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## Using incentives to address cannibalization

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### ABSTRACT

In a decentralized multi-product firm, different products within the firm sometimes compete with one another for the same customers. This paper proposes managing such cannibalistic behavior with incentives. Designing the appropriate incentives requires detailed information on how the sales of one product impact the profitability of other products. As this paper shows, the only additional information required is the second choice preferences of buyers. Drawing on successful development by General Motors, this paper shows how this information can be collected and used to develop cannibalization incentives. While developed for the automotive industry, this approach is applicable across industries.

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### Introduction

Cannibalization occurs when the products of a multi-product firm compete with one another for the same customers. Cannibalization becomes possible whenever a firm offers multiple products that are somewhat similar to one another (Kim and Chhajed, 2000). For example, Hilton has twelve different hotel chains, Gap has three lines of garments and FIAT offers eight different lines of automobiles. Considerable research has examined the benefits and costs to firms offering multiple similar products (Joaquin and Khanna, 2000; Kollmann et al., 2012; Daniel et al., 2010; Guide and Van Wassenhove, 2001; Aras et al., 2004; Ghose et al., 2006; Caldieraro et al., 2015).

The literature has placed special emphasis on how new products cannibalize existing products (Van Heerde et al., 2010; Davis, 2006). To reduce unprofitable cannibalization, firms may stretch out the time between new product introductions (Mazumdar et al. (1996)). If there is intense competition between firms (DeSai, 2001) in a particular segment, then products in that segment are more likely to cannibalize products from less competitive segments. Cannibalization may also arise when a firm runs two parallel business models (Velu and Stiles, 2013), e.g., a business model providing free digital content to sell advertising and a business model making profit from selling print circulation (Simon and Kadiyali, 2007).

Cannibalization sometimes reduces firm-wide profitability, e.g., when low-priced products cannibalize premium products (Meredith and Maki, 2001). As a result, cannibalization can lead firms to withdraw some products from the marketplace (Ruebeck, 2005). But cannibalization can enhance profitability if it diverts sales from low-profit products to high-profit products or preempts competitors (Chandy and Tellis, 1998). For example, Apple's first quarter 2013 earnings report explicitly acknowledged and welcomed iPhones cannibalizing iPods and iPads cannibalizing Macs. Cannibalization remains an unsolved problem in many multi-product firms.

In centralized firms, cannibalization could be managed by appropriately altering the design and pricing of different products. But many firm are decentralized, especially those in industries characterized by high rates of change in markets and

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technology and uncertainty (Lawrence and Lorsch, 1967). By decentralizing, organizations can differentiate their structures so that each unit (department or division) faces a different sub-environment and is assigned a task commensurate with the firm's strategy and environment. Most decentralized firms have interdependencies (Galbraith and Kazanjian, 1986) in which the actions of one division help (synergy) or hurt (cannibalization) the performance of other divisions. The firm must then manage these interdependencies in the context of the overall corporate environment (Lawrence and Lorsch, 1967) while preserving the differentiation needed to adapt to various sub-environments.

This paper addresses the research question of how to manage cannibalistic interdependencies in decentralized firms. The first section shows that incentives can be used to manage cannibalization in decentralized firms. Because every pair of products made by the firm can potentially cannibalize one another (Carpenter and Hanssens, 1994), using incentives to manage cannibalization requires reliable and timely measures of cannibalization between every pair of existing products. The importance of using data to develop such measures was highlighted by Sharma and Gassenheimer (2009)'s study showing that many retail outlets overestimate the degree to which internet sales are cannibalizing their sales. Such measures also enable the firm to distinguish between profitable (Kalnins, 2004) and unprofitable cannibalization (Bourgeois, 1981). The second section presents an actionable approach toward reliably and regularly measuring cannibalization between every pair of existing products, and describes the application of this method at General Motors (GM). The closing section discusses how this approach can be applied across a wide variety of industries. Thus this paper demonstrates how cannibalistic interdependencies can be managed in decentralized firms.

### Managing cannibalization in decentralized firms

For concreteness, this section first focuses on the classic multi-divisional organization, once described as "American capitalism's single most important innovation in the twentieth century" (Williamson, 1971). The multi-divisional organization, when compared with the centralized functional organization, provides large firms operating in diverse business with a more effective means of allocating capital. This allows the firm to operate closer to the production frontier while enabling more effective strategic decisions (Armour and Teece, 1979). The multi-divisional organization manages its divisions with a charter (Galunic and Eisenhart, 1996) and a formal incentive system. The charter assigns each division resources and operational decision making responsibility for certain designated capabilities and market domains. The incentive system monitors and rewards each division's performance against its charter.

General Motors (GM) is widely regarded as a good example of a multi-divisional organization. Formed in 1908 as a holding company of independent companies, GM was nearly bankrupted by cannibalistic competition between these companies. The firm was reorganized in 1921 into a multi-divisional organization. To minimize cannibalization, the new GM subdivided the market into price-based market segments and chartered each company (or division) to compete within an assigned market segment (Johnson, 1978). The new GM also instituted a sophisticated management accounting system (Chandler, 1977) that monitored divisional performance. After verifying that divisions sold products within their prescribed price ranges, GM then rewarded performance by awarding bonuses to divisional managers (Murphy, 1985; Milgrom and Roberts, 1992). The price segmentation discouraged cannibalization while the bonuses encouraged good operational decision making. This balance of centralization and decentralization, which GM CEO Alfred Sloan (1964, pg. 429) called coordinated decentralization, resulted in the company's divisions producing a range of vehicles at different price-levels. Because Ford's functional organization could not separate short-term operating decisions from long-term strategic decisions (Williamson, 1971), Ford could not match the diverse product line offered by GM. GM eventually surpassed Ford Motors in 1931.

Unfortunately the price-based segmentation was only able to temporarily eliminate cannibalization. Eventually GM divisions began to compete with each other based on product content. By 1958, divisional distinctions began to blur. Consistent with Birkinshaw and Lingblad (2005), GM attempted to dynamically update divisional charters in order to prevent these new forms of cannibalistic behavior. But divisional resistance (Rugman and Verbeke, 2001) frustrated these efforts. To prevent cannibalization, GM slowly but systematically reduced divisional autonomy and centralized decision-making. But this centralization led to inferior operational decisions, and contributed to the firm's bankruptcy in 2009.

To address cannibalization without centralizing decision making, this paper considers a solution initially developed in public economics. The sales which a cannibalizing division diverts from other divisions is treated as an externality which that division has imposed on its intra-firm environment. Then a Pigouvian solution (Sandmo, 2008) to the externality makes the division 'pay' for the cost of the externality which it has created. This forces the division to consider what other divisions lose when it cannibalizes their profits. If the division's profit exceeds the profit lost by other divisions, the division imposes the externality.

To make the division 'pay' for the externality, the firm's headquarters could redefine the division's direct costs, as recorded in the firm's management accounting system (Horngren, 1972), to include the profits lost to other divisions from sales cannibalized by the division. This solution allows the division to retain complete responsibility for operational decision-making. It can also be justified as an application of full cost accounting (Schaltegger and Burritt, 2000) where all opportunity costs are included in the profit calculation.

Adjusting the profit calculation impacts executive behavior because executive compensation usually includes a bonus which is based on the division's profit. For example, the original General Motors bonus scheme defined the bonus pool as 10% of the division's manufacturing profit in excess of a 7% return on capital. The divisions then had discretion to apportion that bonus pool among their executives. Typically half of a GM executive's compensation came from the bonus.

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