



## Marketing capabilities and innovation-based strategies for environmental sustainability: An exploratory investigation of B2B firms

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### ABSTRACT

While emerging literature on sustainability shows that environmentally responsible strategies can contribute to competitive advantage and enhanced financial performance, little is known about specific marketing capabilities that lead to sustainable consumption behavior, and whether implementing such strategies leads to firm competitive advantage. Using the case method approach, this study explores marketing-related strategies and practices pertaining to sustainable consumption as reported by leading sustainable firms in the B2B context. We examine case studies of forty seven B2B firms and identify key marketing capabilities that tie to innovation-based sustainability strategies, sustainable consumption behavior and firm performance. We use our findings to develop a conceptual framework linking marketing capabilities to innovation strategies for firm sustainability, sustainable consumption behavior and firm competitive advantage, and put forward propositions for future research.

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### 1. Introduction

“The only hope for sustainability is to change *forms* of consumption. To do so, we must innovate.”

*World Business Council for Sustainable Development (WBCSD, 2002).*

Rapid rise in global population growth, consumption patterns associated with global affluence, as well as a consumerist culture among different income groups have put unsustainable stress on environmental ecosystems. According to the World Bank, sixty percent of the earth's ecosystem has been degraded in the past 50 years, while natural resource consumption is expected to rise to 170% of the Earth's bio-capacity by 2040. Consequently, businesses are coming to the realization that the issues of sustainability and sustainable development can no longer be sidestepped, and have identified several important areas for sustainable development, one of which consists of innovation-based strategies (WBCSD, 2008a). While academic and managerial research has suggested that sustainability and sustainable development can lead to competitive advantage for firms (Berns et al., 2009; Bilgin, 2009; Wagner, 2005), research studying the role of marketing capability in innovation-based competitive strategy has been

limited (Weerawardena, 2003), and no study to date has examined the specific capabilities that can drive innovation-based sustainable development strategies. Our study addresses this gap in the literature with a focus on Business-to-Business (B2B) firms.

In a recent issue of *Journal of Marketing*, Kotler (2011) states that the need for sustainable marketing practices means new challenges to marketing scholars and marketing practitioners, and highlights major research imperatives in the area of sustainability including the following issue: “What factors lead companies to compete on the basis of sustainability? What changes in marketing practice does sustainability seem to require?” (p. 135). We derive our motivation for this study from past research arguing that firms' quest for sustainability helps them develop distinct competencies that drive innovations (Nidumolu, Prahalad, & Rangaswami, 2009), and hence competitive advantage (Day and Wensley, 1988; Hurley & Hult, 1998; Porter, 1990). Research also suggests that basic competencies and internal capabilities should precede development of sustainability-based managerial practices (Christmann, 2000; Darnall & Edwards, 2006; de Ruyter, de Jong, & Wetzels, 2009; Hart, 1995).

Based on extant research in strategic marketing (Weerawardena, 2003), we contend that firm marketing capability influences the development of innovation-based sustainable strategies, while also facilitating the success of such innovations in the marketplace, leading to firm competitive advantage. Though marketing capabilities have the potential to generate innovation-based sustainability strategies, the functional role of marketing in the strategy dialog has been overlooked by marketing and related disciplines. This oversight is even more acute in the B2B context. Though B2B

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transactions represent a majority of all marketing activities outnumbering Business to Consumer (B2C) transactions, i.e., purchases by end-consumers (Polonsky, Broks, & Henry, 1998), limited academic research has addressed the issue of how B2B firms address sustainability challenges within their new product development processes (Geffen, 1997; Pujari, Peattie, & Wright, 2004). The managerial practice also reflects a similar gap (Joshi, 2009; Stoiber, 2011).

The present study bridges this research gap by exploring whether different types of marketing capabilities can help generate innovation-based sustainability strategies in B2B firms. We argue that firm marketing capabilities are a key driver to sustainable development. We define sustainable development as one that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development is a process of change in which “the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs” (WCED, 1987). Specifically, our exploratory study investigates the relationship between marketing capabilities and the innovation-based strategies intended to promote sustainable consumption behavior in the B2B context. Borrowing from the United Nations Commission on Sustainable Development, we define sustainable consumption behavior as a range of social, economic and political practices at the individual, household, community, business and government levels that support and encourage the consumption of goods and services that respond to basic needs and bring a better quality of life, while minimizing the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardize the needs of future generations (OECD, 2002).

Understanding the relationships between marketing capabilities and innovation-based sustainability strategies is both theoretically and managerially relevant. Theoretically, we integrate the literature on marketing capabilities, innovation and sustainability to develop a conceptual and testable framework on the relationship between marketing capabilities and innovation-based strategies for sustainable development in the B2B context. From a managerial perspective, a key question facing firms that engage or plan to engage in sustainability business practices relates to how they can leverage the firm’s capabilities to enhance sustainable consumption behavior. This study attempts to shed some light on the specific capabilities that managers must seek to develop in order to attain desired sustainable behavioral outcomes in a B2B environment.

The fundamental premise of this study is that different types of marketing capabilities can be a catalyst to different types of innovation-based sustainability strategies. Based on findings from our case analysis, we formulate propositions that relate marketing capabilities of firms that pursue sustainability to both technical (product and/or services, and production process technology) and non-technical (managerial, market, and marketing) innovations. Further, we also propose that such innovation-based sustainability strategies are positively associated with sustainable consumption behavior and firm competitive advantage.

Our paper is organized as follows: first, we review the extant literature on marketing in the context of sustainability and innovation and make the case that marketing capabilities are positively associated with innovation-based sustainability strategies that lead to firms’ competitive advantage. Based on the literature review, we develop the specific research questions that guide our study. Next, using the case research method, we systematically examine forty seven firms to identify B2B firms that practice sustainable development, and develop a conceptual framework linking marketing capabilities to innovation-based sustainability strategies, sustainable consumption behavior and firm performance. We then put forward propositions for future research and discuss the findings, managerial implications, and conclusions.

## 2. Literature review

### 2.1. Marketing and sustainability

The last two decades have seen an increasing number of firms advocating the goal of sustainability. Academic research on sustainability/sustainable development has also grown in parallel. Yet, although the idea of sustainability has been widely endorsed by major companies, agreeing about what it means and how to achieve it has proven to be elusive. While some have criticized the vagueness of the term (Lele, 1991; Mebratu, 1998), there is relative agreement among academics that sustainable development encompasses environmental, economic, as well as social (equity) sustainability (Rogers, Jalal, & Boyd, 2008), referred to as the 3 Es that constitute the “triple bottom line” (Hunt, 2011; Savitz & Weber, 2006), or sustainability’s three-legged stool (Newport, Chesnes, & Lindner, 2003). While the ecocentric term “environmental sustainability” has dominated the sustainability literature (e.g., Sheth, Sethia, & Srinivas, 2011), and the environment has traditionally had primacy in the discourse on sustainability (Newport et al., 2003), recent academic and practitioner literature (e.g., Newport et al., 2003; Holliday, 2001) have noted the importance of embracing the three components of sustainability. For example, the Dow Jones Sustainability Index (Sustainability Asset Management Group, 2002) transcends the environmental fixation in its prospectus by “...embracing opportunities and managing risks deriving from economic, environmental and social developments.”

While we acknowledge that the three dimensions of sustainable development are important in their own right, we deliberately limit the scope of our research to focus on the environmental component of firm sustainability initiatives in marketing, owing to the following reasons (in addition to practical considerations): first, the topic of environmental sustainability has particularly attracted increased research attention from marketing scholars (e.g., Baker & Sinkula, 2005; Banerjee, Iyer, & Kashyap, 2003; Drumwright, 1994; Menon & Menon, 1997; Strong, 1997), some of whom have recently highlighted the pressing challenges that environmental sustainability poses for marketing academics and practitioners (e.g., Kotler, 2011; Scott, 2005). For example, Kotler (2011) singles out the environmental agenda as the one likely to have a “profound influence...on marketing theory and practice” and notes that marketing “will have to reinvent its practices to be environmentally responsible” (p. 132). Second, given the B2B focus of this research, it should be noted that environmental sustainability initiatives in the B2B context engender various benefits for the partners involved, both in terms of supply and demand management (Berth, 2011). Sharma, Iyer, Mehrotra, and Krishnan (2010) note that “environmentally-conscious supply management would enable better waste management and inventory control through lean manufacturing, reuse, remanufacture, and recycling, as well as a focus on product design for disassembly” while “environmentally-conscious demand management would require strategies that would reduce reverse supply, including better product design, precision in demand forecasting, and customized development and delivery” (p. 331).

While the B2B environment is characterized by marketing activities of organizations exchanging commerce transactions with other organizations along the value chain (Turnbull & Leek, 2003), the practitioner literature reports that B2B firms engage in both environmental and social stewardship using their supply chain, and that B2B firms also use social sustainability initiatives to cement B2B buyer–supplier relationships (Perkins and Brewer, 2010). Reflecting this managerial practice, the academic literature defines sustainability as comprising both environmental and social components. Though no specific definition of sustainability for the B2B context exists, attempts at defining the concept have been made in the supply chain management context. For example, Carter and Rogers (2008) define sustainability as the “strategic, transparent integration and achievement of a firm’s

social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chains." Another definition states sustainability as the "management of raw materials and services from suppliers to manufacturer/service provider to customer and back with improvement of the social and environmental impacts explicitly considered" (NZBCSD, 2003).

While the supply chain management literature implicitly recognizes that B2B firms pursuing sustainability take into account both social and environmental issues (Carter & Rogers, 2008), the practitioner literature reports that up to ninety percent of firms' total carbon emissions can be attributed to activities in their value chain (Perkins & Brewer, 2010). Therefore, the greatest opportunity for reducing environmental footprint might actually lie within a firm's supply chain, and B2B marketing firms are in a position to positively impact their customers and supply chain partners through varied environmental sustainability initiatives, including but not limited to greenhouse gas emissions and other key environmental metrics (Perkins & Brewer, 2010). For example, Walmart leverages environmental stewardship as part of doing business (Damico, 2007). Juxtaposing the current managerial practice of B2B firms engaging in supply chain environmental initiatives with the fact that research on the strategies to implement environmentally sustainable programs in the B2B environment are "still in their infancy" (Sharma et al., 2010), our focus is on the environmental dimension of sustainable development. Based on the specific focus for the study, we define sustainability in the B2B marketing context as the environmental initiatives that impact a firm and its supply chains for the purpose of reducing the environmental impact of their business operations, while also using the initiatives as a competitive advantage in their marketing strategies.

## 2.2. Sustainability in the B2B context

Past research has studied sustainability in the context of both B2C firms (e.g., Fuller, 1999; Polonsky & Ottman, 1998; Pomeroy & Lester, 2009; Pujari & Wright, 1996; Ryding, 1994; Sen & Bhattacharya, 2001; Speer, 1997), and B2B organizational buying (e.g., Green, Morton, & New, 2000; Polonsky et al., 1998). In practice, although the predominant marketing activities occur in the B2B environment (Pujari et al., 2004), and organizational buying of industrial products exceed purchases by end-consumers (Polonsky et al., 1998), green marketing is mostly applied to B2C organizations, and hardly considered in B2B organizations (Berth, 2011). Though the benefits that arise from sustainability practices can be common to both B2C and B2B firms, e.g., increased sales (Fierman, 1991), improved customer feedback (Frankel, 1992), closeness to customers (Dean, Fowler, & Miller, 1995), enhanced competitiveness (Porter & van der Linde, 1995) and improved corporate image (Kolk, 2000), the impact of environmental concern is more conspicuous in the B2B environment (Drumwright, 1994; Morton, 1996; Peattie & Charter, 2003). B2B marketers face strong governmental regulations and public pressure due to the significant impact of their products on the environment and society (Berth, 2011). For example, negative images that involve pollution and environmental damage will bring B2B marketers in chemical industries within the focus of governmental regulation (Iles, 2006). Moreover, because the impact of branding and advertising is greater on end-consumers vis-à-vis business customers, B2B firms face the tough challenge of convincing the more rational business customer into adopting usually more expensive pro-environmental and sustainable product solutions.

## 2.3. Sustainable marketing

The literature on sustainable marketing suggests that the underlying principles of sustainability pose an opportunity as well as a

significant challenge to the marketing discipline and practice (Peattie, 2001) because: (a) as ecological and social issues become significant external influences on companies and their markets, companies see the importance of reacting to changing customer needs, new regulations and a new social order that portrays increasing concern about the socio-environmental impacts of business (Peattie & Charter, 1994); and (b) the pursuit of sustainability requires fundamental change to the management paradigm which underpins marketing and other business functions (Kotler, 2011; Shrivastava, 1994). Thus, the role of marketing in enhancing sustainable development becomes critical because (a) much of the economic activity is triggered by the marketing process, which offers and stimulates the consumption process (Sheth & Parvartiyar, 1995), and (b) marketing has been cast both as a villain for its role in stimulating unsustainable levels of demand and consumption, and as a potential savior through the application of market mechanisms to tackle social and environmental problems (Peattie, 2001). Therefore, as the challenge of sustainability exerts an influence on current marketing practice, there is a pressing need for a profound shift in the marketing paradigm, and an equally important need for scholarly research examining the role of marketing in sustainable development (Kotler, 2011).

The starting point for research into marketing with an environmental perspective can be traced to the special edition of the *Journal of Marketing* in 1971. Early research in this area focused mostly on the links between environmental concern and behavior and on the characteristics of the 'green consumer' (Fisk, 1973, 1974; Shapiro, 1978). After a brief hiatus during the late 1970s, research interest renewed again with the second ecological movement in the late 80s and the 90s. Between 1990 and 1997, several special issues on the environment appeared in marketing journals such as the *Journal of Consumer Research* and the *Journal of Marketing Management* (see Chamorro, Rubio, & Miranda, 2009; Kilbourne & Beckmann, 1998), exploring the relationship between marketing and environmental issues (Banerjee & McKeage, 1994; Crane, 2000; Stanley & Lasonde, 1996).

During the latter half of the 1990s, the marketing discipline began to address the issue in terms of the pursuit of sustainability (Peattie & Crane, 2005). Marketing scholars moved towards a broader management concept which focuses on creating, producing and delivering sustainable solutions with higher net sustainable value while continuously satisfying customers and other stakeholders. This ideology was popularly termed sustainable marketing, defined as the process of planning, implementing and controlling the development, pricing, promotion, and distribution of products in a manner that satisfies three criteria: (1) customer needs are met, (2) organizational goals are attained, and (3) the process is compatible with eco-systems (Fuller, 1999). Not surprisingly, this conceptualization of sustainable marketing is similar to the marketing concept. They both ultimately aim at delivering and enhancing customer value (Belz, 2006). The main difference is that sustainable marketing aspires to do so while also enhancing social and ecological values (Belz, 2005; Belz, 2006).

## 2.4. Sustainability and competitive advantage

One of the daunting questions that confront any discussion on firm engagement in sustainable development has been that of whether firms will find such investments viable in terms of competitiveness. Recent literature on sustainability has shown that sustainability strategies can indeed be a source of competitive advantage (e.g., Bilgin, 2009; Medina-Munoz & García-Falcon, 1998; Rodriguez, Ricart, & Sanchez, 2002; Shahbazzpour & Seidel, 2006; Wagner, 2005). Research suggests that embracing the responsibilities associated with sustainable development reinforces the benefits associated with competitive advantage (Rodriguez et al., 2002; Sharma et al., 2010).

The acknowledgement of the scarcity of natural resources and the need to reduce their use and the waste generated by business activities



may lead to the development of new activities and capabilities, which could create persistent competitive advantages (Hart, 1995). Wagner (2005) showed that strategic choices pursuing sustainability can be a decisive factor that may enable firms to create unique competitive advantages in terms of product image, sales, market share, and new market opportunities (Wagner, 2005). Bilgin's (2009) PEARL model for sustainable development, which includes perception friendliness, environment friendliness, action, relationship, and locality, has been suggested as a venue for competitive advantage when implemented as a corporate strategy through marketing activities involving processes that cannot be promptly imitated (Bilgin, 2009).

Porter (1985) classified the sources of competitive advantage into cost advantage and differentiation. Important sources of cost advantage include scale economies, learning economies, production capacity management, management efficiency, cost of inputs, product design, and process technology (Porter, 1985). Firms engaging in sustainable development gain cost advantages associated with designing products that minimize the environmental impact of wastes, thereby reducing simultaneously the consumption of energy and materials (Porter & van der Linde, 1995; Shrivastava, 1995). Cost savings also come from implementing technology and processes necessary to reduce the consumption of energy and materials, reuse materials and limit waste generation. Other sustainable strategies such as product wrapping, packaging, and bottling represent a major source of cost savings (Porter & van der Linde, 1995), and can actually provide added value to channels of distribution members and customers (Medina-Munoz & García-Falcon, 1998).

Among sources of differentiation, social, emotional, psychological, and esthetic considerations are directly related to sustainable business behavior, and the ecological image of a firm is usually recognized by a growing segment of potential customers (Medina-Munoz & García-Falcon, 1998). Moreover, as businesses become interested in the economic and social development of the geographical area in which they operate, they also gain the reputation of being a sustainable firm. As reputation is a scarce, valuable and inimitable resource, as well as one of the reasons for the often significant difference between the book and market value of businesses (Black, Carnes, & Richardson, 2000; Kotha, Shivaram, & Violina, 2001; Srivastava, McInish, Wood, & Capraro, 2000; Vergin & Qoronfleh, 1998), it is a source of persistent competitive advantage enabled by firm sustainable strategies (Rodriguez et al., 2002).

### 2.5. Innovation strategies for sustainable development

Extant research in strategic marketing suggests that firm innovation and the competitive advantage process are closely inter-related, and that all types of innovation can lead to sustained competitive advantage (Naidoo, 2010; Weerawardena, 2003). Past research argues that innovation is not only central to marketing strategy (Varadarajan & Jayachandran, 1999), but also the primary source of competitive advantage (Day & Wensley, 1988; Porter, 1990). Sustainable development in firms requires new ways of thinking and acting, and entails the development of new products, services and technologies. Thus, the quest for sustainable development can be seen as a stimulant for organizational change and an undeniable source of opportunities for innovation, resulting in value generation not only for the company but for society as a whole (Rodriguez et al., 2002).

Innovation-based sustainability strategies can be new technologies, products and/or processes that are intended to either (a) minimize the costs of the environmental impact of business activities, or (b) improve the efficiency in the usage of materials and energy (Medina-Munoz & García-Falcon, 1998). For instance, innovations aimed at minimizing the costs of the environmental impact of business activities may use recycling to convert contaminating substances or wastes into something valuable (Hart, 1995; Shrivastava, 1995). When such measures result in either cost savings or improvement of quality and consistency of products and services, they will represent a major source of cost

advantage (e.g., Porter, 1994; Porter & van der Linde, 1995; Walley & Whitehead, 1994), suggesting a link between innovation-based sustainable strategies and competitive advantage (Medina-Munoz & García-Falcon, 1998).

### 2.6. Marketing capabilities and innovation

Capabilities are "complex bundles of skills and accumulated knowledge that enable firms [or SBUs] to coordinate activities and make use of their assets" (Day, 1990, p. 38). The strategic management literature suggests that basic competencies must be in place before organizations can develop advanced environmental management practices requiring higher-order learning proficiencies (Christmann, 2000; Hart, 1995). According to the resource-based view (e.g., Barney & Zajac, 1994), competitive strategies and performance depend significantly upon firm-specific organizational resources and capabilities. Applying the resource-based view to the domain of corporate environmental strategies, Hart's (1995) natural resource-based view of the firm argues that firm competitive advantage is rooted in capabilities that facilitate environmentally sustainable economic activity. A firm's environmental strategies depend on its ability to distribute resources toward developing basic strategic competencies (Aragon-Correa, 1998; Darnall & Edwards, 2006; Russo & Fouts, 1997). For instance, an organization's expertise in complementary knowledge-based processes may support the development of more advanced environmental management processes (Hart, 1995). Nidumolu et al. (2009) also propose specific firm competencies that can lead to innovation opportunities in a firm's path to sustainability. In sum, past research suggests that firm capabilities may play a critical role in the development of innovation-based sustainability strategies.

The strategic marketing literature states that the primary role of marketing in the competitive advantage process is innovation (Varadarajan, 1992; Weerawardena, 2003). Past research suggests that marketing capability contributes to commercial success of the products and services marketed by the firm (Day, 1994; Hooley et al., 1999; O'Cass & Weerawardena, 2009; O'Driscoll, Carson, & Gilmore, 2000; Shantanu, Om, & Surendra, 1999), and that marketing capability plays a critical role in organizational innovation-based competitive strategy (Weerawardena & O'Cass, 2004); however, the literature specifically examining the role of marketing capabilities in innovation-based competitive strategy has been limited (Weerawardena, 2003). Still, research suggests that the combination of marketing capabilities and the facilitation of market success that marketing entails leads to competitive advantage (Sharma et al., 2010; Weerawardena, 2003).

Capabilities are distinct competencies that are difficult to imitate by current competitors, difficult to substitute by current and new competitors and valuable, i.e. positively valued on the market (Barney, 1991; Rumelt, 1984; Wernerfelt, 1984). As a firm's sustainability-based innovation strategies drive its market research efforts, its selection of target markets, its product development processes, its market communication programs, and its delivery processes, many specific capabilities that enable the firm to carry out activities become necessary to move its products or services through the value chain (Day, 1994; Woodruff, 1997). Based on past research that argues that marketing capability influences all types of innovations pursued by the firm (Weerawardena, 2003), we contend that marketing capabilities impact innovation-based sustainable strategies. Accordingly, we map the relationships between specific marketing capabilities and innovation-based strategies for sustainable development.

Although the literature on marketing capability has theorized and operationalized "marketing capability" as a distinct competency (e.g., Song, Nason, Benedetto, & Anthony, 2008), different classifications of marketing capabilities have also been proposed in the literature (Vorhies, Morgan, & Autry, 2009). While developing a scale to operationalize Miles and Snow's (1978) strategic typology, Conant, Mokwa, and Varadarajan (1990) forwarded a list of twenty distinct marketing

competencies that firms can possess. Weerawardena's (2003) operationalization of Atuahene-Gima's (1993) scale includes specific skills such as customer service quality, promotional effectiveness, salesperson quality, strength of distribution network, and speed of new product introduction, as indicators of marketing capabilities. Relatedly, Song et al. (2008) examine the relationship between Miles and Snow's (1978) strategic type and marketing capabilities, including knowledge of the competition and of customers, skill in segmenting and targeting markets, and in advertising and pricing.

More recently, Vorhies et al. (2009) classified marketing capabilities into two categories, specialized and architectural. Specialized marketing capabilities are functionally focused capabilities built around the integration of the specialized knowledge held by the firm's marketing employees, and reflect task-specific marketing activities such as pricing, marketing communications, personal selling, product development, and distribution. Architectural marketing capabilities (cf. Teece, Pisano, & Shuen, 1997) are capabilities that direct the coordination of the specialized marketing capabilities, thus focusing resource deployments to achieve product-market goals, and provide the planning and coordination mechanism needed to ensure that marketing program-level activities, such as those represented in the firm's specialized marketing capabilities, are effectively deployed to implement the requirements of the firm's strategies (Noble & Mokwa, 1999). Ramaswami, Srivastava, and Bhargava (2009) draw from Srivastava, Shervani, and Fahey's (1998, 1999) conceptual development of market-based assets, to forward several types of marketing capabilities under three broad categories of market-based capabilities, viz. new product development, customer management, and supply chain management market based capabilities (see Table 1 for a detailed list of marketing capabilities). In this study, we focus on the specific marketing capabilities forwarded by extant literature, and use them in combination with the findings of our case study analyses, to develop the conceptual model and specific propositions (Fig. 1).

2.7. Research problem and questions

Based on our review of the literature on sustainability-based innovation, marketing capabilities and competitive advantage in the

context of the broad research issues raised in Weerawardena and Mavondo (2010) and Kotler (2011), we follow the approach laid in Weerawardena and Mort (2006) to identify the specific research gap and problems and thereby derive the substantive research questions that will further guide us in the study. Accordingly, the broad research problem as evident in our review of the literature highlights a gap in academic research addressing (a) the issue of innovation-based competitive strategy in B2B firms engaging in sustainable development, specifically (b) the role of marketing capability factors in driving sustainable-based innovation strategies towards achieving firm competitive advantage. We attempt to address this void in extant research by asking the following research questions: (1) *What is the nature of the different sustainability-based innovation strategies in B2B environments?* (2) *What are the specific marketing capabilities among those identified in extant literature that impact sustainability-based innovation strategies in a B2B environment?* (3) *How do different sustainability-based innovation strategies affect sustainable consumption behaviors and a firm's competitive advantage?* We address the research questions by analyzing case studies of B2B firms that have engaged in sustainability development activities.

In the next sections, we empirically explore the different innovation-based sustainable development strategies implemented, and the resulting sustainable consumption behavior and firm performance in B2B firms practicing sustainable development strategies. We then identify appropriate specific marketing capabilities that can be a catalyst to the implementation of innovation-based strategies. First, we describe our research methodology. We then synthesize our findings into an integrative conceptual framework that leads to a set of research propositions for future empirical testing.

3. Methodology

To develop our propositions, we use the case study approach (Eisenhardt, 1989). We use this method for several reasons: first, building theory from case study research is most appropriate in early stages of research on a topic (Eisenhardt, 1989). There is a lack of academic research on the development of marketing capabilities for innovation-based sustainable strategies, suggesting that an exploratory/

Table 1  
Review of specific marketing capabilities.

Specific marketing capabilities	Sources	Specific marketing capabilities	Sources
Knowledge of customers	Conant et al.(1990); Song et al.(2008)	Firm's market research efforts	Weerawardena(2003)
Knowledge of competitors	Conant et al.(1990); Song et al.(2008)	Speed of new product introduction	Weerawardena(2003)
Knowledge of industry trends	Conant et al.(1990); Vorhies et al.(2009)	R&D intensity	Ramaswami et al.(2009)
Accuracy of profitability and revenue forecasting	Conant et al.(1990); Vorhies et al.(2009)	Customer-driven development <sup>a</sup>	Ramaswami et al.(2009)
Awareness of organizational marketing strengths	Conant et al.(1990)	Advertising expenditure as percentage of sales	Weerawardena(2003)
Awareness of organizational marketing weaknesses	Conant et al.(1990)	Skill to segment and target markets	Song et al.(2008); Conant et al.(1990)
Marketing planning process	Conant et al.(1990); Vorhies et al.(2009)	Focus on high-value customers	Ramaswami et al.(2009)
Allocation of marketing department resources	Conant et al.(1990)	Responsiveness to customers	Ramaswami et al.(2009)
Ability to differentiate service offerings	Conant et al.(1990)	Sharing information and decisions	Ramaswami et al.(2009)
New service development process	Conant et al.(1990); Vorhies et al.(2009)	Supply chain leadership	Ramaswami et al.(2009)
Quality of service and offerings	Conant et al.(1990); Weerawardena(2003)	Customer-linking capabilities <sup>a</sup>	Song et al.(2008)
Effectiveness of pricing program(s) <sup>a</sup>	Conant et al.(1990); Song et al.(2008)	Supplier relationship capabilities <sup>a</sup>	Song et al.(2008)
Effectiveness of public relations	Conant et al.(1990); Vorhies et al.(2009)	Ability to retain customers	Song et al.(2008)
Image	Conant et al.(1990)	Channel-bonding capabilities <sup>a</sup>	Song et al.(2008)
Effectiveness of cost containment	Conant et al.(1990)	Integration of marketing activities	Song et al.(2008)
Control and evaluation of marketing activities	Conant et al.(1990)	Customer asset orientation	Ramaswami et al.(2009)
Personal selling <sup>a</sup>	Vorhies et al.(2009); Weerawardena(2003)	Integration of marketing activities	Conant et al.(1990)
Pricing <sup>a</sup>	Vorhies et al.(2009)	Marketing skill development	Vorhies et al.(2009)
Distribution	Vorhies et al.(2009); Weerawardena(2003)	Locations of facilities	Conant et al.(1990)
Internal coordination and communication	Vorhies et al.(2009)	Cross functional integration	Ramaswami et al.(2009)
Advertising effectiveness	Conant et al.(1990); Vorhies et al.(2009); Weerawardena(2003); Song et al.(2008)		

<sup>a</sup> An adapted form of these capabilities appears in the conceptual model and the propositions.

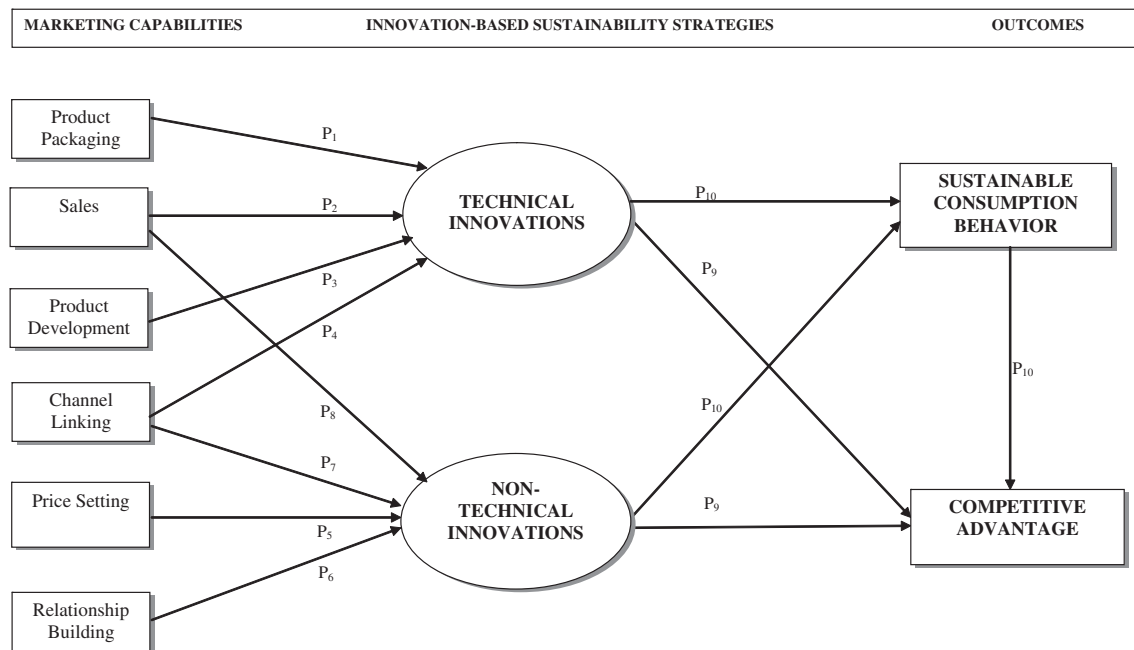


Fig. 1. Firm marketing capabilities driving sustainable consumption strategies – Conceptual Model.

theory building approach is more appropriate (Strauss & Corbin, 1994; Yin, 1994). Second, the diverse range of terminology used by practitioners and academics in the area of sustainable development requires methods that develop deep insights, as opposed to surface level observations (Alvesson & Skoldberg, 2000; Gronhaug & Olson, 1999). Third, the diversity in the type of firm strategies used for sustainable development and the corresponding sustainable behaviors enabled, suggest that the relationships may be path dependent (Mahoney, 2000). To understand and analyze path dependent processes, detailed case studies are preferred and sometimes required (Garud & Karnoe, 2001; Mahoney, 2000). Finally, understanding the development of marketing capabilities requires investigating firms' tacit knowledge (Polanyi, 1962) and "theories-in-use" (Argyris & Schön, 1978), which is greatly facilitated through detailed cases analyses.

We use the roadmap prescribed by Eisenhardt (1989) for building theories from case study research. As shown in Table 2, we adapt the 8-step case study framework to our specific context, while maintaining

the core principles of the suggested process. The main objective of step 1 is to define the research question(s). The definition of the research question allows researchers to specify the type of data to be gathered. Also, a priori specification of the constructs helps shape the initial design of the theory building research, and results in strong, triangulated measures on which to ground the emergent theory (Eisenhardt, 1989). Therefore, after deriving the research questions based on the procedure outlined in Weerawardena and Mort (2006), we specified the important constructs that helped us decide what to look for while collecting data sources, i.e., innovation-based sustainable strategies, sustainable consumption behavior and improvements in firm performance.

In step 2, cases were selected based on theory, rather than randomly from a specified population in which the process of interest is transparently observable (Glaser & Strauss, 1967; Pettigrew, 1988). Cases may be chosen to "fill theoretical categories and provide examples of polar types" (Eisenhardt, 1989). Accordingly, we scanned for data from a

Table 2  
Case study research methodology.

Step	Activity (as suggested in Eisenhardt, 1989)	Procedure as adapted to our study
1. Getting started	<ul style="list-style-type: none"> <li>• Definition of research question</li> <li>• Possibly a priori constructs</li> <li>• Neither theory nor hypotheses</li> </ul>	<ul style="list-style-type: none"> <li>• Research questions were defined</li> <li>• A priori constructs were defined</li> </ul>
2. Selecting cases	<ul style="list-style-type: none"> <li>• Specified population</li> <li>• Theoretical, not random, sampling</li> </ul>	<ul style="list-style-type: none"> <li>• Case studies from reports of WBCSD members and non-members and other relevant publications were collected after initial assessment of whether the strategies fit the research questions.</li> <li>• Detailed protocols and coding sheets were crafted</li> <li>• Three investigators reviewed the data to select cases of B2B marketing firms.</li> </ul>
3. Crafting instruments and protocols	<ul style="list-style-type: none"> <li>• Multiple data collection methods</li> <li>• Qualitative and quantitative data combined</li> <li>• Multiple investigators</li> </ul>	<ul style="list-style-type: none"> <li>• No field visits made</li> <li>• Data collection and analysis frequently overlapped</li> <li>• Team of 6 researchers formed for data analysis</li> <li>• Cross-case analysis<sup>a</sup> conducted using iterative methodology</li> <li>• Iterative tabulation of evidence for each construct from finding</li> <li>• Developed conceptual model from table of findings</li> <li>• Developed propositions for future research</li> </ul>
4. Entering the field	<ul style="list-style-type: none"> <li>• Overlap data collection and analysis including field notes</li> <li>• Flexible and opportunistic data collection methods</li> </ul>	<ul style="list-style-type: none"> <li>• No field visits made</li> <li>• Data collection and analysis frequently overlapped</li> <li>• Team of 6 researchers formed for data analysis</li> <li>• Cross-case analysis<sup>a</sup> conducted using iterative methodology</li> <li>• Iterative tabulation of evidence for each construct from finding</li> <li>• Developed conceptual model from table of findings</li> <li>• Developed propositions for future research</li> </ul>
5. Analyzing data	<ul style="list-style-type: none"> <li>• Within-case analysis</li> <li>• Cross-case<sup>a</sup> pattern search using divergent techniques</li> </ul>	<ul style="list-style-type: none"> <li>• No field visits made</li> <li>• Data collection and analysis frequently overlapped</li> <li>• Team of 6 researchers formed for data analysis</li> <li>• Cross-case analysis<sup>a</sup> conducted using iterative methodology</li> <li>• Iterative tabulation of evidence for each construct from finding</li> <li>• Developed conceptual model from table of findings</li> <li>• Developed propositions for future research</li> </ul>
6. Shaping hypotheses	<ul style="list-style-type: none"> <li>• Iterative tabulation of evidence for each construct</li> <li>• Replication, not sampling, logic across cases</li> <li>• Search evidence for "why" behind relationships</li> </ul>	<ul style="list-style-type: none"> <li>• No field visits made</li> <li>• Data collection and analysis frequently overlapped</li> <li>• Team of 6 researchers formed for data analysis</li> <li>• Cross-case analysis<sup>a</sup> conducted using iterative methodology</li> <li>• Iterative tabulation of evidence for each construct from finding</li> <li>• Developed conceptual model from table of findings</li> <li>• Developed propositions for future research</li> </ul>
7. Enfolding literature	<ul style="list-style-type: none"> <li>• Comparison with conflicting literature</li> <li>• Comparison with similar literature</li> </ul>	<ul style="list-style-type: none"> <li>• Comparing conflicting/similar literature on management and marketing capabilities</li> <li>• Future empirical testing of the propositions</li> </ul>
8. Reaching closure	<ul style="list-style-type: none"> <li>• Theoretical saturation when possible</li> </ul>	<ul style="list-style-type: none"> <li>• Future empirical testing of the propositions</li> </ul>

<sup>a</sup> Cross-case search for patterns is done by dividing the data by type across all cases investigated, and pattern from one data type is corroborated by the evidence from another.

number of sources including books (Fisk, 1974; Goleman, 2009; Peattie, 1992; Peattie & Charter, 1994), case reports of sustainable development firms and pro-environmental reports on each firm (WBCSD, 2008a), CEO and executive interviews from press and trade journal articles (Peattie & Charter, 1994; Polonsky, 1994), as well as academic journal articles dating back to the 1970s. Specifically, we identified (i) 369 case studies on members and non-members of the WBCSD who have adopted sustainable strategies, and (ii) 12 published sustainability reports, by sustainability-related institutions such as WBCSD, Organization for Economic Cooperation and Development, and Business Council for Sustainable Development. Based on our literature review and the corresponding research questions, we excluded case reports of sustainable strategies with a focus exogenous to the firm. For example, we excluded case reports about firms conserving indigenous forests, sustaining lakes or protecting and preserving trans-boundary eco-systems, as part of their sustainable development agenda. This resulted in 130 data sources, covering 96 unique firms, as several firms such as Procter and Gamble, Xerox Corporation, and Sony Corporation appeared in more one case report.

Step 3 in the case research process is crafting instruments and protocols, where data collection methods such as archives, interviews, questionnaires and observations, are combined so that triangulation provides for stronger substantiation of constructs and hypotheses (Burgelman, 1983; Harris & Sutton, 1986; Mintzberg & McHugh, 1985). Guided by our research questions, three primary investigators focused on B2B firms and drafted detailed coding sheets with questions and criterion-based forms (step 4). This exercise led to the identification of 47 B2B firms for our study (see Table 3 for characteristics of the firms included in the study).

Step 5 represents the most important phase of the case study research process, as it is the most challenging part of the process (Eisenhardt, 1989). We used a multi-phase process: first, we formed a six-member team comprising the principle investigators and graduate business students. We then divided archival data containing information about the 47 firms among the coders. To ensure inter-coder reliability, and unknowingly to them, we gave two coders the same data sources. In the first phase of data coding, coders differentiated between sustainable strategies that involved the firm and/or the firm's business stakeholders (e.g., business customers, supplier firms), and those that reported sustainable strategies involving production processes. At the end of the first phase, investigators compared the coding sheets of the different coders and identified differences in coding information in terms of (a) misidentification of sustainable consumption behaviors or firm performance outcomes, and (b) mismatch of data due to oversight. In the second phase, the coding sheets were returned to the coders and the first phase was again repeated. In phase three, we went back to the data sources of the firms identified in the first two phases and repeated the process, but this time with the objective to refocus the analysis on firms that used innovation-based sustainable strategies as opposed to firms that were using non-innovation based strategies (e.g., advertising, energy conservation, recycling, etc.). In phase four, we used cross-case analysis to search for patterns and categorized the data from the coding sheets by type of innovation strategies. We then developed the list and types of innovation strategies that had a specific impact on sustainable consumption behavior, and/or firm performance. In the last phase, for each innovation strategy identified, we returned to the original cases

to find which specific marketing capabilities were mentioned as being the key to the innovation reported by the firm.

Finally, we adapt steps 6, 7 and 8 in Eisenhardt's (1989) case study research process that deal with hypothesis formulation, literature comparison, and closure. Accordingly, we present our findings in the following section on innovation-based sustainable strategies, sustainable consumption behavior and financial performance outcomes. We use the findings along with existing literature on marketing capabilities to identify the specific marketing capabilities that drive the innovation strategies resulting from our case study method. Based on the discussion, we develop our conceptual model and present our research propositions.

#### 4. Findings

As mentioned earlier, stage 5 of our case study methodology involved categorizing the innovation strategies based on common themes. Our multi-phased data analysis process resulted in the identification of several strategies used to elicit sustainable consumption behavior. Out of the 47 case studies, we identified 14 distinct innovation-based sustainability strategies from 19 different cases (see Table 4). Following extant literature, we categorized the strategies into technical (i.e., product and/or services), and non-technical (i.e., managerial, market, and marketing innovation) innovation (Ambruster, Bikfalvi, Kinkel, & Lay, 2008; Ngo & O'Cass, 2010). Similar dichotomies in innovation type have been suggested in the literature, such as technical and administrative innovations (Han, Kim, & Srivastava, 1998; Kimberly & Evanisko, 1981), and technological and managerial innovations (Tuominen & Anttila, 2006). Technical innovation as a sustainable marketing strategy aims to increase the availability of more sustainable products and services through integrating sustainability and life cycle processes into product design innovation, without compromising quality, price or performance in the market. Accordingly, the goal of sustainable technical innovation is to deliver high levels of emotional and functional values, while minimizing resource use and environmental impacts.

As seen in Table 4, strategies used under technical innovation include by-product synergy strategy, the synergy among diverse industries resulting in profitable conversion of by-products into resalable products. Non-technical innovation strategies involve creating a market for sustainable products and business models by influencing consumer choice and behavior. This entails working in partnership with consumers and other key stakeholders to demonstrate that sustainable products and lifestyles deliver superior performance. Non-technical innovation strategies include developing innovative pricing models to convince customers to purchase innovations that result from the firm's sustainability strategies, positioning innovatively based on green ingredients or packaging, and/or building sustainability regulations in the usage of current or new products. Non-technical innovation also includes strategies aiming at editing out unsustainable products, product components, processes and business models in partnership with other actors such as retailers. Firms influence consumer choice by controlling elements of their supply chain or by eliminating product components that pose a risk to the environment or human health. Firms also use their partnerships with channel members and retailers to eliminate specific products from their shelves or by demanding certain standards of their supply chain members. Such strategies include green alliances or in-store marketing (e.g., Crane, 2000; Cronin, Smith, Gleim, Ramirez, & Martinez, 2011; Mendleson & Polonsky, 1995). We find that firms that use technical innovation strategies often use them in combination with the non-technical approaches.

##### 4.1. Sustainable consumption behavior and financial performance

Our analysis shows that a wide range of sustainable consumption behaviors has resulted from sustainability strategies implemented by leading firms in sustainability. Specifically, firms reported 19

**Table 3**  
Characteristics of B2B firms used in case study.

Characteristics	Number of B2B cases	Geographic scope	
		Global	Domestic
Manufacturing, service and utilities	34	32	2
	13	10	3
Total	47	42	5



**Table 4**  
Emerging linkages between marketing capabilities, innovation strategies, and sustainable behaviors.

Innovation-based firm sustainability strategies Technical (T) and non-technical (NT)	Sustainable behavior enabled at the level of the firm, customers or suppliers.	Selected firm examples from case reports	Critical marketing capabilities
1. By-product synergy strategy – synergy among diverse industries resulting in profitable conversion of by-products into resalable products. (T)	Increased efficiency in disposal efforts at the firm level.	Chapparral steel reprocessed and resold non-chlorinated clean plastics to industrial customers, generating revenues of \$500,000 per year. General Motor's Resource Management program resulted in changing former wastes into valued by-products that have realized over US\$ 6 million in sales.	<ul style="list-style-type: none"> <li>• Product development</li> <li>• Sales capability</li> <li>• Customer/channel linking capabilities</li> </ul>
2. Designing carbon offset programs with business customers. (NT)	Increased motivation to reduce carbon footprint in products sold.	Interface's Cool Carpet™ option allowed for all of the life cycle impacts of a carpet product (up and down the supply chain) to be completely offset with emission reduction credits.	<ul style="list-style-type: none"> <li>• Product development</li> <li>• Customer/channel linking capabilities</li> </ul>
3. Develop incremental innovations by discovering innovative uses for industrial waste. (T)	Increased efficiency in waste disposal efforts at the firm level.	Florida Power turned wastes into industrial products for use in road fill and sugar mill, adding \$1.8 million in profits annually.	<ul style="list-style-type: none"> <li>• Product development</li> <li>• Sales capability</li> <li>• Customer/channel linking capabilities</li> </ul>
4. Engaging external organizations to create policies and market incentives encouraging sustainable practices. (NT)	Increased recycling behaviors by partner firms.	The carpet reclamation initiative of Interface has enabled the floor covering companies to divert more than 49 million pounds of material from landfills since 1994.	<ul style="list-style-type: none"> <li>• Relationship capabilities</li> <li>• Customer/channel linking capabilities</li> </ul>
5. Engaging both customers and channel members in product innovation. (NT)	Increased conversion of waste into by-products, and efficient waste disposal for partner firms.	Dow Chemical Company collects all the used coolants from cars serviced at BMW and Peugeot garages in Germany and recycles them for resale.	<ul style="list-style-type: none"> <li>• Relationship capabilities</li> <li>• Customer/channel linking capabilities</li> <li>• Sales capability</li> </ul>
6. Innovative pricing models – renting hazardous raw materials. (NT)	Increased risk-reducing behavior	Dow Chemical Company's Safe-Chem program allows safe delivery and takes back of hazardous solvents for customers.	<ul style="list-style-type: none"> <li>• Price setting</li> </ul>
7. Persuading customers to lease the product. (NT)	Companies retain ownership of their products and maximize resource productivity.	Interface leases their products; a new floor covering is supplied to replace the old and the spent product is refurbished and resold.	<ul style="list-style-type: none"> <li>• Sales capability</li> </ul>
8. Develop innovations to fuel sales of firm's primary products. (T)	Increased use of innovations at customer level to reduce emissions in the environment.	Interface develops the market for Natural Gas Vehicles to increase sale of its gas fuel. In a bid to increase its electricity business, the Tokyo Electric Power Company Inc. (TEPCO) developed a standard technology for fast electric vehicle (EV) charging, though it does not produce nor sell any products related to this technology.	<ul style="list-style-type: none"> <li>• Product development</li> </ul>
9. Positioning innovatively vis-à-vis competitors (NT)	Increased purchase of pro-environmental products by industrial customers.	Broderne Hartmann used an “environmental” market positioning for industrial customers, making “unique raw materials” its unique selling point. Retailers and brand owners using Cargill Dow's Polyactide use “packaging” as a positioning plank to bolster their brand and improve the fresh image of their food while also helping the environment.	<ul style="list-style-type: none"> <li>• Sales capability</li> </ul>
10. Building regulations within usage of new products. (NT)	Customers to follow regulations while/if using the products.	AkzoNobel's came up with the antifouling technology, bringing to market the very products necessary to meeting the regulations in vessel production by shipyards.	<ul style="list-style-type: none"> <li>• Relationship capabilities</li> </ul>
11. Creating new markets by marketing existing in-house process innovations developed for firm sustainability. (NT)	Increased conservation of energy at firm and customers site.	Johnson Controls has added water management as a new facility service to build top-line value, and offer a full scope of facility solutions.	<ul style="list-style-type: none"> <li>• Sales capability</li> </ul>
12. Embedding sustainability principles into its supplier and customer contracts. (NT)	Suppliers and customers follow sustainability principles while executing the contract.	In the steel sector, ArcelorMittal worked with several companies in its supply chain, helping them to incorporate social and environmental standards, resulting in 53% of them developing a new product or service with a specific social or environmental feature into their business practices. Bayer employs a sustainability-based supplier relationship management program for all its suppliers. BASF's Responsible Care audit program audits its service providers, including contractors, raw material suppliers, contract manufacturers, transporters, tank farm and warehouse operators causing an auto-catalytic effect and generating more best practices throughout the chemical industry.	<ul style="list-style-type: none"> <li>• Relationship capabilities</li> <li>• Sales capability</li> </ul>
13. Develop new products to mitigate critical sustainability problems. (T)	Improved sustainability behavior by customer firms.	TEPCO's heat-pump technology-based heating and cooling system reduces CO <sub>2</sub> emissions by about 3500 tons, almost 70% less than a conventional gas absorption chiller, and reduces water use to 117,800 m <sup>3</sup> , or 92% less than a common office building.	<ul style="list-style-type: none"> <li>• Product development/product design</li> <li>• Sales capability</li> </ul>
14. Develop innovations in packaging material to mitigate environmental issues of packaging material. (T)	Cost and waste reductions due to change in recycle and reuse behavior.	Cargill Dow has pursued a range of applications and successfully test-marketed and launched its nature based packaging products in the packaging and fiber markets.	<ul style="list-style-type: none"> <li>• Product development</li> <li>• Product packaging</li> </ul>



instances of changes in sustainable consumption behavior, and 10 instances of change in firm performance outcomes. Specifically, technical innovation strategies resulted in changes in sustainable behavior, including increased efficiency in waste disposal, increased use of innovations to reduce emissions, increased purchase of pro-environmental products, increased compliance at customer levels and waste reductions due to change in recycle and reuse behaviors. Our findings show that non-technical innovation strategies resulted in changes in sustainable consumption behaviors, including reduction in carbon footprint in products sold, increased recycling behaviors, increased conversion of waste into by-products, increased purchase of pro-environmental products, increased adoption of safe adhesives, and increased waste-reduction and energy-saving behavior.

In terms of competitive advantage, various resource, waste and cost saving outcomes have been reported, resulting in increased firm profits in the long run. Improvements on existing products often extend their use. For example, Chapparral steel generated additional revenues of \$500,000 per year by reprocessing and reselling non-chlorinated clean plastics to industrial customers. General Motor's Resource Management Program resulted in changing former wastes into valued by-products, realizing over US\$ 6 million in new sales. In another example, Florida Power turned waste into industrial products for use in road fill and sugar mills, adding \$1.8 million in profits annually. In the steel sector, ArcelorMittal worked with several companies in its supply chain, resulting in 53% of them developing a new product or service with a specific social or environmental feature into their business practices. Similarly, Tokyo Electric Power Company's (TEPCO) heat-pump technology-based heating and cooling system reduces CO<sub>2</sub> emissions by about 3500 tons, almost 70% less than a conventional gas absorption chiller, and reduces water use to 117,800 m<sup>3</sup>, or 92% less than a common office building. Performance improvements have been reported for partner companies as well, e.g., Ledesma, an Argentine-owned agro-industrial company in the sugar, paper and fruit industries, used non-technical innovations strategy of engaging partners to encouraging sustainable practices, that resulted in a more sustainable environment with sales increases by selected supplier companies to Ledesma going up to "some 80% between 2005 and 2006 – from US\$ 5,212,502 to US \$ 9,378,675 – as a result of the program" (WBCSD, 2007). In sum, our findings show that through technical and non-technical innovation strategies, sustainable firms positively affect sustainable consumer behavior as well as firm performance.

## 5. Conceptual model and propositions

We now combine our findings with extant academic literature on marketing capabilities, to develop a conceptual framework outlining the specific marketing capabilities that drive innovation-based sustainability strategies, firm sustainable consumption behavior, and firm performance. The marketing capabilities we use for conceptual development are a subset of the capabilities that were identified at the literature review stage. Table 5 provides a list of definitions of constructs in the model.

### 5.1. Marketing capabilities and technical innovation

Innovation represents the adoption of a new idea, process, product or service, developed internally or acquired from the external environment. Past literature suggests that the organizational processes facilitating innovations vary depending on the type of the innovation involved (Zmud, 1984). Hence, to be able to explore the relationships among the marketing capabilities and innovation-based strategies, we distinguish between the type of innovations, as different types of innovation have distinct characteristics (Damanpour, 1991; Johnson, Donohue, Atkin, & Johnson, 2001), different drivers (Subramaniam & Youndt, 2005), and differential effects on firm performance (Subramanian & Nilakanta, 1996).

**Table 5**  
Definitions of key constructs used in this study.

Construct	Definition
Innovation-based sustainability strategies	Strategies implemented by B2B firms (pursuing sustainable development) with an aim to develop innovation(s) that will promote environmental sustainability for the firm or its business partners.
Technical innovations	Innovations that result in the launch of an incremental or radical new product that will promote environmental sustainability for the firm or its business partners.
Non-technical innovations	Marketing or managerial innovations that result in the launch of a new program that will promote environmental sustainability for the firm or its business partners.
Sustainable consumption behavior	A range of social, economic and political practices at the firm level that support and encourage the consumption of goods and services that respond to basic needs and bring a better quality of life, while minimizing the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardize the needs of future generations.
Competitive advantage	The strategic advantage a firm can have over its competitors by improvements in its market and/or financial performance in the form of cost savings, profits, market share, or brand equity.
Product packaging capability	Skills in developing efficient packaging for the firm's products.
Sales capability	Skills in personal selling in the firms/customers industry.
Product development capability	Skills in developing new products as per the needs specified by marketing department
Channel linking capability	Skills in building networks with upstream and downstream channel members
Price setting capability	Skills in effective pricing of current and new products based on firm objectives
Relationship building capability	Skills in building relationships with other constituents such as the community, regulators, consumer groups, and other businesses.

Our findings show that several marketing capabilities can be drivers of technical innovations. Packaging is a starting point for many companies' sustainable marketing efforts, since it can often be safely and cost-effectively reduced without expansive changes to core products or production processes. However, distinct skills in packaging will be required to develop technical innovations in packaging without the risk of disaffecting customers (Peattie, 1995). Competencies in product packaging are therefore a key driver to innovation-based sustainable strategies that are technical in nature. For example, when Cargill Dow pursued a range of applications and successfully test-marketed and launched its nature based packaging products in the packaging and fiber markets, it relied heavily on its competencies in product-packaging technology. In the words of an official from the company: "In fresh market aisles like the deli and bakery, branded packaging is an important element in creating value-added products that command interest and loyalty from customers. This is where cutting-edge packaging technology like NatureWorks PLA can give you the advantage. Nature-based packaging is a simple – yet effective – way to take products beyond commodity items, and stand out at the point-of-sale" – Lisa Owen, global business leader for rigid packaging, Cargill Dow LLC (WBCSD, 2004). Thus, product packaging capabilities can be seen as an important driver of technical innovations for sustainable firms. Based on the discussion above, we state the following proposition:

**P1.** Product packaging capability is positively associated with technical innovations that result from a firm's sustainability strategies.

In all cases that involve technical innovations, our findings point to the critical role of a firm's capability to convince customers of the

viability of the new product alternatives and to “close the sale”. For example, in many of the cases we studied, the popular strategy of by-product synergy (BPS) was used. BPS is the practice of matching under-valued by-product streams with potential users, helping to create new revenues or savings for the firms involved, while also addressing social and environmental objectives. At Chaparral Steel and a TXI cement mill, engineers discovered that steel slag could be converted into a valuable raw material for cement production and developed a process that uses steel slag in a cement kiln to create high-quality Portland cement. This resulted in increasing profits for both companies, reduced energy requirements by 15% and reduced carbon dioxide emissions by over 10%. In all the cases we studied, we found that successful introduction of the new products to a business customer relied heavily on a strong sales competency in the industries that the company is targeting. Thus, specialized marketing capabilities related to sales drive the success of technical innovation-based sustainable strategies. In light of the above, we propose:

**P2.** Sales capability is positively associated with technical innovations that result from a firm's sustainability strategies.

Product development is an important marketing organizational capability that is activated by market, competitor, and external challenges and opportunities (Song et al., 2008). An effective product development process yields products that are unique and differentiated, enjoy market success, and developed in a time-efficient manner (Baker & Sinkula, 1999, 2005). Our findings show that firms active in product development are able to effectively gather technical and market information and disseminate it throughout the organization (Jaworski & Kohli, 1993; Kohli & Jaworski, 1990; Narver & Slater, 1990), and hence are able to produce technical innovations. For example, while British Gas and TEPCO were developing innovations to fuel sales of the firms' primary products, a key driver to developing the new products was their product development capability. In the case of Airbus, product development capabilities were critical in designing the A380 “... in order to optimize environmental performance at each stage of the aircraft life cycle. In particular, the high passenger capacity with a 2-deck design and the use of new lightweight materials has decreased the energy consumption per passenger dramatically. The A380 is expected to use less than 3 liters of fuel per 100 passengers kilometers” (ENDP, 2007). We therefore propose:

**P3.** Product development capability is positively associated with technical innovations that result from a firm's sustainability strategies.

Marketers of sustainable products also need to build good networks with upstream and downstream channel members to help introduce or push new and sustainable alternatives in the marketplace (Ramawami et al., 2009). Firms that have developed a distinctive capability for managing collaborative relationships find that they have more integrated strategies (Day, 1994). Channel linking enables the firm to compete by effectively sensing market changes, anticipating shifts in the market environment before competitors, creating and retaining durable links with customers, and creating strong bonds with channel members (Song et al., 2008). In our findings on the firms that were involved in the by-product synergy strategy, resale of industrial products reprocessed from waste and by-products would have been impossible in the absence of strong linkages among upstream and downstream partners of the firms. For example, in Tampico, Mexico, 21 local industries worked together to identify 68 potential synergies, of which 29 resulted in commercial possibilities. In Chicago, a network of 27 company members and seven city departments came together to convert “waste to profit”, diverting 13,500 tons from landfill. Thus, we state:

**P4.** Channel linking capability is positively associated with technical innovations that result from a firm's sustainability strategies.

## 5.2. Marketing capabilities and non-technical innovation

Pricing represents the crux of the green marketing challenge, because greening strategies can affect the cost structures of a business with a knock-on effect on prices, particularly if pricing is on a ‘cost plus’ basis (Peattie, 1995). Since business customers might be resistant to changes in pricing and payment schemes even when they are cost-beneficial, capabilities in providing better pricing options (e.g. leasing) will influence customer choice in favor of green products. For example, Dow chemical company enabled safe delivery and take back of chlorinated solvents as assistance to customers in the use of these solvents in closed loop equipment. The company implemented this process through a non-technical pricing innovation of renting the solvents instead of selling them to the customers. Therefore, we propose that pricing capabilities will be positively associated with innovation strategies.

**P5.** Pricing capability is positively associated with non-technical innovations that result from a firm's sustainability strategies.

While channel linking capability ( $P_4$ ) denotes strength and skill in building networks with upstream and downstream channel members, relationship building represents skills in building relationships with other constituents such as the community, regulators, and consumer groups. Our findings indicate that both marketing capabilities are critical for successful non-technical innovation strategies. Firms that had successfully added ‘green alternatives’ to existing products for customer solutions mention the need for a strong relationship capability with suppliers, customers, regulators and NGOs, in addition to building strong ties with distribution members. Our findings show that several firms report engaging with external organizations to create policies and market incentives encouraging sustainable practices. Such strategies not only require that the firm has trusting and long-term relationships with partner firms, but also strong links with its upstream and downstream channel members, so that these links can be capitalized on to remove unsustainable products in favor of new and less known alternatives. Such links are also critical to launch campaigns to increase ecological awareness and behavioral changes. Firms reported engaging both customers and channel members in product innovation. While this involves critical capabilities in establishing and nurturing marketing relationships, strong competencies in channel linkages help exploit the relationship capital available in the channel networks to the advantage of the strategy. Thus, we state:

**P6.** Relationship building capability is positively associated with non-technical innovations that result from a firm's sustainability strategies.

**P7.** Channel linking capability is positively associated with non-technical innovations that result from a firm's sustainability strategies.

One important non-technical innovation reported by B2B firms is about innovative market positioning of industrial products using sustainability-based unique selling propositions (USPs). For example, in the case of Broderne Hartmann, an “environmental” market positioning was used, making “unique raw materials” its USP. Cargill Dow promotes “packaging” as a positioning plank while selling their Polyac-tide to retailers and brand owners. In all these cases, sales capability plays a critical role in the success of the non-technical innovations. Due to the unique positioning to industrial consumers, the absence of strong brand and advertising programs in industrial markets and the important role of the salesforce in B2B markets will mean that firms have to rely upon a strong sales capability to promote the non-technical innovations. Moreover, while promoting sustainable products or de-marketing harmful products and offering new sustainable products, salespeople have to be aware of the environmental implications of the company and its products and processes (Drumwright, 1994). For example, Dow Chemical's Safe-Chem program collects used coolants

from car companies throughout Germany for recycling and reuse, an example of successful non-technical innovation where the salesforce played a major role in convincing oil suppliers of the value of the program. Based on the above discussion, we propose the following:

**P8.** Sales capability is positively associated with non-technical innovations that result from a firm's sustainability strategies.

### 5.3. Innovation, sustainable consumption behavior, and firm performance

Several theories of consumer behavior have been discussed in the academic marketing literature on the effects of marketing variables and strategies such as advertising, product differentiation, packaging, promotion, retail availability, point of sale display, and direct selling, on pro-environmental consumer behavior (Ehrenberg & Goodhardt, 1979; Kalafatis, Pollard, East, & Tsogas, 1999; Osterhus, 1997). As detailed earlier, our findings show that in firms which have adopted sustainable marketing, both technical and non-technical innovation strategies can lead to improved sustainable consumption behavior. For example, AkzoNobel's "Intersleek 900 product, an environmentally sensitive, fluoropolymer based biocide-free antifouling paint that is not harmful to marine life, has demonstrated that innovation can result in a high-value product with environmental benefits in a growing market. Its use is predicted to reduce marine fuel consumption levels and environmental emissions by up to 6%. Expected sales for 2007 were almost 50,000 liters, and the company estimates they will rise 20-fold to one million liters by 2010, showing a textbook case of ecological awareness and profitability working together to create a benchmark product" (WBCSD, 2008b).

Past research has shown that sustainable consumption behavior by firms and end consumers is associated with competitive advantage for the firm. An increase in sustainable consumption by end-consumers represents significant differentiation advantages (e.g., Shrivastava, 1995; Walley & Whitehead, 1994) and cost advantages (e.g., Porter, 1994; Porter & van der Linde, 1995; Smart, 1992; Walley & Whitehead, 1994) for a firm. There is ample empirical evidence for the claim that green products are profitable through cost reduction and first-mover advantage (e.g., Porter & van der Linde, 1995). Spicer (1978) found that the best environmental performers also enjoyed higher profits and lower perceived risks. Klassen and McLaughlin (1996) showed that the rewards for superior environmental performance may be due to: (1) market gains, or (2) cost savings. More recently, the revenue gains/cost reduction model was also used by Jacobs, Singhal, and Subramanian (2010) in analyzing shareholder value effects of announcements of firm environmental performance. Another explanation for a positive association between environmental performance and financial performance is that environmental management becomes a source of a sustainable competitive advantage through a layering of both differential and cost based positions (Bonifant, Arnold, & Long, 1995). This suggests a strong positive relationship between performance on sustainable consumption indicators and competitive advantage for the firm (Miles & Covin, 2000). Further, given the extensive literature suggesting and empirically showing the relationship between innovation strategies and competitive advantage (Weerawardena, 2003), both technical and non-technical innovation-based sustainable strategies should be expected to influence competitive advantage through their effect on sustainable consumption behavior. Based on our discussion, we propose:

**P9.** Technical and non-technical innovations that result from a firm's sustainability strategies will have a positive impact on a firm's competitive advantage.

**P10.** Sustainable consumption behavior will mediate the relationship between technical and non-technical innovations resulting from a firm's sustainability strategies and firm competitive advantage.

Our findings also show that firms using innovation-based sustainable strategies almost always combine technical and non-technical innovations. Since the development of innovative products or processes should be supported by strategies that influence consumer behavior and/or strategies that provide sustainable alternatives to consumers, technical innovation strategies are more successful when combined with non-technical ones. Among other things, non-technical innovation strategies enable change in consumer behavior and help develop captive markets for technically innovative products. Thus, it is reasonable to expect a synergy between technical and non-technical innovation strategies in their impact on sustainable consumption behavior. Hence we propose:

**P11.** Technical and non-technical innovation strategies will synergistically interact to lead to sustainable consumption behavior.

## 6. Discussion and future research

Marketing scholars have recently highlighted the need for innovation strategies in order to satisfy the expectations of the wide range of 'green' stakeholders that have often ambiguous, and sometimes conflicting, demands (Cronin et al., 2011; Hall & Vredenburg, 2003). In a recent review, Cronin et al. (2011) propose eleven urgent research questions that warrant further academic investigation. While one of these research questions relates to "green innovation" (p. 163), "understanding the development process and associated performance (or outcomes) surrounding the generation of new green products" is a field ripe for research, as such an approach "likely generates innovative and technological advances that allow firms to capitalize on both the entrepreneurial and environmentally-friendly strategies rather than merely meet legal or regulatory standards" (p. 164). Our study is an attempt at a change in the strategic management paradigm, by using the sustainability discourse to identify new resources and capabilities that can generate a competitive advantage for the firm (e.g., Hart, 1995; Medina-Munoz & García-Falcon, 1998; Post & Altman, 1992; Shrivastava, 1995). Accordingly, the major sources of competitive advantage of the future will be those resources (e.g., those contributing to the environment conservation) and capabilities (e.g., waste reduction, green product innovation) that can significantly contribute to a sustainable economic activity. Juxtaposing this research gap with the observation by marketing scholars on the dearth of studies examining the role of marketing capabilities on firm innovation (Varadarajan, 1992; Weerawardena, 2003), our paper is a timely attempt to investigate the relationship between marketing capabilities and environmental sustainability in the innovation-based competitive strategy.

The findings from our case study of 47 sustainable firms in B2B marketing concur with extant research suggesting that a study of innovation strategies need to include both technical and non-technical innovations (Weerawardena & Mavondo, 2010). Specifically, we find that both technical and non-technical innovation strategies lead to sustainable consumption behavior. Based on empirical evidence and guidance from the capabilities theory, we posit 11 propositions that suggest relationships among various marketing capabilities, innovation-based sustainable strategies, sustainable firm consumption behavior and competitive advantage. An important finding in our analysis is that innovation is an important strategy in the path to a firm's sustainability.

Our research has important theoretical and managerial implications. Theoretically, we open up the stream of research related to the impact of marketing capabilities in the realm of sustainable development. Specifically, we put forward propositions that will move the field forward in terms of theoretical conceptualization of how specific marketing capabilities identified in the extant literature can impact innovation strategies of a firm that pursues sustainability. Additionally, we propose an indirect relationship of innovation-based



sustainability on competitive advantage, mediated by sustainable consumption behavior. Though the path between innovation and competitive advantage has been suggested and shown in recent research (Weerawardena, 2003), the mediating role of sustainable consumption in environmental sustainability contexts is new to the literature. Finally, we introduce the sustainability discourse within the theoretical ambit of innovation-based competitive advantage. While our study is exploratory and conceptual, we hope the propositions put forward in the research build up into a theoretical debate on the complex relationships between marketing capabilities, environmental sustainability, innovation and competitive advantage. From a managerial perspective, this study suggests that if firms' sustainability is indeed keyed to innovation and superior performance (Nidumolu et al., 2009), top management must identify and build sustainability-driven capabilities. Conversely, if managers feel that they have strong marketing capabilities, our research highlights the specific strategies that can be pursued given a specific set of capabilities.

Our exploratory study provides propositions for further empirical work by marketing scholars. While our propositions and conceptual model were based on an exploratory research into firms that were already pursuing sustainability, future research can look at a more diverse sampling of firms. Also, our study focuses on firm sustainability in the B2B market; future research could investigate similar relationships in the B2C market. Preliminary findings from our data suggest that marketing capabilities in the B2C market can also be associated with innovation-based strategies. For example, to influence consumers to adopt products or brands that are environmentally friendly, firms need specialized marketing capabilities that can effectively relate this information. Firms need to possess knowledge and use state of the art promotional techniques required to convince consumers about the value of green products. In that regard, firms should recognize the emergence of the concept of 'sustainable communications' rather than the more narrowly defined concept of green promotion (Peattie, 1995). As consumers are increasingly exhibiting skepticism to green messages using conventional marketing communications media, firms with excellent promotional capabilities might be able to use sustainable communications to drive their innovation strategies.

Additionally, research can investigate whether interactions exist between marketing capabilities as related to innovation strategies. Of the firms we reviewed for example, several companies that converted their product packaging capabilities into technical innovation also reported the launch of integrative marketing communications to ensure that their efforts are known and supported through customer information and education (Peattie, 1995). Similarly, firms using their product development capabilities for innovation-based sustainability strategies were also market-oriented and possessed strong market research capabilities, which they capitalized on for successful innovation. In these companies, marketing research provides R&D units with the needed input and customer feedback to develop products that satisfy the rising green customer segment. Therefore, it may be that the value of specific marketing capabilities gets accentuated in the presence of others. Thus, investigating the effect that the interaction or the combination of multiple marketing capabilities has on innovation-based sustainability strategies would lead to significant theoretical and managerial insight. Future research can also investigate how one can gain the commitment of other constituents, including customers and employees, to environmental practices (Handfield, Walton, Seegers, & Melnyk, 1997). Often, a gap exists between the desire to be environmentally responsible and the degree to which environmental management is practiced (Gattiker & Carter, 2010), hence exploring the factors contributing to implementation of environmental practices would be a valuable endeavor. Finally, this study focused only on environmental sustainability. Future research must include the other 2Es of the "triple bottom

line", viz. economic and social sustainability into the conceptualization of sustainable development, as suggested by Hunt (2011), Savitz and Weber (2006) and Rogers et al. (2008).

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