

An Exploratory Study to Improve Sales Operations When Selling Multiple Prescription Drugs

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This paper explores the importance of integrating knowledge with quantitative modeling process to improve sales operations in multiple product selling situations in the pharmaceutical industry. A knowledge-based approach is proposed to minimize challenges in detailing multiple products to physicians who are more and more difficult accessing in recent years. The performance of this new approach is compared against the traditional approach via actual implementation by the firm that is sponsoring the research. Results based on three months of implementation indicate that the knowledge-based approach performs significantly better with increasing the number of responsive physicians by 71% and profit by 9%.

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I. INTRODUCTION

The pharmaceutical industry has faced a number of challenges in the recent years, with many branded drugs going off patent without enough blockbuster drugs in the pipeline to replace them (PricewaterhouseCoopers, 2008). In addition, the industry has received a lot of negative press from both the government and consumers for the aggressive investment in to their sales and marketing efforts (Gagnon and Lexchin, 2008; Washington Post, 2002). Obviously, the industry needs to find a way to better utilize their sales and marketing spending to fend off some of these challenges.

Sales force is the most expensive marketing investment that a pharmaceutical company can make. The primary function of sales force is to provide detailing to their target physicians. The target physicians are those who already prescribe or have potential to prescribe

the firm's prescription drugs; detailing involves pharmaceutical sales representatives visiting each of their physicians to disseminate the latest information on the firm's prescription drugs that is meaningful to the physician's specialty and the patients he or she is treating. The detailing is done with the goal of encouraging the physician to correctly prescribe the firm's drugs for those patients who fit the diagnostic criteria, and given a similar treatment situation where two prescription drugs are equal in providing help to patients, the firm assumes that the sales rep's selling capability would sway the physician to prescribe their product. With a heavy price tag of \$150 to \$200 per detail, companies put a significant effort into determining the right physicians to target, the order of the details, also known as detailing sequence, when multiple products are involved, and the frequency of details to the targeted physicians over time (Gagnon and Lexchin, 2008).

This paper explores the importance of a knowledge-based approach in improving sales force operations in multiple product detailing situations by integrating domain knowledge with quantitative modeling process. The approach specifically targets to minimize major limitations of the traditional approach in planning for detailing multiple products. The result from this study is implemented and tested in a real-world environment to a sample of physicians in a territory to explore its performance against a control group of similar physician size and sales volume.

The remainder of the paper is organized as follows: Section II gives an overview of the background of the pharmaceutical industry and sales operations related challenges taking place in the industry. Section III explains the data sets used for this study. Section IV describes a knowledge-based approach developed to derive a set of weights for planning detailing strategy, and Section V summarizes the plan's performance based on actual implementation of the approach. Section VI discusses the approach and concluding remarks.

II. BACKGROUND OF THE INDUSTRY

Physician detailing is the primary means to market pharmaceutical drugs because in this market the physicians are the ones who decide the best treatment algorithm for their patients, who are the end users. This dynamic of promoting to physicians, is different from traditional marketing, which targets its promotional efforts directly to the end users; however, detailing is similar to other forms of promotion, used in traditional markets, in a sense that it is both a marketing tool and an informational source (Nelson, 1974).

The detailing efforts have been losing its impact over the years due to significant changes in the selling. The primary change is from managed care organizations' growing influence in regulating the use of drugs coupled with an increasing number of physicians seeking more

objective scientific evidence of benefits (Robinson, 2001). Moreover, a more competitive detailing environment (LeadDiscovery, 2006); lack of new blockbuster drugs to gain physicians' attention (PricewaterhouseCoopers, 2008); and the increasing role of direct-to-consumer advertisements and electronic detailing (Davidson and Sivadas, 2004) all have contributed to the declining detailing impact. In fact, the average detailing duration dropped from five minutes in 1998 to less than one minute in 2004 (Yi, 2008), signaling the physicians' declining interest in hearing from the reps.

Many researchers have found evidence of high market share of detailing voice positively impacting the market share of detailing product (Jones, 1990; Shimp, 2000; Gonul, Carter, Petrova, and Srinivasan, 2001; Pesse, Erat, and Erat, 2006). As a result, pharmaceutical firms are committed to maximizing their share of voice within their resource constraint in an effort to increase sales; one way to increase the share of voice without adding more sales reps is to detail multiple products instead of single product.

2.1. Share of Voice Computation

To derive the share of detailing voice, physician detailing equivalent (PDE) weights for the product and the market are computed first; PDE is used by the industry to calculate total detailing efforts when detailing is done in multiple sequences, and the PDE weights reflect the relative detailing impact of each sequence. Equation (1) shows how PDE_{jkl} , which denotes physician detailing equivalent for physician j , in time period k , for product l , is calculated:

$$PDE_{jkl} = \sum_i (W_i \times D_{ijkl}) \quad \text{for } \forall i, j, k, l \quad (1)$$

D_{ijkl} is defined as the total number of details made in sequence i to physician j in time period k , for product l , while W_i defines the PDE weight for detailing sequence i . In addition, the weights play an instrumental role in computing share of voice in time period k , for product l , denoted as SOV_{kl} , as shown in Eq. (2):

$$SOV_{kl} = \frac{\sum_j PDE_{jkl}}{\sum_l \sum_j PDE_{jkl}} \quad \text{for } \forall k \quad (2)$$

2.2. Impact of Detailing Multiple Products to Share of Voice

The traditional PDE weights, shown in Table 1, are provided by the firm sponsoring this research; the table shows that the full weight of one is assigned to the first detailing product independent of the number of products in the detailing portfolio. In other words, as long as the product is detailed in the first position, it will always carry the full detailing weight. Similarly, if the product is detailed in the second sequence,

it will always have the PDE weight of 0.6. Finally, any product detailed in the third sequence or beyond will have the PDE weight of 0.3. Clearly, the firms detailing multiple products will have higher share of voice with 1.9 PDE when a sales rep details three products to a physician in a single visit versus 1 PDE when a rep details a single product.

According to the sponsoring firm, the origination of the PDE weights is based on primary market research to physicians. Interviews with sales operations professionals in other companies made possible by pre-existing professional contacts have validated that these values are similar across the industry.

TABLE 1: SUMMARY OF TRADITIONALLY APPLIED PDE WEIGHTS FOR DETAILING SEQUENCE BASED ON THE NUMBER OF DETAILING PRODUCTS

	1 st position	2 nd position	3 rd + position
In single product detailing	1.00	-	-
In two-product detailing	1.00	0.60	-
In three+ product detailing	1.00	0.60	0.30

2.3. Limitations of Traditional Approach

The traditional approach in utilizing PDE weights has two major limitations. The first limitation is that the approach always gives benefit to detailing more products versus detailing fewer products by a way of increasing SOV. This is a flawed assumption because it is hard enough to access physicians in recent years and when the access is granted, they are not allowing for more time if reps detail more products with average details lasting less than a minute (Yi, 2008). More likely, the detailing products will likely cannibalize the individual detailing impact due to the spreading of information in a fixed time. Thus, always giving SOV advantage to multi-product detailing strategy may mislead management in making sound sales operations decisions.

Secondly, the PDE weight for each detailing sequence is constant for all physicians regardless of how well they respond to details. This is another flawed assumption because physicians and their patients' needs are different; if the firms do not accommodate for these differences and neglect to provide individualized detailing strategy, a significant negative consequence such as suboptimal resource allocation and undesirable sales force performances are likely consequences (Yi, Anandalingam, and Sorrell, 2003).

In spite of the significance of these weights have on sales operations decisions, surprisingly little is known about them via published research. In this paper, we propose a new approach to minimize the impact of the aforementioned limitations to sales performance, and investigate the feasibility and performance of

the approach when implemented to a small sample of physicians.

III. DATA

A pharmaceutical company with annual US sales over \$2 billion sponsored this research on the condition that the company would receive the model and report of the findings while remaining anonymous and having a say in when to release the research publication. The firm provided (1) the detailing history and respective sales data for one of its territories in the Northeast region, comprising a total of 72 physicians on its target list, and (2) team of domain experts and their time to help in this research on a \$275 million prescription drug product. This drug was launched in late 1990s, is promoted by multiple sales forces in different detailing sequences, and competes against four branded products for market share. The product was selected for this research mainly due to the wealth of detailing data available.

Pharmaceutical companies generally target physicians detail based on the volume of prescriptions they generated in both the drug class and the drug itself. The physicians were sorted in order of prescription volume in the disease class, and then they were grouped into 10 equal segments, with the first decile representing the lowest prescribers and the 10th decile the highest; the higher-decile physicians received more detailing visits from the sales reps than did the lower-decile physicians.

To initiate this study and find the direction of the research, we merged two sets of data, by physician identification number, to form the database. One data set contains the number of prescriptions that the physicians on the company's target list wrote for the studied drug and its competitors. The second contains information about the sales reps' detailing activity with the physicians. Two years' worth of data, broken out into eight quarters from 1st quarter 2003 through 4th quarter 2004, were collected for the study; we used quarterly data

because monthly data contained too much noise for the research.

In addition, the company provided the competitive sales activity data at the territory level for the same period as that used for the data analysis. It captured information on all competing products marketed in the same therapeutic area of the company's product: the competitors' sales force structure; the number of sales reps detailing the drugs; and the detailing sequences of the products for each territory. There were concerns about data integrity of other promotional events, such as direct-to-consumer advertising, electronic detailing, journal advertising, and sponsored medical educational programs; these data points were excluded from this study.

IV. NEW APPROACH: KNOWLEDGE-BASED APPROACH

A knowledge-based approach is defined as one designed to extract and integrate the tacit and explicit knowledge within the organization and then to apply it as a vital component in the quantitative modeling process to improve the organization's performance as well as gaining insights that can provide competitive advantage (Blattberg and Hoch, 1990). This paper proposes a knowledge-based approach at the physician level to explore whether or not limitations of the traditional approach can be alleviated while improving sales operations involving multiple products. The theoretical framework for this approach is founded on knowledge and micromarketing.

4.1. Theoretical Framework for Knowledge and Micromarketing

Knowledge is defined as the set of justified beliefs that enhance a firm's capability to take effective action (Nonaka, 1994). Knowledge can largely be divided into two areas: tacit and explicit. Tacit knowledge refers to insights, intuitions, and hunches that are not

easily verbalized or communicated. This tacit knowledge is critical in decision making process because it is the primary source of problem definition and alternatives (Davenport and Prusak, 1998). On the other hand, explicit knowledge refers to that which can be formally expressed and collected as data, words, and software, therefore, be easily diffused throughout an organization (Davenport and Prusak, 1998). Researchers have found that converting tacit knowledge into explicit knowledge and integrating the two significantly enhances a company's competitive position by improving organizational capability, competence, and performance (Brown and Duguid, 1998). Moreover, knowledge integration across different functions within a firm has demonstrated improvement in decision making quality and organizational performance (Blattberg and Hoch, 1990; Cai, 2006; Liebowitz, 2008).

Recent studies have shown that knowledge capture and management can be improved by integrating visualization into the modeling process, with visually agreed-upon knowledge being very successful in capturing and segmenting complex knowledge (Coffey, Hoffman, and Cañas, 2006; Strohmaier and Lindstaedt, 2007). Also, integrating domain experts' knowledge with secondary data that can be used to derive visually agreed-upon promotional response patterns has proven to be an effective way to identifying responsive physicians, leading to derivation of more accurate response functions and, consequently, improvement in the quality of the detailing plan (Yi et al., 2003). Moreover, it has been demonstrated that the promotional response function parameters for individual physicians can improve its accuracy by calibrating the

parameters to reveal responsiveness as defined by the experts (Yi, 2008).

Based on these previous studies, this paper hypothesizes that optimally utilizing knowledge is critical to improvement of detailing planning. In addition, accurate PDE weights are those that visually reveal physicians' responsiveness by matching its pattern to the predetermined responsive patterns developed by domain experts, resulting in improved promotional functions and detailing plans. Moreover, since PDE weights are inputs to SOV computation as well as to detailing planning, improvement in the weights will also improve the qualities of SOV calculation as well as detailing planning. These benefits are expected to result in minimization of non-value-added costs, making the sales reps more effective and therefore increasing revenue.

Micromarketing is tailoring marketing plans at the consumer level to better accommodate individual differences in responses to promotions (Leeflang and Wittink, 2000; Zhang and Krishnamurthi, 2004). In addition, similar to traditional consumers, physicians respond better to marketing messages tailored to their individual needs (Yi, 2008). Therefore, incorporating micromarketing as part of a knowledge-based approach is expected to be more effective than the traditionally targeting physicians at a macro level, and further increase the effectiveness of sales operations.

4.2. Process Flow of the Knowledge-Based Approach

The process flow of this approach is shown in Figure 1. This flow is developed to provide transparency to the proposed process.

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