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Interfaces with Other Disciplines

Pricing, market coverage and capacity: Can green and brown products co-exist?

A. Yenipazarli [a,*], A. Vakharia [b,1]

[a] Department of Logistics and Supply Chain Management, Georgia Southern University, Statesboro, GA 30460, USA
[b] Department of Information Systems & Operations Management, University of Florida, Gainesville, FL 32611, USA

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ABSTRACT

Environmental strains are causing consumers to trade up to greener alternatives and many brown products are losing market coverage to premium-priced green rivals. In order to tackle this threat, many companies currently offering only brown products are contemplating the launch of a green product to complement their product portfolio. This paper provides strategic insights into and tactical ramifications of expanding a brown product line with a new green product. Our analysis explicitly incorporates a segmented consumer market where individual consumers may value the same product differently, the economies of scale and the learning effects associated with new green products, and capacity constraints for the current production system. It is shown that a single pricing scheme for the new green product limits a firm's ability to appropriate the value different customers will relinquish in a segmented market and/or to avoid cannibalization. A two-level pricing structure can diminish and even completely avoid the salience of cannibalization. However, when resources are scarce, a firm can never protect his products from the threat of cannibalization by just revising the pricing structure which can spell the end of his brown product's presence in the market or preclude the firm from launching the green product. At this point, the degree of cannibalization is higher for the brown product when the green product offers a sufficiently differentiated proposition to green segment consumers.

1. Introduction

"Green" sits at the head of the boardroom charts for many brown companies nowadays. The reasons are many. Shoppers are suddenly hyperconscious of sustainability-related issues and in response they are changing their shopping lists and skewing their purchases to those products deemed environmentally sound. As of 2009, nearly 85 percent of U.S. consumers purchased a wide range of green products representing such categories as compact-fluorescent lamps, natural household cleaning, energy-efficient electronics and appliances, rechargeable batteries, and organic foods.[2] Propelled by this soaring interest in green shopping, a raft of green brands, such as Seventh Generation and Tom's of Maine that started out as a credible response to the environmental concerns of the most ardent green shoppers, branched out into mass marketers of widely distributed green products. Seventh Generation's sales were $150 million in 2009, up 20 percent over 2008, and their cleaning products are now lined up on the shelves of many mainstream supermarkets in addition to visible storefronts like Target and Whole Foods.[3] Equipped with a better grasp of environmental issues and adept at catering to the needs of today's fast-growing eco-aware consumers, these green brands have taken advantage of opportunities to grow their top-line sales and market coverage – and even evolve their businesses.

Managers of branded brown companies face tough new standards in this more environmentally sensitive business climate. Conventional marketing that entails launching new products with better quality, performance and convenience at affordable prices now needs to integrate a focus on incorporating green issues in the product development process. The success of a raft of green brands such as Patagonia outerwear and Tom's of Maine toothpaste proves that consumers want to see environmental benefits in the products they buy and that brown companies must leap in a sustainable fashion – rather than tweak – to partake of growth opportunities in green marketplace. Moreover, numerous up-and-coming firms with a deep-green orientation and with promising green brands are now assertively nipping at the heels of brown companies, and they are facing continuous losses in share to these aggressive green competitors. Encouraged by the potential of green-oriented sales and propelled by the fear of being edged out by green rivals, more and more well-established

* Corresponding author. Tel.: +1 912 478 8010.
E-mail addresses: ayenipazarli@georgiasouthern.edu (A. Yenipazarli), asoov@ufl.edu (A. Vakharia).
1 Tel.: +1 352 392 8571.
2 Natural Marketing Institute (NMI), 2009 LOHAS Consumer Trends Database.

3 L. Burkitt, "Seventh Generation: Protecting Its Green Turf," *Forbes*, 18 January 2010.

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brown companies now look for ways to green up their products and introduce new exciting brands that are more in sync with nature. Just a few notable examples include Nike Organics clothing (made from 100 percent organic cotton), Philips Alto II fluorescent lamps (having the lowest mercury level of 1.7 milligram per lamp in the industry), Toyota Prius hybrid sedan (with an exceptional fuel efficiency rate gauged at 51 miles per gallon in city and 48 miles per gallon on highway), and Caroma dual-flush toilets (reducing water usage by up to 67 percent compared with traditional toilets).[4,5,6,7]

In a headlong rush to attract new green-leaning customers that would pay hefty premiums for green products and/or win back customers that have switched to a green rival, many brown companies are often tempted to offer the greenest of mainstream products. When it works, the combination of a brown and a green brand in the market allows those companies to calibrate those two offerings to their own strategic advantage. On the other hand, once launched, today's crop of green products have a growing tendency to also steal customers from these companies' existing portfolio of brands. In the case of green products which embody significantly less environmental impact in addition to all those consumer demands such as price and convenience, this threat can be more and more daunting. Add to this the challenge that no products stand alone. A new green product cannot be simply added into an existing production system in isolation, and creating a new green brand forces a firm with a pre-existing brown brand in his current system to divide his resources rather than concentrate his efforts on the business at hand. Not to mention that a new green brand can end up wreaking havoc with the finances of such companies by siphoning away more funds than do its brown counterparts because it uses new materials or technologies piling up on the inherent costs of the launch, marketing communications, and hiring and training of new staff. In order to surmount all these hurdles to their advantage and convert these two potential enemies into profitable allies, the managers of branded brown companies must understand in depth how green consumers and their green purchasing motivations differ markedly from those of brown consumers, and carefully leverage their system in which brown and green products are envisaged to operate.

These observations motivate the focus of this paper. This paper attempts to enrich the product portfolio management problem faced by a firm operating under a production capacity with a focus on green products and on factors related to the market that is segmented by customers' commitment to green and green purchasing behavior.[8] We identify implications of expanding the product line with a green product by considering the following important characteristics of green products: (1) a green product is typically a *high-price* alternative to the brown product; (2) green products can have *lower valuation* or *higher valuation* from regular/brown consumer segments depending on how the green product is positioned in the market; (3) with their green image, green products provide *high value* to a relatively small – albeit growing – green consumer segment; (4) a new green product typically ends up being *more costly* to produce than brown products because they lack *economies of scale*, or because they use new materials or new technologies; and (5) green product development is subject to a *higher level of uncertainty* (e.g., technical, market and organizational) that resolves over time as more green products are adopted by consumers due to *learning effects*. In particular, we attempt to examine the following questions: (1) What are the benefits and hazards associated with expanding product line with a green product? (2) Are the benefits derived from higher market coverage or higher selling price of the green product? (3) What is the impact of a firm's production capacity on his production line producing a green product and a brown product? (4) Under what conditions does a firm's investment in additional production capacity to ease the congestion in the product line pay off? and (5) What are the economic implications of cumulative production volume learning effects of a new green product on the value that can be extracted from a segmented consumer market?

The unique contributions of our research are as follows. We show that when introducing a new green product, it is crucial to have a keen grasp of green and brown consumers' differing coordinates of value, and to use these coordinates in pricing strategies to hit one target segment while deliberately missing the other. The firm should adopt a two-level pricing regime for his green product to fully extract the value from green and brown segment consumers, which in turn can expand the market coverage for the firm. Our analysis also shows that in the current market environment, offering a new green product at a premium price in the pursuit of exploiting green consumers' willingness-to-pay can preclude the firm from maximizing the overall profits of his product line, even if it results in higher market coverage. On the other hand, offering the green product at a relatively lower premium cannot only maximize profits but also diminish (and even completely avoid) the threat of cannibalization. When resources are limited, the firm can protect his existing brown product from cannibalization only at the expense of his new green product, and this could prevent the firm from launching the green product.

The remainder of this paper is organized as follows. Section 2 positions our research in the context of current work on green product introduction. Section 3 describes the model and states its basic assumptions. In Section 4, we first analyze the profitability conditions of increasing product variety with a green product without capacity considerations, and then incorporate the issue of limited resources and its impact on increased product variety. Finally, Section 5 summarizes the key results and managerial implications of our research.

2. Literature review

Product variety issues have been extensively studied in economics, marketing and operations management literature. The reader is referred to Lancaster (1990), Krishnan and Gupta (2001) and Ramdas (2003) for comprehensive reviews. Management of product variety involves deciding what and how many products to offer, the target consumer market(s), and introduction timing for each product. Creating and offering distinctive products can result in costly changes to manufacturing and other processes. On the other hand, broader specialized product lines can allow higher prices to be charged and may help to increase market coverage by enabling a firm to better satisfy the needs of distinct consumer segments in the marketplace. The implications of product variety on costs and firm performance are described and empirically verified in Kekre and Srinivasan (1990), and in Bayus and Putsis (1999). Marketing research popularizes utility models where products are characterized via quality-type attributes and consumer preferences are elicited over these product attributes. They

[4] http://www.usa.lighting.philips.com/pwc_li/us_en/connect/tools_literature/downloads/p-6018.pdf, accessed on April 9, 2012.

[5] Organic Trade Association, "Beyond food: fashion show to highlight organic fiber," *What's News in Organic*, Spring 2003.

[6] http://www.fueleconomy.gov/feg/findacar.shtml, accessed on April 9, 2012.

[7] http://www.treehugger.com/bathroom-design/dual-flush-toilet-by-caroma.html, accessed on April 9, 2012.

[8] The focus on a single firm is driven by several industry examples such as: (a) Toyota making the decision on introducing the Prius as a "green" alternative to their regular automobiles; (b) Cascade introducing an eco-friendly dishwashing liquid to complement his regular products; (c) GE introducing the energy efficient lightbulbs (CFLs) while continuing to market their traditional products; (d) Target introducing an eco-friendly clothing line along with the other regular clothing products; (e) Brooks introducing a biodegradable running shoe to complement his current product offerings; (f) Continental airlines choosing to invest in fuel-efficient airplanes when making decisions for aircraft replacement; (g) Nike launching Nike Organics, a full line of clothing made from 100 percent organic cotton; and (h) Caroma dual-flush toilet that is a pioneer in water-saving technology with its half-flush and full-flush technology that reduces water usage by up to 67 percent compared with traditional toilets, which use almost 3 gallons per flush. In most (if not all) of these cases, the green product was added to an existing brown product line to primarily serve the needs of an existing market rather than in response to competitive pressures.