

# Eco-innovation and new product development: understanding the influences on market performance

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## Abstract

The greening of product innovation process has been under study by researchers, but mostly it is at an anecdotal level. Extant literature asks for empirical study to explore how to make greener products more successful at the market place. This paper reports on a survey of environmental new product development (ENPD) projects in North America wherein influences on the market performance are investigated. New activities such as design for environment/life cycle analysis and supplier involvement for environmental responsiveness are identified in the ENPD process. The paper uses hierarchical regression method to find relative and incremental impact of eco-innovation activities in ENPD projects on market performance. Factors that influence market performance of greener products are found to be cross-functional co-ordination between new product development professionals and environmental specialists, supplier involvement, market focus and life cycle analysis.

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## 1. Introduction

Recent years have seen an increased debate and interest in understanding the business case of environmental responsiveness/sustainability (also termed as greening of business) among academia, industry, NGOs and public policy institutions in OECD countries as well in the developing countries (e.g. Banerjee et al., 2003; NRTEE, 1999). Environmental sustainability issues include resource efficiency, dematerialization, reduction of waste and emissions leading to improved environmental performance and/or reduced environmental impact. In spite of the fierce debate about Kyoto protocol ratification and perceived difficulties in becoming green (e.g. Walley and Whitehead, 1994), businesses around the world have recognized the need to respond appropriately to sustainable development challenge and, consequently, many have changed their business activities in purchasing, product development, marketing and corporate strategy (Sharma, 2000; Pujari

et al., 2003; Aragon-Correa and Sharma, 2003; Menon and Menon, 1997; Drumwright, 1994). Where once environmental sustainability was viewed as involving compliance, expense and trade-offs with other corporate goals, increasingly it is being portrayed as an opportunity and a win-win logic of being ‘green and competitive’ (Porter and van der Linde, 1995).

## 2. Eco-innovation and new product development—a background

In recent years, there has been an upsurge in the reporting of research in the area of eco-innovation, ‘green’ innovation or sustainable development innovation with regards to R&D, production processes, new products and new services (e.g. Pujari et al., 2003, 2004; Foster and Green, 2002; Azzone and Noci, 1996; Hart, 1997; Conway and Steward, 1998). The concept of sustainable development, termed under the auspices of the World Commission on Environment and Development described as ‘the ability of current generations to meet their needs without compromising the ability of future generations to meet theirs’ (WCED, 1987). However, this definition of

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sustainable development failed to clarify what exactly is supposed to be done by companies particularly with regards to new product development (NPD). In recent years, though it is widely accepted that in order to address the sustainable development challenge, companies need to balance financial, social and environmental performance. This philosophy has been accepted as ‘triple bottom line’ (Elkington, 1998).

Anecdotal evidence, case studies or popular press frequently report initiatives taken by several companies to develop and market new products that address environmental issues. There is also anecdotal evidence of the market success and/or failure of ‘green’ products. Successes include Body Shop’s range of cosmetic products, P&G’s Lenor concentrated fabric softener, and ARCO’s environmentally reformulated gasoline. There are also failures, for example, ‘EarthLight’ compact florescent light bulbs from Philips, GM’s first electric car EV-1, and Whirlpool’s CFC-free refrigerator (Ottman, 1998). Eco-innovation or sustainable development innovation with particular reference to NPD in companies has taken several forms. Product innovation for sustainability in these companies is either public policy induced or is market-driven (Hall and Vredenburg, 2003); though very few of them are disruptive innovation (e.g. wind power, hybrid car). Most of the sustainable innovation in NPD relates to incremental or evolutionary innovation (e.g. remanufactured products, recycled content, organic cotton-based clothing, water-based paints, to name a few).

Though sustainable new products do address environmental issues very explicitly but it is far from certain whether these products have achieved any market success. Moreover, it is important to know what factors influence to achieve greater market performance. However, academic studies are unclear on the critical success factors of developing greener products. Literature calls for continuous research addressing the aggregate impact and benefits of environmentally responsive actions (Guimaraes and Liska, 1995; Buchholz et al., 1995). Recent research have made significant academic contributions in enhancing our knowledge in this area but the focus has been at corporate and business strategy level, often termed as corporate environmentalism (e.g. Aragon-Correa and Sharma, 2003; Banerjee et al., 2003; Sharma, 2000; Sharma and Vredenburg, 1998). Research advances on the management of environmentally responsive product development have been minimal but is growing in interest (Pujari et al., 2003, 2004). To enhance our knowledge on environmental responsiveness at product development level and to benefit product managers, designers, environmental professionals and marketers, more research is needed. This research aims to address this lack of empirical research in environmental new product development (ENPD).

### 3. Research questions

This research makes a significant academic and managerial contribution to the debate on the business case for environmental sustainability. As mentioned earlier, relatively few studies to date have looked empirically into the impact or performance of companies’ environmentally oriented products (e.g. Pujari et al., 2003; Prothero and McDonagh, 1992; Pujari and Wright, 1996, 1999a,b; Chao-tung, 1994). Key objectives of this research are to conduct a large empirical study on ENPD projects in companies in North America to identify the critical success factors leading to better ENPD performance. ENPD is defined here as an NPD process wherein companies explicitly undertake activities to achieve higher environmental (green) performance as well as commercial performance. Key research questions for the paper are as follows:

1. What are the underlying dimensions of key eco-innovation activities undertaken in companies for ENPD?
2. What constitutes market performance in ENPD projects?
3. What is the relative impact of eco-innovation activities on ENPD performance?

### 4. Theoretical context and research propositions

Within the broader framework of innovation, NPD and sustainability, this paper presents a theoretical framework by integrating the literature on new product innovation and environmental strategy (e.g. Pujari et al., 2003, 2004; Cooper and Kleinschmidt, 1993a,b, 1995). This research puts a special emphasis on ENPD—an under-researched area in both NPD and environmental strategy streams. Extant literature argues that the goals of social good and business success are no longer an either/or proposition, but are being increasingly interwoven (Menon and Menon, 1997), linking environment, resource productivity, innovation and competitiveness (Porter and van der Linde, 1995). This means tackling the socio-environmental impact of business/functional strategy, both in terms of non-market outputs (through pollution prevention and more sustainable sourcing) as well as market outputs through environmental product stewardship and innovation (Ottman, 1994). Product stewardship encompasses all aspects of managing a product and its performance and impact, through the product’s economic and physical life cycles (‘cradle to grave’). Though various models of the NPD process have long been proposed, tested and applied (e.g. Cooper, 1987, 2001; Urban and Hauser, 1980; Wind, 1982), environmental imperatives have been neglected in the evaluation of these processes. It can be argued conversely that the environmental strategy literature has not adequately addressed the increasing complexities, intricacies

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