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# Cross-functional integration in the sustainable new product development process: The role of the environmental specialist

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ABSTRACT

Companies in the twenty-first century are exposed to a variety of pressures to respond to environmental issues, and responding to these pressures affects several aspects of business such as purchasing, marketing and logistics. Managers increasingly view sustainability as a complement to their corporate agendas, or even as an opportunity. It is important to understand how firms integrate environmental issues into their businesses and how these integration strategies affect performance. The process of sustainable new product development (SNPD) is a key strategic focus to achieve economic and environmental sustainability. This paper examines the integration of environmental specialists into new product development teams that are composed of other functional specialists including marketing, manufacturing, and R&D personnel, and its impact on SNPD project performance across three stages: concept development, product development, and product commercialization. We empirically test our theoretical model using a sample of 219 firms from a range of business-to-business industries. We present evidence that integrating an environmental specialist into a new product team has a positive influence on SNPD project performance beyond what the traditional members of such a team would accomplish. We analyze this relationship across the stages of SNPD to obtain a clearer picture of the effects of this integration. In particular, the integration of the environmental specialist was more effective on SNPD project performance in the final stage of the SNPD process when the product was being launched; this effect is even greater for high-innovative projects.

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## 1. Introduction

The degradation of the natural environment is an important current issue for governments and societies throughout the world (Stern Report, 2006). After governments and societies awakened to the urgency of this problem, they began pressuring companies in various ways: regulators are increasing legislation such as Clean Air Act, United Nations Environment Program, North American Agreement on Environmental Cooperation (NAAEC), community groups and activists are protesting against firms that have unsustainable business practices, and consumers are demanding "environmentally-friendly" or "sustainable" products. Responding to this change, an increasing number of firms are committing to including the natural environment in their corporate agendas and have adopted sustainable business practices (Kolk, 2008; Madsen, 2009; Marcus & Fremeth, 2009). In tandem with the shift in the business world, several research studies have been conducted about distinct aspects of sustainability. Impressive progress has been made in understanding the importance of sustainable business practices in marketing and many other fields (Varadarajan, 2010). Several studies have found that the expenses incurred by sustainability initiatives can be compensated for gains made elsewhere; namely, it does "pay to be green" (Ambec & Lanoie, 2008; Clemens, 2006; Hart & Ahuja, 1996).

Nevertheless, these studies on sustainability are conducted typically in the context of pollution reduction, emissions of toxic chemicals, spills and other plant accidents, rather than adopting a more holistic, strategic point of view. In fact, little research has been done regarding the incorporation of sustainability issues and considerations directly into the conventional NPD process, which we refer to here as *sustainable new product development* (SNPD) (Huang & Wu, 2010; Pujari, Wright, & Peattie, 2003). In this study, SNPD is defined as "an organization-wide process of NPD into which sustainability concerns are explicitly integrated to minimize impacts on the natural environment, and on animal and human health". Incorporating sustainability issues into conventional NPD is important because it will bring several benefits to the firms such as reducing inefficiencies during the production process, and creating differentiation and cost advantages (Siegel, 2009).

Cross-functional integration has been identified as one of the most important factors for explaining new product success (Berchicci & Bodewes, 2005; Gemser & Leenders, 2011; Leenders & Wierenga,

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2008; Nakata & Im, 2010; Pujari, 2006; Troy, Hirunyawipada, & Paswan, 2008). Studies found that organizational factors, as opposed to technical/process factors, are more likely to hamper the success of SNPD (Lenox & Ehrenfeld, 1997) which points to the additional importance of cross-functional integration in the context of SNPD. This study focuses on cross-functional integration in the SNPD process with specific attention to the role of the environmental specialist in the process. We expect that the integration of environmental specialists with the team will lead to a smooth and efficient transition from the conventional NPD process to the SNPD process, and, in turn, that will result in sustainable new products that can achieve better results in the market (Boks, 2006; Cordano & Frieze, 2000; Petala, Wever, Dutilh, & Brezet, 2010; Russo & Harrison, 2005).

However, the literature does not give a clear picture of how the integration of the environmental specialist into conventional NPD teams might influence the market performance of new products. The objective of this research study is to increase our theoretical understanding of the role of the environmental specialist on the NPD team and the impact on the success of sustainable new products. We make a theoretical contribution to the literature by showing the stage-wise impact on NPD performance of the integration of the environmental specialist to the NPD team. We develop a theoretical model that is based both on the NPD literature stream and on the sustainable management literature. In our model, we place particular attention on the integration of the environmental specialist on the NPD team across three stages of the NPD process: concept development, product development, and product commercialization. We empirically test our theoretical model using a sample of 216 business-to-business firms representing a wide variety of industries. We conclude with theoretical implications and managerial recommendations.

## 2. Theoretical framework

### 2.1. Sustainable new product development

Although today many large companies are producing sustainable products, relatively few studies to date have empirically examined the impact of sustainable products on a firm's performance (e.g.,Pujari & Wright, 1999; Pujari et al., 2003; Huang & Wu, 2010; Kesidou & Demirel, 2012). This relatively new notion is at the center of two streams of research: work on conventional NPD and work on sustainable management (Seebode, Jeanrenaud, & Bessant, 2012). The conventional NPD literature is replete with variables and models that have been proposed and empirically tested. As stated above, however, the question of how sustainability concerns should be integrated has not yet been resolved. Likewise, the sustainable management literature has not adequately addressed the direct impact of sustainability concerns on the market success of new products.

Successful new product development is a requirement for any firm's long run competitiveness (Cooper, 1983; Ulrich & Eppinger, 1995; Wheelwright & Clark, 1992), but the firm that incorporates sustainability and environmental concerns can extract additional advantage. For example, reducing inefficiencies during the production process, recycling manufacturing by-products, or innovating to meet strict environmental regulations may bring cost advantages for companies (Porter & van der Linde, 1995), and redesigned packaging, sustainable products, and promotion of environmental benefits can yield differentiation advantages (Siegel, 2009). Therefore, integrating sustainable management into the conventional NPD process would help firms achieve long-run competitiveness and sustainability goals, leading to a win–win situation for the firm and society (Chen, Lai, & Wen, 2006).

Furthermore, Pujari et al. (2003) conclude that a paradigm shift is underway, in which sustainability is more explicitly incorporated into product development by manufacturing firms. The greater responsiveness to sustainability at the corporate level has necessitated more substantive changes at the product development level. Based on the definition used by Huang and Wu (2010), this study defines SNPD[1] as "an organization-wide process of new product development into which sustainability concerns are explicitly integrated to minimize impacts on the natural environment, and on animal and human health." SNPD is not a radically different process than conventional NPD, but it involves sustainability concerns in addition to the other factors required for market success.

### 2.2. Cross-functional integration in SNPD

Cross-functional integration is a critical driver of new product success (Berchicci & Bodewes, 2005; Gemser & Leenders, 2011; Leenders & Wierenga, 2008; Nakata & Im, 2010; Pujari, 2006; Troy et al., 2008). Creating new products requires multidisciplinary viewpoints and the involvement of different functional units (Dougherty, 1992; Olson, Walker, Ruekert, & Bonner, 2001). Cross-functional integration provides significant benefits for the NPD process including stimulating creativity, encouraging open communication, achieving a common understanding of the product and enhancing consistency among decisions (Han, Kim, & Srivastava, 1998; Sethi, 2000).

To our knowledge, there is little research on cross-functional integration in the context of SNPD (e.g., Huang & Wu, 2010; Pujari et al., 2003) and the role of the environmental specialist as one of the functions on the team. Nonetheless, organizational factors have been shown to significantly affect the success of SNPD (Lenox & Ehrenfield, 1997). Since cross-functional integration is a major organizational component, we propose that cross-functional integration is an important success factor of SNPD and may even be more critical than conventional NPD.

### 2.3. The role of the environmental specialist

Product developing firms must comply with newly-implemented, rigorous environmental regulations, and as consumer interest in the subject grows, the environmental aspects of a product are becoming more valuable to consumers (EPA, 2009). Due to these concerns, many firms meet consumer demand by launching sustainable products through sustainable management practices that go above and beyond existing regulations. Given these conditions in the market, there should be experts in the company who are dedicated to supervising the application of new environmental requirements, identifying sustainability procedures for the new product development process, complying with applicable laws, regulations and other sustainability-oriented requirements, performing environmental audits, spotting significant areas for reducing energy use and waste, and proposing modifications to the whole process by going above and beyond what is required by law. These experts are referred to as "environmental specialists" in this study.

The literature suggests that improving cross-functional teamwork between environmental specialists, engineers and production personnel leads to the successful incorporation of sustainable management strategies into corporate strategic planning (Boks, 2006; Cordano & Frieze, 2000; Petala et al., 2010; Russo & Harrison, 2005) and results in improved financial and environmental performance (Judge & Douglas, 1998). Nevertheless, the interaction between marketing and environmental specialists is often weak and marked by a limited understanding of each other's roles and challenges (Charter & Clark, 2007). Pujari et al. (2003) emphasized the importance of including an environmental specialist in the SNPD process, and the positive effect of this specialist on sustainable new product performance, but did not elaborate on how the specialist would interact with other team members. Our

[1] There is small but growing literature on SNPD, which is alternatively named *environmental NPD* (Pujari et al., 2003) or *green NPD* (Huang & Wu, 2010). We consistently used "sustainable" instead of "environmental" or "green" in this study as it is a more comprehensive and clear term encompassing many sustainable new product development objectives.