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Franchisor–franchisee supply chain cooperation: Sharing of demand forecast information in high-tech industries ☆

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ABSTRACT

In order to maintain their competitive edges in the market, high-tech firms cannot simply rely on superior technology alone. In addition, due to rapid technological changes, market demands in the high-tech industries have become volatile and difficult to forecast. This study proposes an option (i.e. franchising) that high-tech firms can use in order to expand their markets and improve firm performance. We also utilize a Bayesian forecasting methodology in order to address information sharing between the franchisor and franchisee. Our study demonstrates how high-tech franchising firms can benefit from information sharing of demand forecasts when franchising in order to enhance franchise performance. We also show that a profit sharing mechanism that results in optimal profits for the franchisor and franchisee. The study fills the research gaps that currently exist in the franchising literature and provides important managerial implications for practitioners in B2B markets.

1. Introduction

A substantial amount of venture capital pours into high-tech industries (e.g., pharmaceuticals, communication and electronic equipment and office computing machines) each year due to their high profits and growth potential. For instance, recent reports have indicated that the global electronic manufacturing services market, which consists of the computer applications segment; the consumer, industrial, medical and Aerospace segments; and the communications segment, had total revenues of $194.6 billion in 2010 (Datamonitor, 2011a) and that the global semiconductor market reached a value of $346.8 billion in 2010 (Datamonitor, 2011b). The global sales of consumer electronics reached $722 billion in 2010 and these sales are estimated to continue to grow (Euromonitor International, 2011). However, instead of relying on technological superiority, high-tech firms have increasingly focused on developing a variety of marketing programs to maintain their competitive edges (Traynor & Traynor, 2004).

In North America, manufacturers sell consumer electronics through major retailers, such as Best Buy and Wal-Mart. In addition to these traditional distribution channels, some firms (e.g., Dell and SONY) have attempted distributing products via kiosks in shopping malls and other high traffic locations. Given the high competition in high-tech industries, firms should attempt to find more ways to expand their markets. Research has indicated that franchising could be an optimal solution to the channel design problem in some circumstances when high-tech firms decide to expand their markets (Ayal & Izraeli, 2002). The most recent example of franchising in the high-tech industry can be found in Apple's decision to expand its market in China. Apple has given its franchise to Hon Hai Precision Industry Co., Ltd., which will sell Apple's consumer electronics products in China via its established Cybermart Digital Square (Liu, 2009).

Franchising plays an important role in the US economy and is becoming the world's fastest growing form of retailing (Kaufmann, Gordon, & Owers, 2000). In 1985, sales of franchising in the US were estimated at $529 billion (Lal, 1990). More recently, sales of franchising are more than $1.3 trillion and account for more than 10% of retail sales by all U.S. businesses (U.S. Department of Census, 2010). Franchising has become one of the most popular ways of doing business in today's marketplace. Entering and exiting the franchising industry is a common feature of franchisors (Lafontaine & Shaw, 1998; Shane & Foo, 1999). Prior research on franchising has focused on investigating factors that have caused franchising failures. However, franchising performance remains under-researched (Alon, Drtina, & Gilbert, 2006; Combs, Michael, & Castrogiovanni, 2004). Since franchising may serve as a good alternative to expanding markets for high-tech industries (Ayal & Izraeli, 2002), additional studies are needed to investigate how to enhance franchising performance. Prior research has suggested that sharing demand forecast information between franchisors and franchisees could be one possible method by which

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to improve franchising performance (Dant & Nasr, 1998). Within this study, we propose a specific model by which to improve franchising performance through information sharing between the franchisors and franchisees.

Accurate demand forecasting is essential to businesses (Lancioni, 2000) as it influences profits substantially (Taylor & Xiao, 2010). For example, in order to meet various consumer needs, high-tech firms like Hewlett-Packard offer many innovative products. By providing multiple similar products, Hewlett-Packard's forecast accuracy reduced and, thus, profits were affected adversely (Ward, Zhang, Jain, Fry, & Olavson, 2010). Because of rapid technological changes and numerous product configurations, the demands in the high-tech industries are very volatile and difficult to forecast (Yelland, 2009). In addition, due to the current uncertain and turbulent economy (IDC, 2009), demand forecasting is more difficult than in previous years in the high-tech industry (e.g., PC and consumer electronics). As such, efforts have been made to discover better ways of producing accurate forecasts (e.g., McDade, Oliva, & Thomas, 2010; Meredith, 2006). For instance, Sun Microsystems Inc., a vendor of enterprise computing products with about $14 billion in annual sales, has devoted its effort to developing models to forecast its demand (Yelland, 2009).

In B-to-B markets, the accuracy of demand forecasts could be improved via information sharing between different members, which would allow firms to respond to changes in customer and competitive demands in a real time manner (Lancioni, 2000). As such, mastering more accurate demand forecast information contributes to better managerial decisions, such as an optimal pricing policy and inventory levels (Christopher, 1999). For instance, firms can adjust the inventory level according to the market demand and reduce the costs of inventory shortage with increased demand information accuracy. There has been a growing interest in improving supply chain performance for all members of a supply chain through demand forecast information sharing (e.g., Mishra, Raghunathan, & Yue, 2007; Mukhopadhyay, Yao, & Yue, 2008). In many cases, supply chain players make decisions with limited demand forecast information. A significant benefit of this information sharing is that the shared information (i.e., consumer demand information and sales trend, etc.) improves information accuracy and distribution planning. For example, retailer Best Buy Co. and PC manufacturer Lenovo Group Ltd. have benefited from exchanging information during product distribution. A recent report shows that Lenovo significantly outperformed the market in its PC shipments among the top five vendors (Gartner, 2011). Researchers also indicate that information sharing would be especially useful for improving firm performance in the high-tech industry (Lee, So, & Tang, 2000).

Therefore, the case of demand forecast information sharing between the franchisor and franchisee has gained interest as it is expected to enhance franchising performance. Researchers have identified factors, such as incidences of repeat purchases and the age of the relationship between the focal franchisor and franchisee, that influence a franchisee's willingness to share information (Dant & Nasr, 1998). However, further research is needed in order to encourage information sharing between both parties in such a way that is beneficial to both parties. One stream of research on information sharing in supply chain management identifies the benefits of information sharing in regard to inventory and replenishment (e.g. Parlar & Weng, 1997). Another stream of research has examined the conditions that facilitate information sharing (Li, 2002) and how information sharing impacts price decisions. However, few comprehensive models exist to identify the ways by which to encourage information sharing and bring benefits to channel members. Thus, one of our research objectives is to develop a model that facilitates information sharing between the franchisor and franchisee and, subsequently, brings about optimal profits for both parties. We demonstrate how to enhance franchising performance through information sharing between the franchisor and franchisee. Developing such a model in regard to franchising will contribute to the existing franchising literature.

This research will also contribute to an emergent stream of research on profit sharing in B2B channel relationships. Previous studies have examined the determinants, practices and consequences of profit sharing (e.g., Fang, Palmatier, & Evans, 2008; Jap, 2001; Wagner, Eggert, & Lindemann, 2010; Wagner & Lindemann, 2008). However, little research has been conducted on the mechanism of profit sharing and bargaining in the franchising system. Extending prior research, this research will demonstrate that a profit sharing mechanism that motivates information sharing between the franchisors and franchisees result in optimal profits for the franchisor and franchisee, which further encourages future collaboration. In addition, although substantial research has focused on the coordination between the franchisors and franchisees, prior research has been conducted under the assumption that market demand is certain. Little is known in regard to whether the observed effects could be generalized to when market demand is uncertain. In order to fill the aforementioned research gaps, based on the Bayesian forecasting theory (DeGroot, 1970), this study proposes a win–win information sharing model that encourages franchisors and franchisees to share demand forecast information through pricing strategies and inventory- and replenishment-related savings.

The rest of the paper is organized as follows. Section 2 provides a summary of the relevant literature. Section 3 presents our modeling framework. Section 4 analyzes the cases of non-information sharing and information sharing under the Stackelberg game. Section 5 compares the impact of different information strategies on the performances of the franchisor and the franchisee. We present numerical examples in Section 6. Conclusions and managerial implications are presented in Section 7.

2. Literature review

2.1. Franchising

A franchise is normally based on either some unique products or services, on a method of doing business, or on a trademark, goodwill, or a patent that the franchisor has developed. The franchisee pays a fixed one-time lump-sum fee to the franchisor in exchange for the right to market the product or service. The franchisee is also assumed to pay the franchisor a royalty fee, as a percentage of total gross sales generated at the retail level (Elango & Fried, 1997). The most frequent type of format is having the royalty fee calculated on about 5–8% of the total gross sales that the franchisee earns (Daszkowski, 2010). Such relationships can be found in a variety of settings, especially in the setting of car dealer franchises, auto parts franchises, and computer products franchises (Johnson, 2007; Reynolds, 2008). A normal supply chain consists of two parts: Business-to-Business (B2B) and Business-to-Consumers (B2C). A franchise supply chain is a specific form of organization for the B2B supply chain and usually consists of a franchisor and one or more franchisees. The franchisor distributes the products or services to the end consumers through franchisees without operating its own stores. In this paper, we consider a franchise supply chain, consisting of one franchisor and one franchisee (i.e. B2B). We assume that the demand is a linear function of price. We also assume that the franchisor and the franchisee have their own private information about market demand. A franchisee, for instance, has point-of-sale (POS) data, knowledge of its own merchandising efforts and aggregate store measures. A franchisor, on the other hand, often has broader information about the market, consumer motivations, demographic patterns (Desrochers, Gregory, & Albert, 2003) and these factors which affect sales of its own products or services (Blattberg & Fox, 1995). When their information is not shared, the franchisor and the franchisee set their optimal prices respectively, based on their own private information. However, when information is shared, both the franchisor and the franchisee use the shared information to set their optimal prices. Using a game theoretical model,