individuals are concerned with justice and fairness, even when there is no apparent economic benefit for doing so, and that this morality-based concern for justice drives their interactions with the moral actions of the firm (Turillo et al. 2002; Cropanzano et al. 2003). Also, within supply chains, the concepts of justice and fairness have been shown to impact SSCM practices significantly (Vachon and Mao 2008). More specifically, stewardship theory suggests that organizational actors like supply-chain managers bring their personal morality-based values, which may go beyond economic self-interests, to the firm (Davis et al. 1997). When supply-chain managers feel responsible to the environment and behave according to stewardship interests by instigating actions, driven by moral motives, toward a better society, they are likely to inject SSCM practices in their firm strategies (Logsdon and Wood 2002; Cantor et al. 2012). For instance, management and employees at Subaru of Indiana Automotive (SIA) plant share a sense of commitment to the scarce resources and environment, and subsequently became the first zero-landfill car factory in the U.S. (Farzad 2011). Meticulously reducing waste using the Kaizen principle before recycling 98 % of the plant's waste and incinerating the remaining 2 % to sell power back to the grid has allowed SIA to actuate its concerns for environmental sustainability—moral motives—and save millions of dollars a year.

In summary, moral motives are concerned with what Aristotle labeled goods of first intent, chosen for their own sake, as opposed to goods of second intent, such as profit, reputation or power, which have instrumental (egoism) or relational (utilitarianism) positions. With a belief that “the ends justify the means” in utilitarianism, some actions are acceptable despite being immoral or unethical in their own right. Furthermore, with utility as the sole moral good in utilitarianism, the principle of utility may come into conflict with that of justice (Tsalikis and Fritzsche 1989). Unlike utilitarianism, the rightness of an action is a key concern of virtue ethics or organizational virtuousness, which accentuates the virtues, or moral character. Also in stark contrast with utilitarianism, deontological ethics, as a nonconsequential theory, embraces the concept of “good will” including adherence to duties and obligations in ethical decision-making.

Collectively, these research streams lead us to conjecture that as firms learn good habits of character (e.g., feeling responsible for the environment), they are likely to incorporate such virtues into their practices. Managers with a genuine concern for the environment or who believe that

protecting the environment is the “right thing to do” will act accordingly. Therefore, we posit

**H3** Moral motives will likely have a positive effect on a firm's SSCM practices.

### *SSCM Practices and Firm Performance*

SSCM practices encompass sustainable product design, process design, and close sustainability collaboration with suppliers as well as customers (Zhu and Sarkis 2004; Vachon and Klassen 2006; Drake and Schlachter 2008; Hollos et al. 2012; Gimenez and Sierra 2013; Morali and Searcy 2013). To start, products should be designed with eco-friendly raw materials and component parts in mind (Rao and Holt 2005). Next, easy disassembly incorporated in product design is crucial for reuse and recycle. Further, for products that are to be disposed of at the end of their useful life, biodegradable and recyclable materials are key to environmental performance (Carter and Easton 2011; Zhu et al. 2012). Coupled with sustainable product design, a supply-chain organization's process design and innovation aimed at reducing air pollution, solid/effluent waste (Rao and Holt 2005; De Giovanni 2012; Narasimhan and Schoenherr 2012), and energy and resource consumption (Wong et al. 2012) can have a significant impact on the firm's sustainability performance.

Customers are increasingly holding a supply-chain organization responsible for environmental negligence even if its suppliers are at fault. A firm, therefore, needs to educate and, in many cases, help its suppliers in setting up green supply-chain practices (Rao and Holt 2005; Hojmosse and Adrien-Kirby 2012; Shi et al. 2012), insist that its suppliers provide eco-friendly material and parts (Carter et al. 2000; Zailani et al. 2012), and require its suppliers to implement environment management system (EMS) and/or secure ISO 14001 certification (De Giovanni 2012; de Jong et al. 2014). Finally, upholding strong interorganizational collaboration with customers and suppliers has been found to result in improved environmental performance (Geffen and Rothenberg 2000; Vachon 2007; Drake and Schlachter 2008; Gimenez and Sierra 2013; Morali and Searcy 2013), and provide formal and informal mechanism that promote trust, reduce risk, and in turn increase profitability (Dyer and Singh 1998; Chen and Paulraj 2004).

Extant literature at the nexus between SSCM practices and firm performance, especially the financial outcome, over the past two decades has been mixed, if not contradictory. Earlier studies found that managers are generally reluctant to invest in SSCM because of the cost involved and the uncertain benefits that can be gained (Orsato 2006; Curkovic and Sroufe 2007), and that investments in sustainable supply-chain practices is a zero-sum game,

reducing profitability by an equal amount (Pagell et al. 2004). A more encouraging perspective is that SSCM practices may lead to a decline in short-term profit (Bowen et al. 2001; Zhu et al. 2012), but can result in long-term competitive advantage (Krause et al. 2009). The most promising view is that SSCM practices are positively related to an organization's environmental and financial performances as part of "win-win" propositions (Montabon et al. 2007; Wong et al. 2012), although critics challenge the idea of win-win solutions and argue that firms are required to deal with the tradeoffs (Seuring and Muller 2008; Hahn et al. 2010; Winn et al. 2012).

General analysis on the link of business ethics/CSR and performance mirrors the mixed findings mentioned above, even though many studies find a positive link (Pava and Krausz 1996). From an ethical point of view, firms might benefit financially when their responsible initiatives are more aligned with societal expectations as they gain legitimacy (Palazzo and Scherer 2006), retain motivated employees (Rodrigo and Arenas 2008), incur fewer negative events (Husted 2005), and attract more customers and funds (Hill et al. 2007), which all might outweigh the initial costs incurred for socially responsible activities.

As discussed above, empirical research investigating the relationships between environmentally sustainable initiatives and firm performance has resulted in disparate and, to some extent, contradictory findings. While many studies have attempted to answer the question of "does it pay to be green?" and a subsequent meta-analysis of these studies conclude that it does pay to be green (Golicic and Smith 2013), some researchers maintain that firms often have no choice but to adopt sustainable supply-chain practices even though such practices may have uncertain or even negative impacts on their performance (e.g., Hahn et al. 2010; Winn et al. 2012). Furthermore, several recent studies imply that SSCM practices do not directly affect firm performance, but can improve it indirectly (Pullman et al. 2009; De Giovanni 2012; Zhu et al. 2013). In light of the mixed and inconclusive findings, we put forth the following hypotheses.

**H4** SSCM practices are likely to be positively associated with a firm's environmental performance.

**H5** SSCM practices are likely to be positively associated with a firm's financial performance.

## Methodology

### Survey Instrument

All theoretical constructs were measured using indicators that were adapted from extant SSCM and CSR literature. A

5-point Likert scale with anchors "strongly disagree" and "strongly agree" was used for all nonperformance-related (i.e., motives and SSCM practices) indicators. In case of performance measure, we used a 5-point Likert scale with anchors "decreased significantly" and "increased significantly." In addition, for performance indicators, we instructed the respondents to indicate changes in the performance measures over the past 2–3 years (Paulraj et al. 2008). Since the initial survey instrument was designed in English and eventually translated to German, we adopted a rigorous translation/back-translation process to ensure that the scales were consistent. In addition, we conducted face-to-face discussion with supply-chain academic researchers as well as German practitioners to review the questionnaire and provide us with feedback. Subsequently, we made minor modifications to the instrument to enhance clarity and appropriateness of the measures.

### Data Collection

Supply-chain management executives were selected as potential respondents to our survey. We derived the initial sample of 1400 German firms from the Dun & Bradstreet database. This sample included industries within SIC codes covering 31–33 and 47–49 since they were considered to be of primal importance to Germany. Surprisingly, we found the contact details in the initial sample to be quite outdated. Accordingly, we used supply chain and sourcing groups within business-related social networks such as LinkedIn and Zing to find appropriate contacts within these 1400 sample firms. These social network-based groups also helped us in contacting a high percentage of senior executives within the initial sampling frame.

We adopted a modified version of Dillman's (2007) total design method. Specifically, we sent multiple reminder emails and followed them up with telephone calls. We received a total of 259 responses, representing a response rate of 18.5 %, which is comparable to recent research within the broad area of supply chain management. Demographic details of our final sample, including industries, firm size, job level and function of respondents, are presented in Table 1. Since our survey covered both firm-level and supply-chain collaboration practices, we took additional steps to ensure that the respondents were appropriate and competent to answer the survey questions. With this ambition, we included two questions focusing on (1) the respondent's knowledge on the topics covered and (2) confidence in filling up the survey instrument. The average for knowledge and confidence was 3.64 and 3.48, respectively, on a 5-point Likert scale (1—"not at all" and 5—"significantly"). In addition, around 56 % of the respondents held senior positions (president, vice president



**Table 1** Company and respondent profile

Description	SIC Code	Percent
Manufacturing	31–33	73.1
Transportation, Communications, Electric, Gas & Sanitary Services	47–49	14.6
Other Industries		12.3
Description		Percent
<250 employees		17.7
250–1000 employees		22.0
1001–10,000 employees		32.5
10,001–50,000 employees		17.7
>50,000 employees		10.1
Job level		Percent
CEO		8.2
Vice President		33.3
Director		15.0
Senior Manager		16.3
Manager		27.2

and director), indicating that we have included key respondents that are appropriate for our survey.

Although the survey instrument included indicators grounded in the extant literature, we conducted the q-sort approach not only to ensure that these indicators are appropriate within our context, but also to increase pre-response reliability of the adopted indicators. For this purpose, we used a team of eight supply-chain management researchers and practitioners to assess interrater reliability suggested by Perreault and Leigh (1989) that measures the proportion of agreement between all judge pairs. Extant research suggests that the proportion of interjudge agreement must be over 65 % to be considered acceptable (Moore and Benbasat 1991; Stratman and Roth 2002). We achieved a final score of 81.1 %, suggesting that the indicators were appropriate and reliable. The indicators for measuring the various theoretical constructs and performance outcomes are included in Tables 2 and 3.

## Measures

The construct “instrumental motives” measured the extent to which firms engage in SSCM so as to (a) satisfy demand for sustainability improvement, (b) avoid poor publicity, (c) appease shareholders, and (d) achieving short-term and long-term profitabilities (Bansal and Clelland 2004; Reinhardt et al. 2008; McWilliams and Siegel 2011). Items measuring “relational motives” mirror the extent to which firms practice SSCM to (a) increase customer base, (b) meet

sustainability regulations, (c) differentiate from competitors, and (d) gain competitive advantage (Buysse and Verbeke 2003; Aguilera et al. 2007; Delmas and Toffel 2008; Seuring and Muller 2008; Tate et al. 2010; Sarkis et al. 2011; Hofer et al. 2012). The construct “moral motives” was measured by indicators reflecting firms’ intent to practice SSCM due to (a) genuine concern for the environment, (b) a sense of responsibility to the environment, and (c) top management belief (Logsdon and Wood 2002; Cameron et al. 2004; Aguilera et al. 2007; Cantor et al. 2012).

The indicators measuring “sustainable product design” assessed the extent to which firms incorporate sustainability guidelines including reduce, reuse, recycle, and/or recovery when designing products (Zhu and Sarkis 2004; Carter and Easton 2011; Zhu et al. 2012). The construct “sustainable process design” included indicators measuring the extent to which firms design their processes to be environmentally friendly (Zhu and Sarkis 2004; Rao and Holt 2005; De Giovanni 2012; Narasimhan and Schoenherr 2012; Wong et al. 2012). “Supply-side sustainability collaboration” included indicators that measure the extent to which the responding firm cooperates with its suppliers to achieve sustainability objectives as well as provides suppliers with requirements, materials, equipment, services, and feedback to support its sustainability goals (Carter et al. 2000; Rao and Holt 2005; Vachon and Klassen 2006; Hoejmose and Adrien-Kirby 2012; Shi et al. 2012; Zailani et al. 2012; Zhu et al. 2012). Along similar lines, the construct of “demand-side sustainability collaboration” includes indicators that capture the extent to which the buying firm cooperates and jointly plans with its customers to achieve the sustainability goals (Vachon and Klassen 2006, 2008).

As for performance factors, “environmental performance” included indicators measuring the firm’s ability to (a) reduce energy, pollution, and waste; (b) decrease consumption of natural resources and hazardous materials; and (c) decrease environmental accidents (Zhu and Sarkis 2004; De Giovanni 2012; Zhu et al. 2013). Finally, “financial performance” included items measuring the change in (a) return on assets, (b) net income before tax (EBIT), and (c) profit as percentage of sales (Chen and Paulraj 2004; Ameer and Othman 2012).

## Nonresponse Bias

We assessed nonresponse bias by comparing early and late respondents (Armstrong and Overton 1977). Specifically, we looked at the survey submission date and split our sample into the two groups: the “early” group included 129 responses, while the “late” group included 130 responses. We compared the two groups using firm-size as well as 10 randomly selected indicators from our survey instrument. These group comparisons did not reveal any

**Table 2** Measurement model for motives and SSCM factors

Indicator (Eigen value, Cronbach's alpha, composite reliability, average variance extracted)	Principal component <sup>b</sup> factor loading	Measurement model	
		Std. coefficient	<i>t</i> -value <sup>c</sup>
<b>Instrumental motives</b> (Eigen value = 1.85; $\alpha$ = 0.63; CR = 0.66; AVE = 0.42)			
We engage in sustainable activities ...			
Due to the shareholders demand for sustainability improvements	0.73	0.58	–
In order to avoid poor publicity	0.68	0.49	5.60
In order to appease our shareholders	0.83	0.81	5.57
For short-term profitability <sup>a</sup>			
In order to achieve long-term profitability <sup>a</sup>			
<b>Relational motives</b> (Eigen value = 2.45; $\alpha$ = 0.85; CR = 0.86; AVE = 0.68)			
We engage in sustainable activities ...			
In order to increase our customer base	0.81	0.69	–
In order to differentiate us from our competitors	0.85	0.85	12.04
As it is a source of sustained competitive advantage	0.87	0.90	12.24
Primarily due to sustainability regulation <sup>a</sup>			
<b>Moral motives</b> (Eigen value = 3.12; $\alpha$ = 0.87; CR = 0.88; AVE = 0.65)			
We engage in sustainable activities ...			
Because we feel responsibility to the environment	0.87	0.88	–
Because of genuine concern for the environment	0.80	0.84	16.96
As top management considers environmental responsiveness as a vital part of corporate strategy	0.70	0.69	12.44
Because it is the right thing to do	0.75	0.79	15.39
<b>Sustainable product design</b> (Eigen value = 3.40; $\alpha$ = 0.85; CR = 0.85; AVE = 0.53)			
When designing products, we pay attention to reduced consumption of material/energy	0.66	0.70	–
When designing products, we pay attention to reuse, recycle, and/or recovery of material	0.74	0.79	11.38
We design our products to use environmentally friendly materials	0.76	0.84	11.86
We design our products with standardized components to facilitate reuse	0.77	0.69	10.11
We design our products for easy disassembly	0.70	0.61	8.93
We use life cycle analysis to evaluate the environmental impacts of our products <sup>a</sup>			
We have formal guidelines for environmental product design <sup>a</sup>			
<b>Sustainable process design</b> (Eigen value = 2.52; $\alpha$ = 0.89; CR = 0.90; AVE = 0.69)			
The design of our processes is heavily dependent on sustainability goals	0.65	0.81	–
We evaluate our existing processes to reduce their impact on the environment	0.82	0.82	14.86
We have formal design for environment guidelines for process design	0.67	0.77	13.80
We constantly reengineer our processes to reduce their environmental impact	0.63	0.88	16.30
We improve the environmental-friendliness of our production <sup>a</sup>			
<b>Supply-side sustainability collaboration</b> (Eigen value = 4.68; $\alpha$ = 0.93; CR = 0.93; AVE = 0.68)			
We cooperate with our suppliers to achieve sustainability objectives	0.72	0.80	–
We provide our suppliers with sustainability requirements for their processes	0.71	0.82	14.60
We collaborate with our suppliers to provide products and/or services that support our sustainability goals	0.76	0.82	20.53
We develop a mutual understanding of responsibilities regarding sustainability performance with our suppliers	0.85	0.85	15.79
We conduct joint planning to anticipate and resolve sustainability-related problems with our suppliers	0.77	0.88	16.32
We periodically provide suppliers with feedback about their sustainability performance	0.80	0.78	14.12
<b>Demand-side sustainability collaboration</b> (Eigen value = 4.06; $\alpha$ = 0.94; CR = 0.94; AVE = 0.76)			
We cooperate with our customers to achieve sustainability objectives	0.85	0.87	–
We cooperate with our customers to improve their sustainability initiatives	0.86	0.86	25.05

**Table 2** continued

Indicator (Eigen value, Cronbach's alpha, composite reliability, average variance extracted)	Principal component <sup>b</sup> factor loading	Measurement model	
		Std. coefficient	<i>t</i> -value <sup>c</sup>
We collaborate with our customers to provide products and/or services that support our sustainability goals	0.79	0.87	18.98
We develop a mutual understanding of responsibilities regarding sustainability performance with our customers	0.79	0.90	20.02
We conduct joint planning to anticipate and resolve sustainability-related problems with our customers	0.71	0.83	17.44

Model Fit Indices: Normed Chi Square = 2.36 ( $\leq 3.0$ ); Non-Normed Fit Index = 0.96 ( $\geq 0.90$ ); Comparative Fit Index = 0.97 ( $\geq 0.90$ ); Root Mean Square Residual = 0.07 ( $\leq 0.08$ ); Root Mean Square Error of Approximation = 0.07 ( $\leq 0.08$ )

<sup>a</sup> Items dropped during instrument development process

<sup>b</sup> EFA total variance explained is 74 %

<sup>c</sup> All *t*-values are significant at  $p < 0.01$  level

**Table 3** Measurement model for performance factors

Indicator (Eigen value, Cronbach's alpha, composite reliability, average variance extracted)	Principal component <sup>a</sup> factor loading	Measurement Model	
		Std. coefficient	<i>t</i> -value <sup>b</sup>
<b>Environmental performance</b> (Eigen value = 3.48; $\alpha = 0.85$ ; CR = 0.86; AVE = 0.52)			
Reduction in air pollution	0.75	0.75	–
Reduction in waste (water and/or solid)	0.81	0.82	11.49
Decrease in consumption of hazardous/harmful/toxic materials	0.75	0.70	10.01
Decrease in frequency for environmental accidents	0.70	0.60	8.58
Increase in energy saved due to conservation and efficiency improvements	0.75	0.66	9.35
Decrease in use of natural resources	0.78	0.65	9.41
<b>Financial performance</b> (Eigen value = 2.49; $\alpha = 0.88$ ; CR = 0.89; AVE = 0.73)			
Return on Assets	0.83	0.74	–
Firm's net income before tax (EBIT)	0.93	0.92	13.52
Profit as percentage of sales	0.92	0.89	13.40

Model Fit Indices: Normed Chi Square = 1.96 ( $\leq 3.0$ ); Non-Normed Fit Index = 0.97 ( $\geq 0.90$ ); Comparative Fit Index = 0.98 ( $\geq 0.90$ ); Root Mean Square Residual = 0.04 ( $\leq 0.08$ ); Root Mean Square Error of Approximation = 0.07 ( $\leq 0.08$ )

<sup>a</sup> EFA total variance explained is 66 %

<sup>b</sup> All *t*-values are significant at  $p < 0.01$  level

differences at the 95 % confidence level. In addition, we compared our final sample with 350 randomly selected nonrespondents using demographic variables such as annual sales volume and the number of employees. These group comparison tests also pointed to no difference between the respondents and nonrespondents ( $p < 0.05$ ). Based on these results, we conclude that nonresponse bias is not a concern.

**Common Method Variance**

Common method variance (CMV) was addressed through procedural as well as methodological approaches. As for

procedural approaches, we eliminated bias due to commonalities by anchoring the indicators measuring independent and dependent constructs using different scale endpoints. We used the Harman's single-factor test to assess CMV (Podsakoff et al. 2003). This exploratory factor analysis (EFA) resulted in ten factors with eigenvalues greater than 1.0. In addition, while 74.63 % of the total variance was explained by these six factors, the first factor accounted for only 30.51 % of the variance. Using confirmatory factor analysis (CFA), we found the single factor model to exhibit significantly worse fit than our six factor model. We also conducted the Widaman (1985) approach as an additional test of

CMV, which compares a model including only the traits (theoretical factors) to another model that also includes a method factor along with the traits (Podsakoff et al. 2003). When compared to the first model, the fit for the second model was the same in terms of NNFI and CFI. However, the method factor explained only 2 % of the total variance (Williams et al. 1989). In summary, based on these results, we can safely conclude that CMV is not a concern.

### Measurement Instrument Development

First, we conducted specific tests to assess the assumption of normality, constant variance, and the existence of outliers. We tested for multivariate normality using the Mardia's (1970) test. For our entire dataset, the Mardia coefficient was found to be only 1.15. Since this is well within the recommended limits of  $-1.96$  and  $1.96$ , we can safely conclude that our data satisfy the assumptions of multivariate normality. In addition, given that none of the plots and statistics indicated any significant deviances from the assumptions of normality, constant variance, and outliers, we proceeded to the assessment of our measurement instrument for reliability, validity, as well as unidimensionality.

Both EFA and CFA were used to assess *convergent validity* and *unidimensionality*. As indicated earlier, we used different end points (scale anchors) for independent and dependent indicators. Therefore, we had to use two different measurement models for assessing the independent and dependent factors. During CFA, the constructs were made scale-invariant by fixing one of the loadings in each construct to 1 (Chen et al. 2004). The Eigen values (all above 1.0) as well as factor loadings (all above 0.50) from EFA suggest that our indicators exhibit convergent validity (Hair et al. 1998). In addition, the model fit indices, standardized coefficients (all except one value above 0.50), and t-values (all values significant at the 99 % confidence level) from CFA (Tables 2 and 3) suggest that our theoretical constructs exhibit convergent validity as well as unidimensionality (Hu and Bentler 1999).

We assessed *discriminant validity* by comparing average variance extracted (AVE) to the squared correlation between two constructs. As suggested by Fornell and Larcker (1981), the AVE of the each pair of constructs must be greater than their squared correlation. Comparing the correlation values given in Table 4 to the AVEs given in Tables 2 and 3 indicate that the requirements of discriminant validity for all constructs are met. Finally, we assessed *reliability* using the composite reliability (CR) as well as Cronbach's Alpha values (Bagozzi and Yi 1988; Nunnally and Bernstein 1994). As shown in Tables 2 and 3, all Cronbach Alpha and CR values, except those for

instrumental motives, were greater than 0.70, indicating that the constructs are reliable as well. Since the values for instrumental motives were greater than 0.60 and given that we adapted the indicators for this construct from past research, these values were deemed acceptable. In addition, all constructs except for instrumental motives had an AVE value greater than 0.50. Although the reliability assessment for instrumental motives was not completely satisfactory, we decided to retain this construct as it forms an integral part of our operationalization of sustainability motivations. Alternatively, we were able to improve the reliability of this construct by eliminating the second indicator, but we decided to keep this indicator as its elimination will reduce the total number of indicators to below three.

### Hypothesis Tests

We tested the five hypotheses by the structural equation modeling approach. The widely recommended method of maximum likelihood was utilized to estimate the model parameters. We controlled for the effect of number of employees (a measure of firm-size) on our performance measures. However, as the effect of this control variable was found to be insignificant, we have reported the results after excluding it from the hypothesized model. The fit indices (Normed Chi square = 2.11; Normed Fit Index = 0.93; NNFI = 0.95; CFI = 0.96; RMSEA = 0.07; Root Mean Squared Residual = 0.07) suggest that the data fits our hypothesized model. While the path from instrumental motivation to SSCM practices was found to be not statistically significant (H1:  $b = 0.07$ , ns), the paths from relational motivation (H2:  $b = 0.15$ ;  $p < 0.05$ ) and moral motivation (H3:  $b = 0.54$ ;  $p < 0.01$ ) to SSCM were significant. In addition, SSCM also had a significant impact on environmental performance (H4:  $b = 0.68$ ;  $p < 0.01$ ) as well as financial performance (H5:  $b = 0.33$ ;  $p < 0.01$ ). Therefore, among the five hypotheses, only H1 was found to be insignificant.

### Post-hoc Analysis

To shed more light on our proposed model, we conducted multiple post hoc analyses. First, although we did not forward a formal hypothesis for the mediating effect of SSCM, we conducted specific analyses since motivations influence SSCM practices, which in turn affect performance measures. Second, to answer additional questions raised in the opening of the paper, we specifically tested to see whether firms that are primarily driven by moral motives performed better or worse than those that are highly motivated by instrumental and relational considerations. These analyses along with their results are explained below.



**Table 4** Correlation between theoretical constructs

Factors	Mean	SD	IM	RM	MM	PD	RD	SSC	DSC	EP	FP
Instrumental motives (IM)	2.99	0.84	1.00								
Relational motives (RM)	3.70	0.93	0.25	1.00							
Moral motives (MM)	4.08	0.80	0.15	0.39	1.00						
Sustainable product design (PD)	3.58	0.82	0.06	0.27	0.45	1.00					
Sustainable process design (RD)	3.25	0.96	0.12	0.25	0.51	0.60	1.00				
Supply-side sustainability collaboration (SSC)	3.03	0.97	0.21	0.30	0.37	0.49	0.65	1.00			
Demand-side sustainability collaboration (DSC)	3.37	1.00	0.13	0.36	0.47	0.43	0.58	0.64	1.00		
Environmental performance (EP)	3.57	0.72	0.06	0.24	0.42	0.44	0.51	0.42	0.38	1.00	
Financial performance (FP)	3.58	0.80	0.01	0.19	0.24	0.22	0.20	0.23	0.25	0.29	1.00

*Mediation Effect of SSCM*

The approach suggested by James et al. (2006) was adopted to test the mediating role of SSCM (Paulraj et al. 2008). We compared three models: (a) a full-mediation model (Model 1), (b) a partial mediation model (Model 2) that includes direct paths from the three motivation factors to the two performance factors, and (c) a direct model (Model 3) that only includes direct paths from the three motivation factors and SSCM to the two performance factors. As is evident from Table 5, Model 1 performs better than the other two models in terms of AIC and CAIC values—lower value is better (Akaike 1987; Bozdogan 1987). In addition, Model 1 has the highest percentage of significant paths, and the variance explained was comparable to the other models (Paulraj et al. 2008). Thus, these results suggest that Model 1 is superior to Models 2 and 3. In addition, we further checked whether SSCM partially or fully mediated the effect of the motivation factors on performance. Since the direct effect of instrumental motives on SSCM is not significant, we could not specifically test for the mediating effect of SSCM on the relationship between instrumental motives and performance factors. However, for relational motives, the direct paths to environmental performance ( $\beta = 0.06$ , ns) and financial performance ( $\beta = 0.07$ , ns) were both found to be insignificant. Similarly, the direct paths from moral motives to environmental performance ( $\beta = 0.10$ , ns) and financial performance ( $\beta = 0.11$ , ns) were also insignificant. Based on these results, we can conclude that SSCM fully mediates the performance outcomes of both relational and moral motives.

*Performance Implications of Motivations*

To test whether firms that are highly driven by moral motives performed better (or worse) than firms with high levels of instrumental and relational motives, we first found

**Table 5** Results of structural equation modeling based mediation analysis

	Model 1 <sup>a</sup>	Model 2 <sup>b</sup>	Model 3 <sup>c</sup>
Structural paths			
IM → SSCM	0.07	0.09	–
RM → SSCM	0.15 <sup>*</sup>	0.14 <sup>+</sup>	–
MM → SSCM	0.54 <sup>**</sup>	0.52 <sup>**</sup>	–
SSCM → EP	0.68 <sup>**</sup>	0.59 <sup>**</sup>	0.59 <sup>**</sup>
SSCM → FP	0.33 <sup>**</sup>	0.23 <sup>*</sup>	0.23 <sup>*</sup>
IM → EP	–	–0.07	–0.07
IM → FP	–	–0.08	–0.08
RM → EP	–	0.06	0.06
RM → FP	–	0.07	0.07
MM → EP	–	0.10	0.10
MM → FP	–	0.11	0.11
Model fit indices			
CFI	0.96	0.96	0.96
NFI	0.93	0.93	0.93
NNFI	0.95	0.95	0.95
RMSEA	0.07	0.07	0.07
PNFI	0.81	0.79	0.79
AIC	575.59	576.07	576.07
CAIC	821.66	849.48	849.48
Variance explained ( $R^2$ )			
EP	0.46	0.46	0.46
FP	0.11	0.12	0.12

\*\* *t*-values significant at  $p \leq 0.01$ ; \* *t*-values significant at  $p \leq 0.05$ ; + *t*-values significant at  $p \leq 0.10$

<sup>a</sup> Hypothesized (full-mediation) model

<sup>b</sup> Partial mediation model

<sup>c</sup> Direct model

the 30th and 70th percentile for the summated scores of the three motivation factors. For each motivation, firms in the top 30 percentile were classified as high in that motivation category while those in the low 30 and middle 40

percentiles were classified as low and medium, respectively. We then selected two groups of firms: the first group (Group 1: high in moral motivation) included firms in the top 30 percentile for moral motivation while simultaneously being in the low 30 percentile score on the other two motivations. The second group (Group 2: high in instrumental and/or relational motivation) included firms in the top 30 percentile for instrumental and/or relational motivations and in the low 30 percentile for moral motivations. Among the 259 firms, only 30 firms fell in Group 1 while 65 firms fell in Group 2. We compared these two groups using MANOVA with the three motivations, SSCM, and performance factors as dependent variables. The MANOVA statistics (Pillai's Trace = 0.60, Wilk's Lambda = 0.40, Hotelling Trace = 1.53, Roy's Largest Root = 1.53) were all statistically significant at the 99.9 % confidence level, indicating that factors representing motivations, SSCM, and performance were all significantly different across the two groups. As illustrated in Table 6, the MANOVA F-test results suggest that all factors are statistically different across the groups, although relational motives were found to be insignificant. In general, these results delineate that firms that are highly driven by moral motivations perform better than those with high levels of instrumental and/or relational motivations.

## Discussion and Implications

This study contributes to and extends the growing research stream of SSCM by merging it with business ethics research. In particular, it examined the relationships among corporate motives, sustainable supply-chain practices, and firm performance. The findings of significant positive relationships between motives, practices, and performance outcomes constitute an important contribution to the literature in SSCM. This study represents a unique treatment to SSCM research in that most studies exploring these links have been qualitative in nature and large-scale quantitative analyses remain very limited (Campbell 2007).

Furthermore, the prevalence of the existing models look at the consequences rather than the antecedents of these responsible practices (Aguilera et al. 2007). By extending prior qualitative research on motives, this empirical study therefore contributes to existing knowledge concerning antecedents of SSCM practices and elucidates some important insights to the business ethics literature. Given that the preponderance of research on SSCM focus on the *consequences* of such activities, studying antecedents can make a particularly valuable contribution to the literature and practices (Bronn and Vidaver-Cohen 2009). This study also responds to a call for a more robust framework that incorporates morality-based, in addition to instrumental and relational motives, as the organizational justice literature has recently experienced a move from instrumental focus to models that consider principled moral obligations to allow for simultaneous investigation of the complex network of factors (Cropanzano et al. 2003; Aguilera et al. 2007).

CSR and business ethics researchers have theorized that firms engage in responsible initiatives with diverse motives. Drawing on multiple theories, this study purported that instrumental, relational, and moral motives can all drive firms to practice SSCM. The findings of significant relationships between *relational* motives and SSCM practices support utilitarianism and stakeholder theory, and suggest that multiple stakeholders, including customers and competitors, can be driving forces behind sustainability practices such as SSCM. In addition, our results illustrate that many firms have strong *moral* motivations based on deontological ethics and/or virtue ethics and are not primarily driven by a self-serving or ethical egoism intention to practice SSCM. This marks an interesting contrast with a recent study, which found that its survey respondents considered moral motives less pertinent to their engagement in social initiatives, compared to motives related to strategic concerns (Bronn and Vidaver-Cohen 2009). While social desirability bias may exist with any self-reported measures, such bias appeared to have little effect on our respondents, because of the fact that (1) the

**Table 6** MANOVA results

Factors	Average for entire sample	GROUP 1 High moral (n = 30)	GROUP 2 High instrumental + relational (n = 65)	F-value (probability)
Instrumental motives	3.18	2.64	3.43	21.02 ( $p < 0.0001$ )
Relational motives	3.74	3.53	3.84	2.17 ( <i>ns</i> )
Moral motives	4.12	4.81	3.80	62.19 ( $p < 0.0001$ )
SSCM practices	3.40	3.72	3.25	11.54 ( $p < 0.01$ )
Environmental performance	3.56	3.78	3.45	5.27 ( $p < 0.05$ )
Financial performance	3.52	3.84	3.37	6.59 ( $p < 0.05$ )

questionnaire was anonymous and survey respondents had little incentive to portray a more favorable picture than is the case and (2) respondents were willing to admit a number of self-serving motives in their responses. Given that many environmental and social problems cannot be solved through regulatory measures alone, it is very encouraging to learn that the majority of the firms in our sample have gone beyond mere compliance with legal obligations to engage in SSCM with strong moral motives. More interestingly, our post hoc analyses reveal that firms with high moral motivations or strong virtues perform better than those whose acts are primarily driven by instrumental and/or relational motivations. This finding resonates with the limited empirical studies on moral motives, which found that moral commitment induces a stronger involvement in CSR and correlates highly with performance (Graafland and Van de Ven 2006; Fernando and Almeida 2012). It also contributes empirical corroboration to the Positive Organization Scholarship (POS) literature by suggesting that *organizational virtuousness* is positively associated with higher firm performance due to the (1) *amplifying* attribute which can foster escalating positive consequences and (2) *buffering* attribute which protects against negative encroachment (Cameron et al. 2004). Virtuous organizations strive to go beyond “do no harm” and pursue the highest aspirations for unconditional societal betterment (Bright et al. 2006).

On the other hand, our hypothesized link between *instrumental* motives and SSCM practices (H1) was found to be insignificant. One reason for this non-finding might be that the scales used for measuring this self-interest construct might be insufficient, as specified by the somewhat low Cronbach alpha value. While this might be the case, a more plausible explanation might be that while the desirability and pervasiveness of the pursuit of self-interest is a key belief and value underpinning American corporate capitalism (George 2014), as is also evidenced by the fact that even research on CSR tends to search for the links between CSR and firm performance (Campbell 2007; McWilliams and Siegel 2011), this depiction is more relevant to the U.S. than to European organizations (Meyer and Boxenbaum 2010). Another plausible explanation could be that the decision makers might not realize that SSCM practices can generate economic benefits. The misperception can be attributed to the fact that these SSCM practices are new and thus awareness of their effectiveness might be lacking. In the absence of strong instrumental interests, it appears that moral motives can serve as a robust driving force for firms to embrace SSCM practices.

In the extant literature, researchers have argued how SSCM practices, including product and process innovations and collaboration with supply-chain partners can become a set of dynamic capabilities. Since these

capabilities are complex, socially created with suppliers and customers, path dependent, and difficult to imitate, they can be a source of competitive advantage leading to improved firm performance. The findings of this study demonstrate that sustainable product design, process design, supply-side sustainability collaboration, and demand-side sustainability collaboration collectively play a central role in enhancing a firm’s environmental and financial performance. Moreover, extant research investigating the relationships between SSCM and financial performance has resulted in disparate and, to some extent, contradictory findings with some advise that “it does pay to be green” (e.g., Golicic and Smith 2013), while others maintain that SSCM practices may have uncertain or even negative impacts on financial performance (e.g., Hahn et al. 2010; Winn et al. 2012). The results of this study provide compelling empirical support that SSCM practices, whether driven by relational interests or moral motives, do yield financial benefits.

## Conclusion

Environmental responsibility and economic performance can often be at odds, due to greed or ignorance. Yet, firms are increasingly integrating sustainability into their supply-chain management practices. Organizations today know that all aspects of SSCM are a more important dimension of business than ever before, and are granting these matters strategic attention. For example, recent allegations that surfaced regarding the amount of toxic chemicals in its supply chain overseas have forced Apple, one of the most influential and profitable companies in the world, to take the matters seriously by arranging for a number of audits and swiftly announcing the removal of two toxic chemicals from its supply chain. For many years, Apple shared very little about its “secret” supply chain. The fact that it now releases its *Supplier Responsibility Progress Report*, shares its supplier list, and gives environmental and social matters corporate priority speaks volumes. Although it is not clear whether moral motives were behind Apple’s decision, it seems apparent that investors, customers, and media reports and thus *instrumental* and *relational* motives (i.e., consequentialism) have played a pivotal role. Since complying with norms reflects the “lowest common denominator” for *less-unsustainable* practices, and becoming more, or truly, sustainable business calls for “moral goodness” that voluntarily exceeds institutionalized normative expectations (Walls and Hoffman 2013), this study has made a convincing case for morality-based SSCM practices. Moreover, it bestows a concrete empirical support for a recent research arguing that moral obligation for

green management is absolute, and whether it “pays” to be green is only partly relevant (Marcus and Fremeth 2009).

Findings of this study contribute to multiple literature researches espousing corporate sustainability and business ethics. This research reveals that moral motives can be a much stronger driver than instrumental motives, and that firms exhibiting a high level of moral concerns for the environment tend to outperform those mainly driven by amoral considerations. Grounded in deontological ethics and virtue ethics, morality-based SSCM practices and financial performance are not mutually exclusive. Rather, they can be “complementary” in that firms can “do well by doing good.” Moreover, since ethical compliance is a moral minimum, virtuous organizations emphasize nurturing moral development and ethical strength to ensure that they not only prevent unethical actions, but also promote virtuous behaviors (Sekerka et al. 2014). Having a clearer understanding of why companies practice SSCM adds significantly to our knowledge of how to better advance corporate sustainability. Managerially, our findings provide additional insights into how companies respond to changes in the external environments and thus can help policymakers, managers, stakeholders, and scholars develop more robust strategies for encouraging businesses to engage in environmentally responsible practices (Bronn and Vidaver-Cohen 2009). Academically, this study helps provide a research framework for developing theory about what drives firms to engage in SSCM, how corporations may respond differently to institutional pressures for acting responsibly, and whether such sustainable practices can enhance a firm’s environmental and financial performances. The provision is timely and of paramount importance because the reason why scholars, managers, and companies today do not agree on the conceptual connections among drivers of sustainability and SCM has been attributed to insufficient theory (Markman and Krause 2014).

Despite the considerable contributions stated above, it is essential to acknowledge limitations of our study that might provide opportunities for future research. Two of the five scale items for the *instrumental* motives construct were eliminated during the instrument development process and the construct ended with a lower than expected Cronbach’s alpha value. Future research can improve it and consider adding new indicators to more completely tap the construct. Likewise, the relational motives construct was characterized by (1) customers, (2) differentiation from competitors, and (3) sustained competitive advantage as a joint effect of enhancing customer base and differentiation from competition. Sustained competitive advantage as a relational motive notwithstanding, if a firm chooses to pursue SSCM for the self-interest of gaining sustained competitive advantage, then sustained competitive

advantage can be considered an instrumental motive. Thus, we encourage future researchers to work to refine this potentially “muddy” scale. In addition, SSCM practices is inherently a multidimensional construct and we had selected four most influential first order factors of sustainable product design, process design, supply-side collaboration, and demand-side collaboration to underpin the construct. Factors focusing on other aspects of sustainability such as logistics and distribution can be incorporated to more fully capture the SSCM practices construct. Furthermore, this study focused on the environmental aspect of SSCM practices, future research can incorporate social issues in the conceptualization of SSCM.

Another limitation of this research concerns the sample population. While this study sample covered a wide range of firms in various industries, it was drawn from the Dun & Bradstreet database of firms in Germany. It would be interesting to find out if firms in the U.S., where the ideology of American corporate capitalism (ACC) fosters and encourages self-interest and consumption (George 2014), would rank instrumental motives higher and moral motives lower in their drive to practice SSCM. Moreover, since the conceptualization and practices of SSCM as well as moral theory are highly contextually and culturally dependent, existing theoretical concepts, constructs, and measurements developed primarily based on research conducted in industrialized Western countries may not be readily applicable to other parts of the world. It would be helpful to conduct a similar study in other regions such as (1) Asian countries that are currently experiencing the bulk of the manufacturing boom and making a profound impact on the global ecological system, and (2) Latin America where companies might have different perceptions of SSCM practices due to limited knowledge and/or resources. Additional analyses can be conducted to determine if motives and SSCM practices vary with firm size across industries and manager profiles. Notwithstanding these limitations, this study paves the way for managers and researchers to better understand what motivates firms to engage in SSCM practices and the differential effects on performance outcomes.

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