# Chapter 7
# Category Captainship Practices in the Retail Industry

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## 1 Introduction

A product category is defined as a group of products that consumers perceive to be interrelated and/or substitutable (Nielsen Marketing Research 1992). Soft drinks, baking products, and canned vegetables are some examples of retail categories. Categories can be viewed as the smallest strategic business unit within a retailer. Retailers implementing category management focus their efforts on managing the entire product category as a single business unit and maximize category profit as opposed to managing each product individually (i.e., either on a brand-by-brand or SKU-by-SKU basis). Category management emphasizes the management of product categories as a whole and allows the retailers to capture the synergies that may arise as a result of grouping the products together. Taking a holistic approach and focusing on category performance allows the retailers to capture synergies such as promotion coordination and store traffic driving strategies. Category management involves decisions such as merchandizing the product assortment, determining retail prices, and allocating shelf-space to each product on the basis of category goals. The category management approach requires the retailers to dedicate significant amount of resources to understanding the consumer trends and consumers' response to the assortment, pricing and shelf placement decisions of products within a category.

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Prior research in marketing (e.g., Basuroy et al. 2001; Dhar et al. 2001; Gruen and Shah 2000) has shown that category management can result in significant benefits for the retailers.

Recently, many retailers have started to rely on their manufacturers for strategic recommendations and insights regarding category management decisions, a practice often referred to as *category captainship*. This approach has now become a common way to execute category management in certain product categories for many retailers. The increase in the number of product categories offered at retailers, combined with the scarcity of retailer resources required to manage each category effectively are some of the drivers of the widespread use of category captainship practices. Other factors are manufacturers' deep expertise in their own categories based on the market research they conduct for introducing new products and improving their existing products. The category captainship approach acknowledges that manufacturers can help retailers manage categories more effectively, and at a lower cost, by leveraging their existing consumer insights (Kurtuluş et al 2013). Even though the captains are not directly compensated for their services, the manufacturers view captainship as a source of competitive advantage over their competitors because the captain usually gains significant control over the key category management decisions (Kurtuluş and Toktay 2004).

In a typical captainship implementation, the retailer first selects a captain by soliciting proposals from the largest manufacturers in the category. The retailer selects the manufacturer that promises the largest improvement in category performance to serve as the captain. After the captain is selected, the retailer and the captain summarize the objectives for the captain and develop metrics to track the captain's performance (ACNielsen 2005; Kurtuluş et al. 2013). The performance metrics typically include measures such as target category profit and/or sales. The category captain then provides the retailer with a plan that includes recommendations about key category management decisions such as which brands to include or exclude from the category, how to display the products, how much space to allocate to each brand, and in some cases how to price the products in the category. The retailer is free to accept or reject any of the recommendations provided by the captain. The captain's performance is evaluated regularly based on the agreed metrics. If the captain's performance is unsatisfactory, the retailer might decide to assign the captainship role to another manufacturer. Retailers usually design the category captainship agreements to be short term (e.g., 1–2 years) in order to keep the flexibility to renegotiate the agreements or rotate the captainship position among different manufacturers.

Many retailers and manufacturers practice category captainship and report positive benefits. Retailers such as Wal-Mart, Metro, Safeway, and Kroger practice category captainship in some of their product categories and usually assign manufacturers such as Kraft Foods, P&G, Kellogg and Danone to serve as category captains because of their established brands in the market and their resource availability (Kurtuluş and Toktay 2004; Subramanian et al. 2010; Kurtuluş and Nakkas 2011; Kurtuluş et al. 2013; Progressive Grocer 2007, 2008). Below are some specific examples of category captainship implementations from practice.

Example 1: Carrefour, the second largest retailer in the world, has asked Colgate to serve as category captain and provide insights to improve the performance of the oral care category. Based on a number of consumer studies, Colgate suggested that Carrefour restructure the display in the oral care category so as to merchandise toothbrush products above toothpaste products, as opposed to merchandising them next to each other. As a result of the restructuring, Carrefour reported 6–16 % sales increase in the oral care categories in its retail markets (ECR Conference 2004). The sales increase in the oral care category came at a little cost to the entire channel because Colgate mostly utilized its already existing consumer studies and its expertise in the oral care category. If Carrefour had conducted the research necessary for such a restructuring, it would have been more expensive.

Example 2: Ross Products serves as category captain for Safeway in the infant formula category (Progressive Grocer 2004). Safeway asked Ross Products to examine the category and prescribe solutions to improve the profitability of the category. Ross' assessment of the category revealed that the category was undermerchandised: the infant formula subcategory was contributing 34 % of the baby care category's dollar volume, but was receiving only 11 % of the shelf-space. Ross recommended changes in shelf-space positioning, and also reviewed and revised the pricing to boost profitability. After implementing the recommendations, the category saw a 9.2 % sales growth benefiting both Safeway and Ross Products (Progressive Grocer 2004). One could argue that Safeway could have developed a similar prescription to improve the performance in the infant formula category without using Ross Products as a category captain, however, the cost of doing so would have been much higher as Safeway does not possess the expertise that Ross Products does.

Example 3: General Mills served as category captain for some of its retail partners in the Baking Ingredients and Mixes category (Progressive Grocer 2004, 2010). General Mills' recommendations are focused around SKU rationalization and variety-vs-duplication analysis. SKU rationalization is aimed at reducing the number of SKUs to reduce consumer confusion at the shelf and thus create growth. Similarly, excessive duplication does not add much in incremental volume. Removing duplications allows for expanded product variety, which in turn can generate more sales in the category and help it grow. One of the retailers for which General Mills serves as category captain has seen a 10.2 % increase in base dollar volume since General Mills' SKU rationalization efforts (Progressive Grocer 2004).

Although category captains are more common in the grocery and consumer products industries, category captainship practices are making an appearance in apparel retailing as well. VF Corp., the NC based manufacturer of brands such as Lee and Wrangler, serves as category captain for a number of its retail partners in the jeans category (Apparel Magazine 2005). VF Corp works with its retail partners to determine the product mix to be offered in each region, how products will be displayed on the sales floor, and how inventory levels will be managed in the category. Inspired by the success in the jeans category, VF Corp is looking forward to take on category captainship responsibility in other categories such as sports licensing and outdoor performance apparel categories.

The above examples illustrate that the scope of the recommendations in each category captainship implementation is different: While some retailers rely on their category captains for shelf and display management, others rely on their captain for assortment related decisions. In addition, category captainship practices vary in terms of the extent to which the retailer implements captain's recommendations, resulting in a continuum of practices. At one end of the spectrum, some retailers implement the category captain's recommendations as they are; at the other end, some retailers filter the recommendations provided by their captain and verify their appropriateness before implementing the recommendations (Steiner 2001).

The above examples, and many other successful category captainship implementations, demonstrate that by working together, retailers can considerably benefit from their manufacturers' expertise in managing their categories and deliver consumer value through supply chain collaboration. However, category captainship practices have also been controversial because the captains provide recommendations to the retailer regarding not only their own products, but their competitors' products too. In addition, conflict of interest between the retailer and the captain are inevitable because what is in the best interest of the category captain may not be the best for the retailer (Kurtuluş and Toktay 2004).

One of the key concerns with category captainship practices has been the captain's potential bias against their competitors' products (Steiner 2001; Desrochers et al. 2003; Greenberger 2003; Leary 2003; Klein and Wright 2006).[1] In this context, it is not surprising that there is an ongoing debate on whether or not category captainship is anti-competitive. The main concern expressed by anti-trust researchers has been that captainship practices might have negative impact on both the non-captain manufacturers and consumers. This is because the use of captains may result in lower variety and higher prices in the category, which may harm the consumers and exclude some of the manufacturers from the category. The term *competitive exclusion* has often been used to refer to situations where the captain takes advantage of its position and disadvantages the competitors' products in the category. Although competitive exclusion is a possible negative consequence of implementing captainship, it can be difficult to prove/detect because it can occur in many different forms.

Anti-trust researchers (e.g., Desrochers et al. 2003; Leary 2003; Klein and Wright 2006) and marketing researchers (Morgan et al. 2007; Gooner et al. 2011)

[1] While there are many cases under investigation due to claims of category captainship misconduct, one publicly known and well-documented case is the United States Tobacco Co. vs. Conwood Co. case. United States Tobacco Co. (UST), the biggest company in the smokeless-tobacco category, was recently ordered to pay a $1.05 billion antitrust award to Conwood, the second biggest competitor in the category (Greenberger 2003). Conwood had sued UST, the category captain, and had claimed that UST used its position as category captain to exclude competition and provide an advantage to its own brands. The court ruled that UST's practices resulted in unlawful monopolization, harming competition, and consequently, the consumers. Similarly, many other captainship arrangements in the tortillas, cranberries, and carbonated soft drinks categories are being investigated for potential category captainship misconduct (Desrochers et al. 2003).

have defined the competitive exclusion phenomenon broadly as the captain behaving opportunistically to favor its own product over competitors' products. Existing research on captainship has also defined some specific forms of exclusion. For example, Kurtuluş and Toktay (2011) point to the possibility of exclusion via a smaller shelf-space allocation to the non-captain manufacturers' products whereas Kurtuluş and Nakkas (2011) point out the possibility of exclusion via reduction in the number of products offered by the non-captain manufacturers after captainship is implemented.

To summarize, while many retailers and manufacturers claim positive benefits from implementing category captainship, there is also evidence regarding category captainship misconduct. Retailers planning to implement category captainship should develop an understanding of the pros and cons of such practices and should weigh potential advantages and disadvantages of using category captains for category management. The goal of this chapter is to provide an overview of the existing research on category captainship, and identify research directions that would improve our understanding of its impact.

The chapter is organized as follows. We start by reviewing the literature on category captainship in Sect. 2. In Sect. 3, we discuss the potential impact of category captainship practices on the retailing industry. Section 4 offers some future research directions.

## 2 Review of Existing Research on Category Captainship

Although category captainship practices have been very popular over the last decade, there is very little academic research regarding the category captainship practice and its consequences. The existing research on captainship can be grouped into four broad categories that aim to answer the following questions:

- What are the consequences of the retailer delegating the pricing decision to a category captain?
- What are the consequences of the retailer delegating the assortment selection decision to a category captain?
- When will category captainship emerge? What are the category characteristics that facilitate the emergence of category captainship?
- What are the antitrust concerns that may arise as a result of using category captains for category management? What can be done to mitigate these antitrust concerns?

The limited research about captainship is due to challenges such as the broad scope of captainship implementations and continuum of category captainship implementations. In general, the retailers rely on a category captain for recommendations about retail category management decisions such as pricing, assortment, shelf-space management, promotions, etc. However, researchers usually focus on recommendations in only one of these areas, limiting their research and findings to a

subset of captainship implementations. In addition, while some retailers implement their category captain's recommendations as they are, others use them only after modifying the recommendations. Researchers usually focus on one end of this spectrum where the retailer implements the recommendations as they are and ignore all other possibilities. In Sect. 4, we propose some avenues for future research that could potentially overcome these challenges and improve our understanding of category captainship practices. In what follows, we review the existing research on captainship by emphasizing the research questions addressed and the methodology used, and we describe how each paper contributes to a better understanding of captainship practices.

## *2.1 Consequences of Delegating the Pricing Decisions*

The idea of an upstream party in a supply chain (such as a manufacturer) interfering with the retailer's pricing decisions is not new. There is a large amount of research in economics on so-called Resale Price Maintenance (RPM) practices where a manufacturer imposes a minimum or a maximum resale price on the retailers (e.g., Gilligian 1986; Overstreet 1983 and references therein). Research on RPM has mainly focused on offering explanations that shed light on the use of RPM practices. The most intuitive explanation is that manufacturers would use RPM and would limit retailers' flexibility in setting their retail prices optimally because there would be too much price competition between the retailers otherwise.

However, there are other alternative explanations. The traditional view has been that RPM can be used to prevent retailers from "free-riding" in providing services (Telser 1960). While one retailer may offer a service in how to use the product, another retailer might benefit or free ride by selling to a customer who has already learned about how to use the product from the other retailer. A more recent explanation offered by Deneckere et al. (1996) is that RPM can be used to respond optimally to demand uncertainty and to encourage retailers to hold inventories. Nevertheless, the literature remains inconclusive regarding the impact of RPM practices on consumer welfare; while some research indicates that RPM practices enhance consumer welfare, other work indicates the opposite (Ippolito and Overstreet 1996).

While the RPM and category captainship practices are similar in the sense that the manufacturer interferes with retailer's pricing decisions, there are significant differences between the two. RPM practices are manufacturer driven, while category captainship practices are usually driven by the retailers. In addition, while with RPM, the manufacturer imposes a retail price on its own products only, in category captainship, the manufacturer might recommend retail prices (and may interfere with prices) for all products in the category. In order to investigate the impact on stakeholders and consumer welfare, the RPM literature generally utilizes models where a single manufacturer sells to consumers through multiple competing retailers (e.g., Chen 1999; Deneckere et al. 1996). On the other hand, the category

captainship literature generally utilizes models where multiple manufacturers sell their products to the consumers through a common retailer (e.g., Wang et al. 2003; Subramanian et al. 2010; Kurtuluş and Toktay 2011; Kurtuluş and Nakkas 2011). To summarize, while RPM practices and category captainship practices differ significantly, the main research questions are similar: Both streams of research aim at providing justification for use of these practices by investigating the impact on involved parties and consumer welfare.

The two papers that focus on category captainship implementations where a retailer relies on a category captain for pricing decisions are Wang et al. (2003) and Kurtuluş and Toktay (2011). Both of these papers consider how each stakeholder in the supply chain is affected when the retailer delegates the pricing decisions to one of its leading manufacturers. Below we review both papers in detail.

Kurtuluş and Toktay (2011) consider a distribution channel where two manufacturers sell their products to consumers through a common shelf-space constrained retailer. The authors use a linear price-dependent demand model (Shubik and Levitan 1980) where consumer demand is given by

$$q_1 = a_1 - p_1 + \theta(p_2 - p_1) \quad q_2 = a_2 - p_2 + \theta(p_1 - p_2)$$

where $p_1$ and $p_2$ are the retail prices of the two products, and $a_1$ and $a_2$ can be interpreted as the relative *brand strength* of each product. For simplicity, the paper assumes that the manufacturers are symmetric, (i.e., $a_1 = a_2 = a$). The parameter $\theta \in [0, 1]$ is the cross-price sensitivity. As $\theta$ increases, the demand for product $i$, $q_i$, becomes more sensitive to competitor's price, $p_j$. The parameter $\theta$ can also be interpreted as the *degree of product differentiation* with $\theta = 0$ implying perfectly differentiated products and $\theta = 1$ implying substitutable products.[2]

Since retailers operate on very thin margins, every unit of shelf-space is scrutinized for profitability and allocating the total store space between categories has become a critical decision for retailers today. The authors capture the shelf-space allocation decision by assuming that the retailer determines the shelf-space for the category, which is denoted by $S$, based on the opportunity cost of the shelf-space, $kS^2$. This is consistent with current practice where retailers typically allocate category shelf-space based on the profitability of each category relative to the other categories (Corstjens and Doyle 1983; Chen et al. 1999) because space allocated to one category means profits foregone from another.

Once the retailer decides on the category shelf-space $S$, the pricing decisions are made subject to the constraint $q_1 + q_2 \leq S$ where $q_1$ and $q_2$ can be interpreted as demand rates for each product per replenishment period. In other words, the retailer prices the products so that the total demand rate does not exceed the shelf-space

[2] This type of linear demand system has been widely used in marketing (e.g., McGuire and Staelin 1983; Choi 1991) and economics (e.g., Vives 1999). These demand functions can be derived from an underlying consumer utility model where consumers maximize their utility.

availability. The quantities $q_1$ and $q_2$ can also be interpreted as the long-term volumes to be purchased and sold subject to a total volume target for the category.

The paper considers two scenarios that differ in who determines the retail prices. In the first scenario, retailer category management (RCM), the retailer first decides on the category shelf-space and announces this category shelf-space to the manufacturers. The manufacturers then simultaneously set their wholesale prices. Finally, given the wholesale prices, the retailer sets the retail prices for both products.

The model is solved by backward induction: In the third stage of the game, the retailer solves the following problem for given category shelf-space $S$ and wholesale prices $w_1$ and $w_2$:

$$\begin{aligned} \max_{p_1,p_2} \ & (p_1 - w_1)q_1 + (p_2 - w_2)q_2 \\ \text{s.t.} \ & q_1 + q_2 \le S \\ & q_1 \ge 0, q_2 \ge 0 \end{aligned}$$

The authors fully characterize the quantity responses $\hat{q}_1(w_1, w_2)$ and $\hat{q}_2(w_1, w_2)$. Then at stage two, anticipating the retailer's demand responses, the manufacturers simultaneously set their wholesale prices. Each manufacturer maximizes

$$\Pi_i(w_i, w_j) = (w_i - c)\hat{q}_i(w_i, w_j) \quad \text{for } i,j = 1,2 \text{ and } i \neq j,$$

where $c$ is manufacturer $i$'s production cost. Finally, in the first stage of the game, the retailer determines the category shelf-space taking into account the sub-game starting in stage two, and the opportunity cost of shelf-space allocation, $kS^2$. Since manufacturers are symmetric, both manufacturers are allocated equal shelf-space in the RCM model.

In the second scenario, category captainship (CC), the retailer assigns one of the manufacturers as the captain and delegates the pricing decisions to that manufacturer. The paper models captainship by assuming that the retailer and the captain form an alliance. In making the category shelf-space decision, the retailer assumes that he will get a fraction $\phi$ of the alliance profit. The value of $\phi$ is either set at the beginning of the category captainship agreement, or it is the fraction of profits the retailer expects to obtain in *ex-post* negotiation with the captain. The sequence of events in the captainship model is as follows: (1) the retailer determines the amount of category shelf-space $S$ and announces it; (2) the second manufacturer offers a wholesale price $w_2$ for its product to the alliance; (3) the captain sets the retail prices for both products to maximize the alliance profit subject to the shelf-space constraint.

Similar to the RCM model, the CC model is also solved by backward induction: In the third stage, the captain sets retail prices for both products to maximize the alliance profit for a given wholesale price $w_2$ and subject to the category shelf-space constraint $S$. The captain solves the following optimization problem:

$$\begin{aligned} \max_{p_1,p_2} \; & (p_1 - c)q_1 + (p_2 - w_2)q_2 \\ \text{s.t.} \quad & q_1 + q_2 \leq S \\ & q_1 \geq 0, q_2 \geq 0 \end{aligned}$$

The authors characterize the quantity responses $\hat{q}_1(w_2)$ and $\hat{q}_2(w_2)$ for all possible $w_2$. Then, the non-captain manufacturer sets the wholesale price $w_2$ in expectation of $\hat{q}_2(w_2)$ by maximizing its profit $(w_2 - c)\hat{q}_2(w_2)$. Finally, in the first stage, the retailer determines the category shelf-space based on its expected share $\phi$ of the profits in the sub-game starting in stage two, and the opportunity cost of shelf-space, $kS^2$. Even though the manufacturers are symmetric in terms of demand and cost parameters, in the captainship model the captain is allocated three quarters of the category shelf-space and the non-captain manufacturer is allocated only one quarter of the category shelf-space.

Kurtuluş and Toktay (2011) investigate the impact of switching from retailer category management (RCM) to category captainship (CC) on the category shelf-space and the profits of each party. The key-driving factor is the profitability of the category net of opportunity costs. The authors find that the switch to captainship can increase the profitability of the category for the retailer through the formation of the alliance via two effects: the elimination of double marginalization and the increased price pressure on the non-captain manufacturer. The authors find that the equilibrium category shelf-space under captainship may be higher if the retailer appropriates a significant share of the alliance profit.

The authors conclude that captainship practices should not immediately raise anti-trust concerns, or be viewed negatively by non-captain manufacturers as the resulting increase in the relative profitability of the category vis-a-vis the retailer's other categories can create value for non-captain manufacturers via an increase in the category shelf-space. In particular, the authors find that captainship does not result in competitive exclusion when the products are well differentiated and the retailer's share of alliance profits is high enough. With differentiated products, the gain from avoiding double marginalization and from the drop in the non-captain manufacturer's wholesale price is higher. Coupled with obtaining a high share of the alliance profit, these effects result in a large enough allocation to the category by the retailer that it offsets the non-captain's loss resulting from a smaller fraction of shelf-space allocation under captainship.

At the same time, the paper also provides support for competitive exclusion and shows that the non-captain manufacturers could be at a disadvantage when captainship is implemented in categories where either the products offered in a category are similar (i.e., substitutable) and/or the retailer is not powerful enough compared to the captain.

Similar to Kurtuluş and Toktay (2011), Wang et al. (2003) also consider the impact of captainship where the retailer relies on a captain for pricing decisions. Wang et al. (2003) consider a model with $N$ manufacturers that sell their products through a retailer and investigate whether it is profitable for the retailer to delegate

pricing authority to a captain. The demand for product $i$ in the model considered by Wang et al. (2003) is given by

$$q_i = \frac{1}{N}\left[a - p_i + \frac{1}{N-1}\sum_{i\neq j}^{N}\theta(p_j - p_i)\right]$$

where parameter $a$ can be interpreted as the base level of category demand and parameter $\theta$ is the cross-price sensitivity.

In the absence of a category captain, the manufacturers act as Stackelberg leaders and offer wholesale prices $(w_1, w_2, \ldots, w_N)$ to the retailer at stage one of the game. Then at stage two, given the wholesale prices, the retailer sets the retail prices to maximize total category profit

$$\max_{p_1,\cdots,p_N} \sum_{i=1}^{N}(p_i - w_1)q_i.$$

The game is solved through backward induction. First, the retailer solves the above optimization problem for given wholesale prices and determines the quantity responses and then each manufacturer sets its own wholesale price in expectation of the quantity demanded of its own product, $\hat{q}_i(w_1, \ldots, w_N)$, to maximize profit. The production costs are assumed to be zero for all the products. At stage one of the game, each manufacturer solves

$$\max_{w_i} w_i\hat{q}_i(w_1, \ldots, w_N).$$

In the category captainship model, the authors assume that the manufacturer with index one (the first manufacturer) is assigned as the captain. Category captainship is modeled as an alliance between the retailer and the manufacturer of the first brand. In other words, under category captainship, the retailer and the category captain act as an integrated firm. In this model, after the $N-1$ manufacturers offer their wholesale prices $(w_2, w_3, \ldots, w_N)$, the alliance (where the captain and the retailer act as an integrated firm) sets the retail prices to maximize the alliance profit

$$\max_{p_1,\cdots,p_N} p_1q_1 + \sum_{i=2}^{N}(p_i - w_i)q_i.$$

Then, given the quantity responses $\hat{q}_i(w_2, \ldots, w_N)$, $i \geq 2$, the manufacturers set their wholesale prices.

The main result in Wang et al. is that using a category captain for category management is profitable for both the retailer and the category captain. The intuition is as follows: After the retailer and the category captain form an alliance, the alliance will gain from the category captain's brand (i.e., coordination between the retailer and the captain) and will lose from selling other brands in the category. It turns out that both the channel coordination effect and the competition effect have

a positive impact on the joint profit gain, therefore benefiting both the retailer and the category captain. On the other hand, category captainship generally does not benefit the non-captain manufacturers due to increased pressure from the channel. Furthermore, the paper identifies conditions under which category captainship can benefit all participating partners. Category captainship may benefit all parties in the supply chain if (1) the captain has the authority to choose the retail price for its own brand only (i.e., partial delegation); and (2) the non-captain manufacturer behaves strategically (i.e., adjusts its own wholesale price to the use of a captain in the supply chain).

In addition, the paper identifies conditions under which category captainship is more beneficial for the alliance members. The paper finds that the profitability of using a category captain is higher if the product category (1) has fewer products (lower $N$); (2) has higher price competition among products (higher cross-price sensitivity $\theta$) and (3) has no store brand as opposed to having a store brand. The inclusion of a store brand modifies the demand system slightly and therefore the alliance profit. When there is a store brand, the alliance sets the retail prices to maximize the alliance profit

$$\max_{p_1,\ldots,p_N} p_1 q_1 + \sum_{i=2}^{N} (p_i - w_i) q_i + p_s q_s$$

where $q_s$ and $p_s$ are the demand and price for the store brand and $q_i$ and $q_s$ are given by

$$q_i = \frac{1}{N-1}\left[a - p_i + \frac{1}{N}\sum_{i \neq j}^{N} \theta(p_j - p_i) + \delta(p_s - p_i)\right]$$

$$q_s = \frac{1}{N-1}\left[a - p_s + \frac{1}{N}\sum_{j}^{N} \delta(p_j - p_s)\right]$$

The parameter $\delta$ in the above equations is the cross-price sensitivity between the manufacturers' brands and the store brand.

The model also offers some insights as to which manufacturer should be selected as a category captain. The ideal category captain is the manufacturer who has a higher brand strength (i.e., higher $a$) and a higher cross-price sensitivity. This finding is in line with the current practice where retailers assign their leading manufacturers as category captains.

To summarize, the contribution of both Wang et al. (2003) and Kurtuluş and Toktay (2011) is in pointing out that category captainship can be beneficial for not only the retailer and the captain but also for the non-captain manufacturer(s).

## 2.2 Consequences of Delegating the Assortment Selection Decision

In both Wang et al. (2003) and Kurtuluş and Toktay (2011), the retailer delegates the pricing authority to a leading manufacturer. However, in practice, the scope of category captainship is broader than making price recommendations. Retailers might rely on their category captains for assortment recommendations as well. Kurtuluş and Nakkas (2011) consider a model where the retailer delegates the assortment selection decision in the category to a leading manufacturer. The goal of this research is to study how the assortment offered to the consumers at the retailers will change if the captain is given an authority over the assortment decisions.

The existing literature on assortment planning in operations has mainly focused on assortment planning by the retailer (i.e., centralized assortment planning) (see Kok et al. (2008) for a review). While a number of papers consider assortment planning in the context of decentralized distribution channels (i.e., Villas-Boas 1998; Aydin and Hausman 2009),[3] Kurtuluş and Nakkas (2011) is the first paper that considers how captainship practices play a role on the assortment offered at a retailer.

Kurtuluş and Nakkas (2011) consider a two-stage supply chain with multiple manufacturers (where each manufacturer offers one product only) sell their products to the consumers through a retailer. A customer either purchases one of the products offered at the retailer or does not purchase anything. The paper uses a generic attraction market share type model (Bell et al. 1975; Gruca and Sudharshan 1991) to model demand for each product in the category. The multinomial logit (MNL), which has been extensively used in the operations literature to study assortment problems (e.g., van Ryzin and Mahajan 1999; Cachon and Kok 2007; Cachon et al. 2008), is one example of an attraction type market share model. Let $A_i$ be the attraction of product $i = 1,2,\ldots, N$. For tractability, the paper focuses on a case where all products are equally attractive, that is $A_i = A$ for $i = 1,2,\ldots, N$. $A_0$ represent the attractiveness of the no-purchase option and $A_0$ is normalized to one. Given these assumptions, if the retailer decides to offer $n$ products, the market share (or the purchase probability) for each product is given by

$$q(n) = \frac{A}{1 + nA}$$

[3] Villas-Boas (1998) considers a manufacturer's product line design in a setting where products are sold through an intermediary (i.e., retailer) and the intermediary does the ultimate targeting of products. Aydin and Hausman (2009) study the use of slotting fees by a manufacturer to coordinate the retailer's assortment decision in a setting where the manufacturer sells multiple products through a single retailer.

Let also $\lambda$ denote the total category traffic. Thus, the average demand rate for each product is given by $\lambda q(n)$.

The paper assumes that all products have the same wholesale price $w$, retail prices $p$, and production costs are normalized to zero. The retailer's net profit margin is defined as $m = p - w$. In this setting, because all products have the same probability of being purchased by a consumer and the wholesale price is the same for all products, it is optimal for the retailer to choose the same price for all products (Shugan 1989; Cachon et al. 2008). Hence, the retailer adopts a constant margin policy. In addition, the authors assume that the retailer incurs an operational cost (e.g., cost of managing and executing the replenishment for each product), which is linear in the variety offered in the category, $\beta n$, with $\beta > 0$ (Honhon and Pan 2013).

The paper models category captainship by assuming that the category captain has better information about the consumers' preferences. This is in line with the main motivation of the retailers for using category captains. The authors capture the information asymmetry through the attraction parameter $A$ in the demand model: While the retailer believes that the attraction parameter $A$ is either high ($A_H$) or low ($A_L$) with probabilities $\alpha$ and $1-\alpha$, respectively, the captain knows the realization of $A$.

First, the paper considers a model where the retailer decides how many products to include in the assortment in the face of uncertainty regarding the attractiveness parameter $A$. The retailer selects the optimal variety $n$ by solving

$$\max_n \alpha \frac{m\lambda n A_H}{1 + nA_H} + (1-\alpha)\frac{m\lambda n A_L}{1 + nA_L} - \beta n$$

where the first two terms are the expected revenue from sales and the last term captures the operational cost of managing variety. The authors show that there exists a unique variety level that maximizes the retailer's profit. The key insight derived from this model is that the retailer's imperfect knowledge about the consumers forces the retailer to act as an expected profit maximizer, and offer a suboptimal category variety. That is, if the retailer knew whether the consumers are L or H-type, the retailer would have offered a higher (when consumers are L-type) or lower (when consumers are H-type) variety compared to the case where the retailer does not know the consumers' type.

Second, the paper considers a model where the retailer delegates the assortment selection decision to a captain in return of a target category profit. The retailer delegates the assortment decision to a captain for two reasons. First, the category captain has better information about consumer preferences. The paper captures the captain's superior knowledge about consumers by assuming that the captain knows the realization of the attraction parameter $A$ (i.e., whether consumers are H-type or L-type). Better information about the parameter $A$ translates into an assortment that better matches consumers' needs. Second, the category captain can collaborate with

the retailer and increase traffic into the category through consumer education, promotions, improved in-store displays and merchandising plans. This benefit is captured by assuming that the captain increases the category traffic from $\lambda$ to $\lambda + \Lambda$ where $\Lambda$ denotes the traffic increase due to captainship and captures the captain's ability to stimulate demand at the retailer.

The sequence of events in the captainship scenario is as follows: At stage one, the retailer offers a category captainship contract, which includes a target profit. The captain either accepts or rejects the contract. At stage two, if the contract is accepted, the captain selects variety of the assortment at the retailer. If the captain rejects the contract, the retailer updates its beliefs about the consumers' preferences and decides on variety of the assortment. Essentially, the paper models the captainship as a two stage screening game in which the uninformed retailer makes a take-it-or-leave-it offer to the informed captain and characterizes the pure strategy perfect Bayesian equilibrium.

The category captainship scenario is solved by backward induction. First, the authors consider the captain's assortment selection problem. Then, the authors consider the retailer's target profit setting problem. For a given target profit level, denoted by $K$, the captain who faces type $i \in \{L,H\}$ consumers solves the following problem at the second stage:

$$\max_{n} (\lambda + \Lambda) \frac{wA_i}{1 + nA_i}$$

$$\text{s.t.} (\lambda + \Lambda) \frac{mnA_i}{1 + nA_i} - \beta n \geq K$$

The category captain's profit is strictly decreasing in the variety offered to the consumers because each additional product in the category cannibalizes the demand for the captain's product. However, the target profit constraint prevents the captain from offering its own product only. Therefore, the captain recommends an assortment where the target profit level is binding. The authors characterize the category captain's best response $n^i(K)$ for $i \in \{L,H\}$.

At stage one, the retailer sets the target profit level $K$ in anticipation of the captain's behavior at the second stage. There are two types of equilibria in Bayesian games (Chu 1992): (1) separating equilibrium and (2) pooling equilibrium. In a separating equilibrium (SE), the uninformed retailer makes an offer such that the informed captain reveals its type. In other words, the retailer sets the target profit such that the captain accepts the offer only if the consumers are H-type. In a pooling equilibrium (PE), the informed captain does not reveal its type because both types accept the retailer's offer. The authors characterize the target profits $K_{SE}$ and $K_{PE}$ that lead to separating and pooling equilibria.

When setting the target profit, the retailer faces a tradeoff between the value of information (about consumer preferences) and the value of additional traffic into the category. If the value of information is greater than the value of additional

traffic, which is the case when $\Lambda$ is small, the retailer prefers screening the captain. On the other hand, if the value of additional traffic is higher than the value of the captain's private information, which is the case when $\Lambda$ is large, the retailer prefers the pooling equilibrium.

Comparing the variety levels in the two scenarios reveals that the transition from retail category management to category captainship can increase or decrease the variety offered to the consumers. This increase/decrease is due to two effects: (1) the *adjustment* effect and (2) the *competitive exclusion* effect. The adjustment effect can either increase or decrease the variety of the assortment and is due to the retailer's imperfect knowledge about consumers and the increased traffic into the category. In particular, the adjustment effect is a result of two forces: (1a) variety increase due to higher traffic, and (1b) variety increase or reduction due to better information about consumer preferences. When consumers are L-type, the adjustment effect increases the variety since both higher traffic and better information lead to increase in variety. However, when consumers are H-type, the adjustment effect is ambiguous since higher traffic leads to increase in variety but better information leads to reduction in variety. The adjustment effect suggests a reduced variety only if the possible variety reduction due to better information dominates the variety increase due to additional traffic. The competitive exclusion effect, on the other hand, always reduces the variety and is due to the captain taking advantage of its position and reducing the variety to increase its own profits.

The results in Kurtuluş and Nakkas (2011) have a number of implications regarding the implementation of captainship in practice. The first implication of the paper is that competitive exclusion via reduction in variety (i.e., exclusion of some brands) is possible. However, a reduction in variety under captainship is not always due to competitive exclusion but sometimes due to the adjustment effect. In particular, expected profit maximizing behavior forces the retailer to offer a suboptimal variety under retail category management. The category captain's additional consumer insights help the retailer to adjust its variety to better satisfy consumer's needs. While this adjustment takes place irrespective of the captain's traffic driving abilities, competitive exclusion takes place when the captain is capable of driving significant traffic into the category because the captain is in a stronger position against the retailer in this case. The authors suggest that the presence of these two effects could be one of the reasons for why competitive exclusion is difficult to detect in practice: a reduction in category variety could be due to either the competitive exclusion or the adjustment effect.

Second, Kurtuluş and Nakkas (2011) suggest that while the retailer and the category captain can benefit from captainship, contrary to the common belief, the non-captain manufacturers can also be better off under captainship. While competitive exclusion is a valid concern for the non-captain manufacturers in some instances, the authors find that the variety in the category might actually increase and the non-captain manufacturers can also benefit from captainship.

To summarize, Kurtuluş and Nakkas (2011) shed light on the consequences of captainship when the retailer relies on a captain for assortment decisions and show that category variety can increase or decrease. More importantly, however, this

paper shows (similar to Wang et al. (2003) and Kurtuluş and Toktay (2011)) that captainship could be beneficial for not only the retailer and the captain but also for the non-captain manufacturers.

## 2.3 Emergence of Category Captainship

Subramanian et al. (2010) examine when and why a retailer may engage one manufacturer exclusively as a category captain to provide category management services and the implications of doing so. Subramanian et al. (2010) consider a setting where two competing manufacturers sell to consumers through a retailer. Category captainship is modeled as follows: a category captain may undertake demand-enhancing services such as better shelf-space management, and design and management of displays within the stores. The paper uses a demand system similar to the one used by Wang et al. (2003) and Kurtuluş and Toktay (2011):

$$q_1 = a_1 - p_1 + \frac{\theta}{1-\theta}(p_2 - p_1) \quad q_2 = a_2 - p_2 + \frac{\theta}{1-\theta}(p_1 - p_2)$$

where the parameter $\theta$ is interpreted as the degree of cross-price sensitivity.

The retailer can assign one, both, or neither of the manufacturers to provide service to enhance demand. The sequence of events is as follows: (1) both manufacturers simultaneously propose the services that they would provide if selected as a captain; (2) the retailer can accept one of the proposals, reject both and engage both manufacturers, or decide not to have any retail service provided by the manufacturers. The retailer's category captaincy decision is denoted by $r \in \{0,1,2,J\}$ where $r = i \in \{1,2\}$ if manufacturer $i$'s proposal is accepted, $r = J$ if the retailer decides for joint assignment, and $r = 0$ if the retailer rejects both proposals; (3) if the retailer accepts manufacturer $i$'s proposal, then manufacturer $i$ provides the proposed service. If the retailer chooses joint service, then the manufacturers simultaneously decide the service they will provide; (4) the manufacturers simultaneously set wholesale price $w_i$; and (5) the retailer sets retail prices $p_i$.

The authors assume that the service by manufacturers influences the consumers by shifting the base consumption level. When the retailer assigns neither of the manufacturers to provide service (i.e., $r = 0$), the base consumption levels are $a_i = \overline{a}_i$ where $\bar{a}_i$ denotes the consumer's default consumption level. When the retailer assigns only one of the manufacturers to provide demand-enhancing services (i.e., $r = 1$ or $r = 2$), it is assumed that service can increase the base level of demand. In this case, a manufacturer may provide a service that benefits both brands equally or may provide a service that is biased toward its own brand, which could be done at the expense of the competitor's brand. That is, a captain can provide: (1) category-expanding service; and (2) share-shifting service. The category-expanding and share-shifting services of manufacturer $i$ are denoted by $e_{ic}$ and $e_{is}$, respectively. The base consumption levels in this case are given by

$$a_1 = \overline{a}_i + \frac{e_{ic} + e_{is}}{2} \quad a_j = \overline{a}_j + \frac{e_{ic} - e_{is}}{2} \quad \text{for } i,j = \{1,2\},\ j \neq i$$

In this model, category-expanding service boosts the base consumption level for both brands, whereas share-shifting service increases the base consumption level for the category captain's brand at the expense of the competitor's brand. When $e_{ic} < e_{is}$, the captain's service enhances its own demand and decreases the rival's demand and is the service is mainly share-shifting. On the other hand, when $e_{ic} > e_{is}$, the captain's service enhances demand for all brands and the service is mainly category-expanding. The cost of providing service ($e_c$,$e_s$) is given by

$$C(e_c, e_s) = \frac{1}{2}\left[4\frac{k}{1-k}e_c^2 + (e_c + e_s)^2\right]$$

where $k \in [1,1/3]$ is a cost parameter that indicates how much more costly category-expanding service is relative to share-shifting service.

The authors also consider an alternative to the category captain arrangement where the retailer involves both manufacturers simultaneously, which the authors refer to as the joint service provision, for retail service (i.e., $r = J$). Let $e_i^J$ denote the service provided by manufacturer $i$ in the joint service model. The base consumption levels in this case are given by

$$a_1 = \overline{a}_1 + \frac{e_{1c}^J + e_{1s}^J}{2} + \frac{e_{2c}^J - e_{2s}^J}{2} \qquad a_2 = \overline{a}_2 + \frac{e_{1c}^J + e_{1s}^J}{2} + \frac{e_{2c}^J - e_{2s}^J}{2}$$

The cost of service in the joint service model is given by $(1/\mu)C(e_{ic}^J, e_{is}^J)$ where $\mu \in [0,1]$ captures the relative efficiency of joint service provision as compared to providing service exclusively as the captain. When $\mu = 1$, the service under the joint service model is as efficient as under the captain arrangement. As $\mu$ decreases, joint service becomes relatively less efficient. When $\mu \to 0$, joint service is inefficient and becomes infeasible.

Given these assumptions, the retailer and manufacturers' profits can be written as

$$\Pi_R = (p_1 - w_1)q_1 + (p_2 - w_2)q_2$$

$$\Pi_1 = w_1 q_1 - \delta(r = 1)C(e_{1c}, e_{1s}) - \delta(r = J)\frac{1}{\mu}C(e_{1c}, e_{1s})$$

$$\Pi_2 = w_2 q_2 - \delta(r = 2)C(e_{2c}, e_{2s}) - \delta(r = J)\frac{1}{\mu}C(e_{2c}, e_{2s})$$

where $\delta(x)$ is the indicator function and is equal to one if $x$ is true and zero if $x$ is false.

The authors find that a captain may provide a service that enhances demand for all brands in a category despite doing so is more costly for the captain. However, the non-captain manufacturer may benefit from the captainship arrangement even

if the captain's service depletes its demand. This is more likely to happen in categories where cross-price sensitivity between the competing brands is high. The authors find a negative relation between the degree of manufacturers' price competition (cross-price sensitivity) in a category and the extent of their competition to become category captain. Consequently, the authors conclude that captainship can be beneficial for manufacturers in product categories where cross-price sensitivity is high. Furthermore, the authors identify conditions under which the manufacturers may even be worse off than they would be without the captainship implying that captainship is not always beneficial for the manufacturers.

The retailer, on the other hand, benefits from category captainship when the cross-price sensitivity is low because when the cross-price sensitivity is low, the competition for category captainship stimulates service to such an extent that the retailer prefers to appoint one of the manufacturers as a captain rather than engaging both manufacturers jointly. The findings in Subramanian et al. (2010) may help explain why, despite concerns regarding competitive exclusion, the practice of captainship where the retailer relies on a single manufacturer has become increasingly popular over the recent years, and why there is limited evidence of harm to non-captain manufacturers.

While Subramanian et al. (2010) consider the emergence of category captainship in a context where the retailer relies on a captain for demand enhancing service only, Kurtuluş et al. (2014) consider the emergence of captainship in a setting where the retailer relies on a captain for both demand enhancing service and assortment decisions. Kurtuluş et al. (2014) observe that the prevalence of captainship practices varies significantly from one category to another. Based on a number of cases from trade publication Progressive Grocer and their interviews with several category managers, they observe that many successful implementations have taken place in certain categories (e.g., Canned and Packaged Foods, Frozen Foods, and Health and Beauty Care). They also observe that there are no successful implementations in categories such as Dairy Milk and Fresh Produce. The authors conjecture that this is presumably because captainship delivers higher value to the involved parties in some categories and lower in others.

Motivated by these observations, Kurtuluş et al. (2014) investigate the environments where captainship is more valuable for both the retailer and the captain, and identify the conditions under which captainship benefits all parties involved. This is the first paper that models the competition among manufacturers for captainship and the retailer's captain selection process via an auction where the manufacturers bid for the captainship role.

To this end, Kurtuluş et al. (2014) consider a two-stage supply chain with multiple manufacturers that sell their products to consumers through a retailer. The scope of category management in this paper is assortment decisions and demand-enhancing activities. The paper models demand enhancing as follows: It is assumed that the total category demand is a function of the effort that the retailer (or the captain) exerts into marketing activities such as consumer education programs, advertisement campaigns, and designing efficient planograms. The base rate

category traffic is normalized to one. By exerting marketing effort $x$, the retailer (or the captain) can increase the category traffic to $(1 + x)$. In order to capture the decreasing returns to marketing effort, the model assumes a convex cost function of the form $x^2/(2c)$ where $c$ is the traffic driving capability of the party exerting the effort.

Similar to Kurtuluş and Nakkas (2011), this paper uses a generic attraction market share model (Bell et al. 1975; Gruca and Sudharshan 1991) to model demand for each product in the category where all products are equally attractive, that is $A_i = A$ for $i = 1,2,\ldots,N$ and the no-purchase option's attractiveness is set to $A_0 = 1$. The market share of each product when the retailer offers $n$ products is given by $q(n) = A/(1 + nA)$. Thus, the average demand rate for each product is given by $(1 + x)q(n)$.

Similar to Kurtuluş and Nakkas (2011), this paper also assumes that all products have the same wholesale price $w$ and retail prices $p$, and production costs are normalized to zero. The retailer's net profit margin is $m = p - w$. Similar to the model in Kurtuluş and Nakkas (2011), the authors assume that the retailer incurs an operational cost, which is linear in the variety offered in the category, $\beta n$ with $\beta > 0$ (Honhon and Pan 2013; Kurtuluş and Nakkas 2011).

The authors first consider the benchmark scenario which is in line with the traditional approach where the retailer manages the category internally and decides on the marketing effort, $x$, and the number of products in the assortment, $n$, to maximize its profit; that is,

$$\max_{x,n} (1 + x)\frac{mnA}{1 + nA} - \beta n - \frac{x^2}{2c_R}$$

where the first term in the retailer's profit is the revenue from sales, the second term is the operational cost of managing variety, and the last term is the cost of effort (with $c_R$ denoting the retailer's capability to drive traffic). Solving the retailer's problem, the authors characterize the retailer's optimal effort and variety as well as the profits of the retailer and manufacturers that are included in the assortment in the benchmark scenario.

The authors then consider the category captainship scenario where the retailer selects a captain and outsources the category management activities (marketing effort and assortment) to the captain. To capture the heterogeneity in manufacturers' abilities to drive traffic, the authors assume that the cost of increasing category traffic by $x_i$ (for manufacturer $i$) is given by $x_i^2/(2c_i)$ where $c_i$ is the privately known capability of manufacturer $i$. The retailer believes that manufacturers' capabilities $c_i$ are independent and drawn from a uniform distribution on the interval $[0, \overline{c}]$.

In practice, retailers select their captains by soliciting proposals from multiple manufacturers for category captainship. The retailer usually selects the manufacturer that promises to deliver the highest performance improvement. The authors model the process of captain selection and the competition among manufacturers

for captainship as a first-price auction where the retailer invites $K$ of the $N$ manufacturers to submit proposals for the captainship role.

The sequence of events is as follows: First, the retailer announces the captainship auction and $K$ manufacturers simultaneously bid their promised total category sales to the retailer. The highest bidder is selected to serve as a captain. The captain exerts marketing effort and decides on the variety to be offered at the retailer. The captainship scenario is solved by backward induction by first deriving the captain's variety and effort decisions assuming that the captain has been selected. If the manufacturer with capability $c$ has been selected as a captain by bidding $S$, the captain selects variety to maximize profit subject to meeting the target $S$; that is,

$$\max_{x,n} (1+x)\frac{wA}{1+nA} - \frac{x^2}{2c}$$
$$\text{s.t.} \quad (1+x)\frac{nA}{1+nA} \geq S$$

The authors characterize the category captain's effort and variety response for given target sales level $S$. Then the authors consider the bidding behavior in the captain selection auction where the manufacturers bid for the captainship role. In the bidding for captainship, each manufacturer faces the following trade-off: If a manufacturer wins the auction, the manufacturer is assured that his product will be included in the assortment but incurs the cost of exerting effort. On the other hand, if the manufacturer loses the auction, then he benefits from the captain's effort (without incurring cost) but there is a possibility that his product will be excluded from the assortment. The auction for captainship is not a standard sealed-bid first-price auction since the manufacturers benefit from captainship even if they lose the auction but are included in the assortment. Thus, the captainship auction creates positive externalities that are endogenously determined by the captain's post-auction marketing effort and variety decisions. These positive externalities create a free-riding incentive for the bidders. The strength of the externalities is determined by the probability of exclusion for the non-captain manufacturers, which is an increasing function of the number of manufacturers $N$.

In this context, the authors find that the most capable manufacturer wins the auction and characterize the equilibrium effort and variety set by the captain. They also characterize the resulting expected *ex-ante* profits for the retailer, the captain, and the non-captain manufacturers who are included in the assortment. The authors proceed to study the value of category captainship by comparing the *ex-ante* expected profits of the involved parties in the benchmark and captainship scenarios and derive a number of insights, which are summarized below.

*Emergence of category captainship:* Captainship is valuable for both the retailer and the captain (therefore more likely to emerge) when the captain is more cost effective (more capable) in exerting marketing effort compared to the retailer, and the cost of managing variety, retail margins (relative to manufacturers' margins), and competition for captainship are moderate.

One factor contributing to the emergence of captainship in categories such as Canned Fruits and Vegetables and Frozen Pizza is the capability differential between the manufacturers and retailers in these categories. Most manufacturers in these categories have a national presence and dedicate significant resources into category management (e.g., Heinz, Kraft, and Dole in Canned Fruits and Vegetables; Kraft and General Mills in Frozen Pizza). The rate of new product introductions in these categories is high because of frequently changing consumer needs. Manufacturers closely follow consumer trends; hence they are more capable of developing strategies to grow these categories compared to the retailers. In addition, a number of manufacturers with significant capabilities compete for captainship, which is another factor that contributes to the successful captainship implementations in these categories.

On the other hand, the authors point out that the lack of successful captainship implementations in categories such as the dairy milk can be attributed to limited competition for captainship and lower supplier capability. Consumer preferences in such categories are well understood and stable and there are only a few smaller manufacturers that have limited resources to dedicate into category management.

*Impact of captainship on non-captain manufacturers*: When a manufacturer is assigned to serve as a captain, this usually results in frustration for the non-captain manufacturers because of the fear of exclusion. The authors demonstrate that this is a valid concern in some cases but also point that captainship can benefit not only the retailer and the captain, but also the non-captain manufacturers. Whether the non-captain manufacturers benefit from captainship is determined by whether the benefits of the increased traffic dominate the possibility of being excluded from the category.

*Impact of captainship on marketing effort and variety*: When the retailer performs category management, an increase in marketing effort leads to an increase in variety. When these decisions are delegated to a captain, a higher marketing effort allows the captain to reduce variety to increase its market share. Hence, when the effort and variety levels are compared across the two scenarios, the effort is usually higher but variety is lower under captainship.

## *2.4 Antitrust Concerns*

Some economists have voiced antitrust concerns related to category captainship (Steiner 2001; Desrochers et al. 2003; Leary 2003; Klein and Wright 2006). In the US, the Antitrust Institute has voiced reservations about category captainship. In Europe, ECR has taken the lead to ensure that category captainship is implemented in compliance with European Union competition rules.

Desrochers et al. (2003) states that antitrust concerns related to category captainship practices focus around two issues: (1) competitive exclusion and (2) competitive collusion. The exclusion-based concern is that smaller competitors are denied the right to compete for category captainship because they do not have the

necessary resources (Desrochers et al. 2003). Retailers usually assign one of their leading manufacturers to serve as a category captain because only those manufacturers have the necessary resources that can benefit the retailer. Big manufacturers already invest a great deal in consumer research and can use these resources toward helping retailers manage their categories better. The concern is that category captain manufacturers' power will be further enhanced and smaller manufacturers will be put at a disadvantage.

Prior research on captainship has provided some evidence supporting and some evidence refuting the competitive exclusion hypothesis and is inconclusive. For example, Morgan et al. (2007) argue that the category captains will engage in opportunistic behavior. However, Gooner et al. (2011) show that category captains can improve category management at the retailer without engaging in opportunistic behavior. Subramanian et al. (2010), Kurtuluş and Toktay (2011), and Kurtuluş and Nakkas (2011) offer some theoretical evidence that competitive exclusion exists but also point to the possibility that captainship can benefit all involved parties including the non-captain manufacturers.

Competitive collusion concerns include the possibility that a category captain can use its role to facilitate collusion and limit the competition among rivals in the category (Desrochers et al. 2003). First, the category captain may transfer sensitive information such as pricing, merchandising, and promotion plans from one manufacturer to another. When manufacturers in the category know about their rivals' pricing, they might price more or less aggressively, or if they know about their rivals' promotion plans, they may promote their brands more selectively. Second, the category captain can coordinate its recommendations across the retailers for which it serves as category captain. Desrochers et al. (2003) suggest that if retailers are more selective in sharing sensitive data with their category captains, some forms of competitive collusion scenarios can be avoided.

To summarize, while category captainship practices in the retailing sector present a very valuable opportunity for the retailers to benefit from their captain manufacturers' expertise and resources, these practices also open up an opportunity for the captain manufacturers to take advantage of their positions as captains and exclude competitors and restrict competition in the categories. While research shows that category captainship may have significant positive impact on the retailer's and the captain's and in some instances on the non-captain manufacturers' performances, existing research also identifies circumstances under which captainship practices result in competitive exclusion.

## 3 Impact of Category Captainship Practices on the Retail Industry

In this section, we consider how category captainship practices could potentially change the nature of the manufacturer-retailer relationships and the landscape in the retail industry. Practices such as category captainship delegate considerable power

to the category captain manufacturers because in most cases they can effectively control outcomes in the category (Desrochers et al. 2003). While some retailers continue to work with their category captains and verify their recommendations, other retailers prefer to implement their captain's recommendations 'as presented by the captain' mainly due to lack of resources. While private information on the category captain's part makes it easier for the category captain to provide biased recommendations and control the outcomes in the category, it also makes it more difficult for the retailers to detect bias in a category captain's recommendations. The category captain's influence over the retailer also depends on the size of the retailer. Small retailers are more likely to accept and implement the captain's recommendations in 'as is' manner, whereas larger retailers have more control over the process and are more likely to implement their category captain's recommendations after verifying them.

In order to decrease the amount of control given to the captains, some retailers assign a second manufacturer in the category to serve as a co-captain and use them as consultants to verify the category captain's recommendations. In addition, the retailers renegotiate the captainship agreements by reviewing the captain's performance frequently to balance the power in the supply chain (Kurtuluş and Toktay 2004).

A potential adverse effect of category captainship on retailers is the loss of capability to manage the categories internally. Retailers should be aware that category management requires a thorough understanding of consumer preferences and purchase patterns, a knowledge base that is hard to build once that expertise is lost (Kurtuluş and Toktay 2004).

Traditionally, manufacturers such as Procter&Gamble and Unilever were the main players in the consumer goods industry and retailers were primarily a means of reaching consumers. The early 1990s saw an increase in the number of high quality new product introductions and the emergence of other strong manufacturers, which led to higher competition for shelf-space. This, combined with the retailers' awareness of the importance to be in contact with end consumers, provided the basis for a shift in power from manufacturers to retailers. Many retailers such as Wal-Mart and Carrefour owe their rapid growth to these developments (Corstjens and Corstjens 1995).

As Corstjens and Corstjens describe in their influential book Store Wars, "...the giant retailers, now, stand as an obstacle between the manufacturers and the end consumers, about as welcome as a row of high-rise hotels between the manufacturer's villa and the beach." Their book describes the contemporary national brand manufacturers over the past two decades as being in a continuous battle for shelf-space and mind-space at the retailers. It is therefore not surprising that manufacturers would advocate any initiative that can increase their influence over retail decisions, and category captainship is one such practice. But by outsourcing retail category management to their leading manufacturers, retailers may in the long run lose their capabilities in managing their product categories and their knowledge about consumers. This loss of capability may prepare the basis for a shift in power back from the retailers to the manufacturers (Kurtuluş and Toktay 2004).

Given this changing landscape in the consumer goods supply chains over the past few decades; an intriguing question is what will happen to the retailer-manufacturer relationships and power balance in the consumer goods supply chains in the near future. With the growing popularity of category captainship practices (and other similar practices such as vendor managed inventory and direct store delivery) in the retail industry, the number of manufacturer-retailer partnerships (e.g., Wal-Mart and P&G, Carrefour and Colgate) is increasing. While such partnerships will positively influence the partner manufacturers, they will also place the non-partnering manufacturers at a disadvantage, forcing them to become a partner to a leading retailer. Manufacturers' battle for shelf-space and mind-space over the past decade has started to transform into a battle for being a partner (e.g., category captain) for a major retailer (Kurtuluş and Toktay 2004).

## 4 Future Research Directions

Although category captainship practices became widespread in the retail industry over the past decade, the consequences of using captains for category management are not fully understood by either academics or practitioners. Therefore, we believe that there is room for more original research in this field. We have identified five directions for future research that would help both academics and practitioners to better understand the consequences of category captainship practices.

First, existing research on category captainship assumes that the retailers either delegate the pricing, or the assortment or retail service decisions such as shelf-space management to a captain. However, in practice, the scope of category captainship implementations is broader: retailers rely on their captain's for a combination of these decisions. Therefore, exiting models cannot fully capture the category captainship phenomenon. The question of how different category captainship arrangements impact the retailer and the manufacturers needs to be answered when the retailer relies on its category captain for a combination of assortment, pricing, shelf-space management, and promotion planning recommendations. Future research can take advantage of the existing research on joint inventory and pricing decisions in operations (see Petruzzi and Dada (1999), Elmaghraby and Keskinocak (2003), and Yano and Gilbert (2003) for literature reviews on different aspects of the joint pricing and inventory decisions) that could be used as the basis for investigating the impact of jointly delegating the shelf-space allocation and pricing decisions to a leading manufacturer. In addition, there is a literature on trade promotions in marketing (e.g., Lal and Villas-Boas 1998; Kim and Staelin 1999) and operations (e.g., Iyer and Ye 2000; Huchzermeier et al. 2002) that could be used as the basis for research to understand the impact of recommendations made by captains to their retailers about different aspects of promotion planning.

Second, existing research on category captainship is mainly based on mathematical models. However, answering broader questions would require empirical research. In particular, empirically testing the impact of category captainship practices on the

financial performance of the retailers and understanding when such practices would benefit the retailers would be a good starting point. Empirical research is also needed to test the hypothesis that category captainship may result in competitive exclusion. Such empirical research would provide a basis for the antitrust cases that are under investigation regarding category captainship misconduct.

Third, existing research on category captainship exclusively focuses on categories where products are substitutes. However, a product category sometimes can consist of complementary products such as toothpaste and toothbrush products in the oral care category. Future research should be conducted to understand the differences in category captainship implementations where the products are substitutes versus complements, and whether categories where the retailer offers complementary products are more suitable for category captainship.

Fourth, future research should explore the value of having an independent third party (i.e., intermediary) providing category management services for retailers. Companies such as ACNielsen collect and sell syndicated data and software that can be used for category management; however, they do not provide category management recommendations. Research is needed to understand the advantages and disadvantages of using a third party for category captainship. On one hand, retailers could take advantage of the expertise and resources of the third party providers without worrying about bias in the recommendations provided. On the other hand, the retailers should be concerned about losing their internal category management capabilities. Another source of concern for the retailers is that these third party providers would provide recommendations to many retailers that compete for the same consumers, potentially causing the retailer to lose its competitive edge.

Finally, future research should consider if and how information leakages as a result of captainship implementations play a role on the value of captainship for the retailers. Category captainship requires that the retailer share significant amount of confidential information with its captain manufacturers. Given that a manufacturer often serves as a category captain for many retailers that compete for the same consumers, the captain manufacturer serves as an information hub by collecting valuable consumer information from multiple retailers. As a result, the captain manufacturers gain significant power in making the category decisions such as pricing for not only their own brands but for all brands in a category. Retailers, on the other hand, may abstain from sharing proprietary information because the leakage of proprietary information to competitors via the category captain can result in loss of competitiveness. It would be valuable to investigate if and how such leakages can play a role on the value of category captainship for the retailers. Future research in this area can take advantage of and build on the existing research on Resale Price Maintenance (e.g., Chen 1999; Deneckere et al. 1996) discussed in Sect. 2.1, which utilizes models where a single manufacturer sells to consumers through multiple competing retailers.

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