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Editorial
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Advertising Response Models for Marketing-OM Interface Research

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Research on the interface between marketing and operation management (OM) is an emerging area. Generally speaking, marketing is the creation of customer demand and operations management is the supply and fulfillment of customer demand [1]. In practice, managing the interface between the marketing and operations is a very challenging task because these two areas are often in conflict. For example, it is better to increase product diversity from the marketing point of view; while a manufacture wants to reduce the product variations [2]. Since conflicts between the two areas often lead to production inefficiencies and unsatisfied customers, co-ordination between marketing and operations is critical for a firm to be successful.

In Marketing-OM interface, advertising expenditure and pricing are two essential elements. Although the topics of Marketing-OM interface research vary significantly, advertising response models are the basis for decision makings. This purpose of this paper is to introduce how to choose a suitable advertising response model for marketing-OM interface researches.

Generally, when authors choose their advertising models for their Marketing-OM interface researches, the following three factors should be carefully considered: (i) to choose an aggregate model or an individual model, (ii) to choose a static or a dynamic advertising response model, (iii) to verify the empirical basis of the model.

Aggregate Models v.s. Individual Models

Typically, there are two types of advertising response models: the aggregate and individual models. Aggregate advertising response models characterize the effects of various marketing variables on the product demand in a market level, whereas the individual advertising response models are usually used to depict the individual customer behavior with advertising efforts taking into account.

Aggregate advertising response models usually can be classified into priori models and econometric models. Commonly, econometric models could have a linear [3-7] or non-linear forms [8-12]. Priori advertising models have two typical forms. One is Vidale-Wolfe model [13] and its modifications [14-20], and the other is Nerlove-Arrow model [21] and its extensions [22-25]. Recently, a new priori advertising model based on Lotka-Volterra model was proposed by Wang et al. [26].

The individual advertising response models are usually based on consumer's utility and surplus [27-29]. Specifically, such models assume that: (i) a consumer has a certain utility when he/she consumes a product, (ii) whether a consumer buys a product or not depends on his surplus, and (iii) consumers' utility for a certain product are heterogeneously according to certain probability distribution. Combining the above three assumptions, the sales of a product can be a certain integration of the probability function.

Static v.s. Dynamic Advertising Response Models

Advertising response models are in static and dynamic forms. In static models, the sales is an direct function of marketing variables such as price and advertising efforts or budgets. Examples of such models include Berger [30], Huang and Li [31], Huang, Li, and Mahajan [32], Yue et al. [33], and Xie and Wei [34]. In dynamic models, market state variables such as sales, market shares and goodwill are changing dynamically by the advertising efforts and are expressed by means of differential equations. Main dynamic advertising models include Nerlove-Arrow model [35], Vidale-Wolfe model, Sethi advertising model [36] and their modifications.

Although dynamic models can characterize the advertising carry-over effect well, authors may have to face the difficulty in obtaining a close-loop solution for decision models. Therefore, utilizing a static advertising response model in a two-stage framework to analyze the system dynamicity is a substitutable choice and is increasingly adopted by researchers [37,38].

Empirical Basis of Advertising Response Models

When authors utilize or choose an advertising response model, its empirical basis should be carefully considered. An advertising response model without empirical evidence supporting makes the whole study doubtful.

It is difficult to introduce an advertising response model satisfying all the characteristics in empirical studies. For instance, summarizing previous advertising empirical studies, Little [39] once proposed five criteria and showed that the most cited models such as Vidale-Wolfe model, Nerlove-Arrow model, Lanchester model and their modifications would not satisfy the five criteria properly. Based on the consumer's population dynamics, Wang et al. [26] introduces an advertising response model which fits Little's five criteria well, but its mathematical complexity makes it impossible to be widely used in marketing-OM interface research.

Therefore, recognition of the advantages and disadvantages of each advertising response model is important to choose a suitable model for marketing-OM interface research. A simple model which can grasp the main characters of the considered problem should always be advocated. Also, reviewers should not be overcritical to require the advertising response model of a paper satisfying too much empirical characteristics.

Suggestions for Choosing Advertising Response Models

Advertising response models are the basis of marketing-OM interface researches. An advertising response model with a support

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of empirical evidences can ensure the correctness of conclusions from marketing-OM interface decision models, whereas a simple form of the advertising response model would reduce the research complexity mathematically. Since a simple model may not satisfy all the advertising characters from empirical studies, authors should make a balance between the empirical evidence and mathematical complexity when they model advertising responses.

Detailed suggestions for choosing advertising response models include: (i) aggregate response models should be firstly considered to reduce the mathematical complexity of a decision making process; (ii) Nerlove-Arrow model and/or Sethi's advertising model can be a preferential choice to formulate the advertising carry-over effect; (iii) authors also would utilize static models in a two or multiple stages framework to formulate a dynamic system; (iv) individual response models based on consumer utility and surplus are powerful in modeling most advertising effects, they are good choices when there are less than three decision variables in the research problems.

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