

## **Market Response and Marketing Mix Models: Trends and Research Opportunities**

By Douglas Bowman and Hubert Gatignon

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### Abstract

Market response models help managers understand how customers collectively respond to marketing activities, and how competitors interact. When appropriately estimated, market response models can be a basis for improved marketing decision-making. Market response models can be broadly classified as: (a) those directly linking marketing stimuli or more generally relevant inputs to market response outputs; and (b) those that also model a mediating process. Inputs include marketing instruments (i.e., marketing mix variables) and environmental variables. This monograph takes a forward-looking perspective, including trends, to identify research opportunities related to market response and marketing mix models as falling under four broad areas: (1) “New” or under-studied inputs and/or “richer” measures of inputs constructs; (2) Explicitly accounting for the process linking inputs to outputs; (3) “New” or under-studied dependent variables; and (4) Under-studied or emerging contexts.

# 1

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## Introduction

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As quantitative information about markets and marketing actions becomes more widely available, modern marketing is presented with both a challenge and an opportunity: how to analyze this information accurately and efficiently, and how to use it to enhance marketing productivity. Marketing response models are tools for achieving these objectives. They relate variables that describe actions available to managers (i.e., the marketing mix), and variables that describe the environment, to performance outputs.

Table 1.1. Market response models.

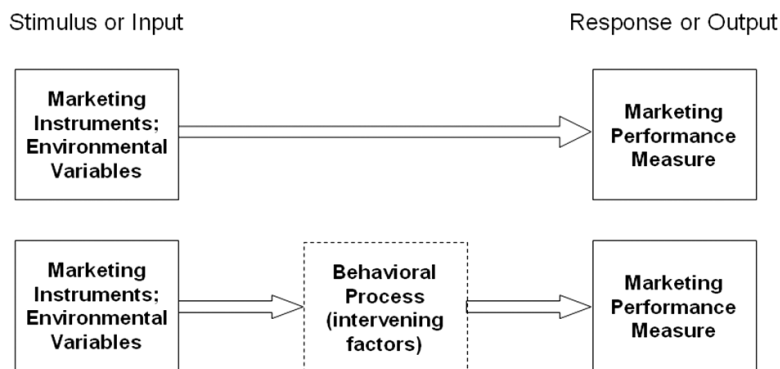


Table 1.2. Summary of trends and research opportunities.

	Representative studies		Research opportunities
Stimulus or inputs	New (or under-studied) input variables	Emerging aspects of marketing	Including variables describing digital marketing (social media, paid search, etc.) as additional explanatory variables.
		Stephen and Galak (2009); Stephen and Toubia (2010); Trusov et al. (2009)	Word-of-mouth
		Bowman and Narayandas (2004)	
		Bolton et al. (2006)	Variables describing actions outside the traditional purview of marketing; Public relations
		Hui et al. (2009a); Hui et al. (2009b)	Distribution measures that better account for in-store merchandising
		Bass et al. (2007)	Accounting for message content, not just effort
		Fader and Hardie (1996); Fang et al. (2008); Naik and Raman (2003); Sorescu and Spanjol (2008)	Disaggregating advertising into media type
Intervening factors	Chain-link or cascading frameworks	Service-profit chain	Dynamics
		Brand-value chain	Dynamics
		Heskett et al. (1994); Kamakura et al. (2002)	
		Keller and Lehmann (2003)	

Table 1.2. (*Continued*)

	Representative studies	Research opportunities
Hierarchical models	Inman et al. (2009)	Better accounting for nested structures in data
Spatial models	Bronnenberg and Sismeiro (2002); Choi et al. (2010)	Better accounting for spatial aspects of data
Data fusion	Gauri et al. (2008); Horsky et al. (2006)	Insights from merging behavioral and mindset data
Financial variables	Boulding and Christen (2003); Christen and Gatignon (2009)	Decomposition into various elements under managerial control
Profit	Srinivasan and Hanssens (2009)	Augmenting model from the finance literature to include variables that describe marketing strategies and tactics
Stock market valuation		
Under-studied levels of aggregation	Bronnenberg et al. (2006); Ataman et al. (2007)	Richer accounting for the role played by distribution
Geographic		
Aggregate versus individual-level	Chen and Yang (2007); Musalem et al. (2008)	Structural models that better accommodate a larger number of explanatory variables
Process that do not end in purchase	Briesch et al. (2008) van Heerde et al. (2008); Smith et al. (2006)	Combining insights from purchase and non-purchase events; Measuring processes that do not end in a purchase
Intangible-dependent variables	Slotegraaf and Pauwels (2008); Villanueva and Hanssens (2007)	More comprehensive models that better account for the underlying processes

This monograph takes a forward-looking perspective, including trends, to identify research opportunities related to market response and marketing mix models as falling under four broad areas: (1) “New” or under-studied inputs and/or “richer” measures of inputs constructs; (2) Explicitly accounting for the process linking inputs to outputs; (3) “New” or under-studied-dependent variables; and (4) Under-studied or emerging contexts. Table 1.1 presents the process linking inputs to outputs that is the framework for the monograph. Table 1.2 presents a representative sample of research and future research opportunity for each of the four sections. Each of the following sections will cover three broad areas related to marketing mix models: data issues and requirements; methodologies (i.e., traditional econometrics; Bayesian methods; structural models); and substantive findings.

# 2

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## Stimulus or Inputs

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Stimulus or inputs include marketing instruments (i.e., marketing mix variables) and environmental variables. We identify opportunities broadly related to two aspects of inputs: new (or under-studied) input variables and “richer” measures of inputs constructs. The former include (1) variables that describe actions that only recently have been used by marketers such as many aspects of interactive marketing; and (2) variables that have been neglected because their relative importance was thought to be minimal, or the effort to collect measures was not deemed to be worth the benefit from including them in a model. The latter include (1) refinements in construct measurement, (2) neglected aspects of a given construct, and (3) decomposition of constructs.

### 2.1 “New” (or Under-Studied) Inputs

Parsimony is a key objective of a model-building effort, implying prudence in decisions to expand the number of explanatory variables included in a model. As Farley et al. (1998) note, simply “including variables that have been measured infrequently is not necessarily optimal . . . [r]educing collinearity among design variables is the key to improved knowledge”.



The first papers to investigate the effects of new or under-studied variables typically seek to establish a main-effect result, follow-on research then focuses on identifying contingencies. With respect to contingencies, conceptually it can be useful to distinguish between situations where the new variable is viewed as a component of the base response function with the goal being to specify a process function that describes contingent effects for its parameter,

$$\begin{aligned} \text{Performance} &= \beta_k(i) \text{New Variable} + \dots && \text{(response function);} \\ \beta_k(i) &= f(\text{Contingency \#1}, \dots) && \text{(process function).} \end{aligned}$$

And, situations where the new variable is viewed as a component of a process function of a well-established response function variable,

$$\begin{aligned} \text{Performance} &= \beta_k(i) \text{Price} + \dots && \text{(response function);} \\ \beta_k(i) &= g(\text{New Variable}, \dots) && \text{(process function).} \end{aligned}$$

Consider for example, research studying effects due to order-of-entry into a market: early papers focused on establishing an automatic regularity due to order-of-entry (e.g., Robinson and Fornell, 1985); later papers first concentrated on identifying situations where the main effect of order-of-entry was accentuated or attenuated (e.g., consumer versus industrial markets; Robinson, 1988), and then examined situations where order-of-entry was part of a process function that described variations in responsiveness to often-studied marketing mix variables (e.g., Bowman and Gatignon, 1996).

In the next subsection, we discuss variables that describe actions that are relatively new to marketers. Following that, we overview variables whose relative importance is believed to have increased in recent years, and thus may warrant more emphasis.

### 2.1.1 Variables that Describe Actions New to Marketers

Variables that describe actions new to marketers include expanded marketing mix tactics and actions made possible by advances in technology. For example, technology has made individual-level targeting of advertising and promotions a greater proportion of a firm’s marketing mix. Internet advertising and paid search recommendations take into

account recent browsing history of individuals (e.g., Danaher, 2007). Supermarkets distribute personalized coupons to their loyalty card members at regular intervals. The coupons a given household receives are chosen by considering the household's recent purchasing history with the chain, demographics collected at the time of enrollment in the program, and vendor participation. From a modeling perspective, these strategies and tactics raise issues of endogeneity and data aggregation challenges not typically accounted for in traditional marketing mix efforts.

Trusov et al. (2009) study the effect of word-of-mouth (WOM) marketing on member growth at an Internet social networking site and compare it with traditional marketing vehicles. Because social network sites record the electronic invitations from existing members, outbound WOM can be precisely tracked. Along with traditional marketing, WOM can then be linked to the number of new members subsequently joining the site (sign-ups). Even though social media have a smaller effect than traditional media on a single media unit basis, the large volume of social media make it extremely influential (Stephen and Galak, 2009). Even new forms of business are being created based on social networks on the Internet. For example, Stephen and Toubia (2010) assess the benefits (in terms of sales) derived from being in a particular position in a network where all members are also sellers.

Conceptually, firms view social media from a number of perspectives: (a) a surrogate for customer's attitudes and emotions (their mindset), (b) a communication channel whose messages can affect consumers' behavior, and (c) an early warning system that can provide timely notification of emerging issues with product quality and marketing program effectiveness for both a focal firm/brand and its closest competitors. Viewed as a reasonable surrogate for consumer mindset, social media data can then be used as a replacement for (more costly) survey data to facilitate estimating a brand-value chain. Viewed as a communication channel, traditional marketing mix models can be augmented to include variables that describe social media in addition to variables describing traditional brand-generated communications.

Viewed as an early warning system, variables that describe social media can be used to account for short-term shocks to a demand system.

Businesses are increasingly concerned about integrating various functional perspectives, which suggests interest in understanding the relative impact of variables outside of marketing’s traditional domain. Indeed, much current effort in marketing is often labeled as being at the marketing–finance interface. Variables outside of the traditional purview of marketing may serve as proxies for difficult to measure marketing inputs. For example, Bolton et al. (2006) use readily available measures of service operations as proxies for various aspects of the service delivery process. Service operations records may already exist, thus reducing the data collection effort, and typically go back in time, thus allowing for a longitudinal data set to be compiled post hoc.

### **2.1.2 Variables Whose Relative Importance is Believed to Have Increased**

Parsimony dictates an emphasis on those variables deemed to have the biggest impact on the focal-dependent variable. Over time, some variables may be deemed to have increased in relative importance such that efforts to include them are warranted. For example, when word-of-mouth communications were largely oral, the ability of any one person to affect purchasing was limited. Electronic channels now allow for any one comment to disseminate quicker, and to a much wider audience.

In addition to variables whose relative importance is believed to have increased over time, are variables that may have been neglected largely because they were difficult to measure. Managers, through their actions, have long deemed publicity and public relations to be an important element of the marketing mix. Empirical researchers on the other hand have long neglected this aspect of the marketing mix for reasons that include difficulty in measurement, assumed correlation with advertising (which has readily available measures), and difficulty in linking its effects to outcomes. Digital channels provide the opportunity to develop reasonable proxies for publicity (e.g., Stephen and Galak, 2009), and thus offer a path to augmenting traditional marketing mix models with variables that describe publicity.

## **2.2 ‘Richer’ Measures of Inputs Constructs**

“Richer” can mean a number of things including accounting for additional aspects of a construct than has traditionally been done (e.g., accounting not just for effort, but also the content of the effort), or, decomposing an aggregate measure into disaggregate parts in order to assess the relative effectiveness of different sub-groupings, to name a few.

### **2.2.1 Refinements in Construct Measurement**

A refinement in construct measurement refers to efforts to better align a construct’s measures with its conceptual underpinnings. Consider for example, distribution. Compared to other elements of the marketing mix, distribution has received substantially less consideration in marketing mix modeling. If distribution is considered in an aggregate marketing mix model, it is typically done using a crude measure of distribution intensity such as number of outlets (e.g., Bowman and Gatignon, 1996). Store-level modeling efforts often neglect distribution as such crude measures of intensity vary little across stores in a chain. Measures of within-store merchandising such as store layout and shelf-set composition offer an avenue for developing marketing mix models that better account for distribution effects. Research that could form the basis for future work in this area include Buchanan et al. (1999); Chandon et al. (2009); Drèze et al. (1994); Grewal et al. (1999); Hui et al. (2009a); and Hui et al. (2009b).

### **2.2.2 Neglected Aspects of Input Constructs**

Neglected aspects of input constructs refer to aspects of a marketing mix construct that are thought to be important, but are typically neglected for reasons of parsimony, measurement challenges, or data limitations. For example, effort is a common operationalization for a marketing mix variable; content is often neglected. A plethora of studies measures brand-generated advertising communications as expenditures (and sometimes exposures). On the consumer-generated side, it is only recently that measures other than word-of-mouth quantity have been studied.

Marketing communications design involves deciding: (a) what to say, i.e., the message strategy, and then (b) how to say it, i.e., the creative strategy. The former refers to the content of the message: broad themes or ideas. The latter refers to how the message is expressed; that is, translating messages into specific communications. Rational (or informational or argument-based) and emotional (or transformational) appeals are two frequently cited general classifications of communications creative strategies. Creative execution follows from creative strategy and refers to executional aspects of copy such as the use of technical evidence, demonstration, comparison, testimonial, animation, fantasy, or humor.

A number of field studies have examined the relative effect of different communications messages. Examples include Eastlack and Rao's (1986, 1989) summaries of matched market experiments done by the Campbell Soup Company to examine the effectiveness of different advertising creatives; Lodish et al.'s (1995) summary of Behaviorscan experiments that included advertising copy in the analysis; Bhargava and Donthu (1999), who used the case-control method to examine the effectiveness of different billboard messages; Tellis et al. (2000) who examined effects due to the age of various creatives for a toll-free dental referral service; Chandy et al. (2001) who examined the effect of rational versus emotional messages; MacInnis et al. (2002) who examined three types of advertising content (emotional; heuristic; rational); and Bass et al. (2007) who found wear-out rates varied by message theme for a phone company.

Social media is a term used to broadly describe consumer-generated communications made more efficient by the Web. First generation metrics deal largely with quantity or volume measures of engagement or measures of virality that capture how a message has spread. If content is considered this is typically through variables that describe the overall sentiment (or valence) of communications over period of time as being positive, negative, or neutral. Second generation metrics describe content more specifically. These can include psychological characteristics of content such as the extent to which a message is awe-inspiring, surprising, emotional, or provides practical information, variables that code the source and writing style (e.g., length, readability, gender tone)

(Berger and Milkman, 2010). Thus, opportunities exist in extending consumer-generating communications to account for its content, and for testing for the inter-play between brand-generated communications content and consumer-generated communications content.

### **2.2.3 Decomposing an Aggregate Measure into Underlying Components**

Though aggregate measures can be useful for understanding the relative effects of broad classes of marketing mix elements, particularly in situations where data are sparse or limited, it can be challenging to make the link to implementation (which is at a more disaggregate level). Also, aggregation can mask potentially important synergies.

As examples, consider advertising communications and product innovation. Advertising communications is commonly operationalized as the total effort across all media. Disaggregating effort by media type (e.g., Naik and Raman, 2003) allows the analyst to examine interactions among media types, assesses their relative effectiveness, and supports integrated marketing communications (IMC) in an organization. Innovation has historically been included as a single aggregate measure, often using a crude measure such as number of patents where the linkage to actual products in the marketplace that consumers are purchasing is weak. Sorescu and Spanjol (2008) provide new insights by distinguishing between new products introduced into consumer packaged goods markets that are innovative versus non-innovative (as determined by a third party rater).

An important contribution is often achieved by disentangling constructs and ideas that had previously been co-mingled in the literature. This avenue has long been pursued in marketing. For example, Kumar et al. (1995a) disentangle the effects of interdependence on various relationship quality metrics into two components: the total level of interdependence and its degree of asymmetry across a dyad. Kumar et al. (1995b) decompose fairness, a central antecedent of relationship quality, into two parts: distributive (i.e., division of outcomes such as earnings) and procedural (i.e., processes). This decomposition makes the findings more actionable by managers compared with studies that

co-mingle the different types of fairness. Palmatier et al. (2007) decompose a business customer's loyalty into loyalty to the vendor firm, and loyalty to the vendor's sales rep. Prior research had largely not made this distinction.

Fang et al. (2008) provide a unified examination of trust at different organizational levels: firm-to-firm; firm to employee; employee of firm A to employee of firm B. Prior to this paper, researchers examined one aspect of trust in isolation from the other two, making it impossible to understand the relative effects of each type.

The brand is a common unit of analysis for reasons that include it being the level at which most communications efforts are aimed. Brand-specific constants are a common way to account for brand-related features such as brand equity and feature. By moving the unit-of-analysis to the SKU level, Fader and Hardie (1996) are able to code product features and assess their relative effectiveness. Recent research in consumer behavior processes conducted largely in a laboratory setting (e.g., Chandon and Ordabayeva, 2009; Deng and Kahn, 2009) could provide a behavioral rationale for expanding consideration of product to better describe a product's features and packaging.

### **2.3 Summary: Stimulus or Inputs**

There are a number of avenues for making substantive contributions that relate to stimulus or inputs in a market response model. One opportunity lies in new (or under-studied) input variables. Investigating variables that describe marketing actions that have only recently been undertaken by business and variables that describe actions whose relative importance has increased in recent years are two broad approaches. A second opportunity is in "richer" measures of inputs constructs, which includes refining construct measures, investigating neglected aspects of a construct, and decomposing constructs into more basic measures with less ambiguity about the actions they describe.

The next section discussed intervening factors. That is, factors that describe the process linking stimulus or inputs, to outputs.

# 3

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## Intervening Factors: Explicitly Accounting for the Process Linking Inputs to Outputs

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While modeling a direct linkage between marketing mix inputs and performance outputs is most common, explicitly accounting for the process linking the two can provide useful insights. We consider factors that mediate the linkage between inputs and outputs, and also interdependencies among observation units that can affect linkages.

### 3.1 Chain-Link or Cascading Frameworks

Chain-link (or cascading) frameworks are useful for linking resources under the control of managers to terminal processes such as brand sales or profits (Rust et al., 2004). Such frameworks can be customer-centric such as the service-profit chain (Heskett et al., 1994) and its derivatives (e.g., Bowman and Narayandas, 2004) or the return-on-quality framework (Rust et al., 1995), or they can be product/brand-centric such as the brand-value chain (Keller, 2008; Keller and Lehmann, 2003). Many customer equity models, which are discussed in detail in Section 4, are conceptualized as a chain-link or cascading framework.



### 3.1.1 Service-Profit Chain

Heskett et al.'s (1994) service-profit chain (SPC) is a frequently studied example of a chain-link framework. Working backward, customer profitability is largely based on customer loyalty. Supporting arguments that have been advanced include loyal customers being less costly to serve, less price sensitive and hence pay higher prices, and more likely to be advocates who generate sales via positive word-of-mouth. Further, the widespread adoption of loyalty programs can only be assumed as due in part to their (presumably) positive impact on profits. Customer loyalty, in turn, is driven by customer satisfaction. This relationship has similar intuitive appeal; if customers are satisfied with a vendor's products and services, then it is only natural that loyalty should follow. The antecedent linkages also seem straightforward: satisfaction is driven by vendor performance; and vendor performance on important attributes results from the vendor's effort or resource investments. Vendors who perform well on important attributes should make a customer more satisfied, and customer management effort appropriately expended should lead to better performance. The result is a parsimonious framework with intuitive appeal that supports investments in customer satisfaction programs and customer loyalty programs. To counter-balance the linkages discussed above, the cost impact of the vendor's customer management effort can be implicitly (e.g., Heskett et al., 1994) or explicitly (e.g., Bowman and Narayandas, 2004; Kamakura et al., 2002) accounted for.

Activity-based accounting systems have made data to calibrate these models more readily available to firms. To date, published research has examined cross-sectional data. Potentially useful insights may be achieved through time lags in a longitudinal analysis. It would not be surprising to find that some relationships decline before they improve.

### 3.1.2 Brand-Value Chain

The brand-value chain (Keller, 2003; Keller and Lehmann, 2003) implies a sequential process: (1) investments in brand marketing programs (defined broadly as investments product, communications, the

trade, and employees) develop and affect consumers' awareness, associations, attitudes, (2) which, in turn, serve to influence consumer buying behavior such as brand choice and share-of-wallet, (3) which, when aggregated, describe the brand's market-level performance such as its market share, price premium or revenue premium, and (4) ultimately the brand's value as an asset of the firm.

Research to date has typically focused on examining a subset or select pieces of the brand-value chain. For example, traditional marketing mix models calibrated using market-level data assume a direct link from the marketing mix (advertising, promotions, price, etc.) activity of brands to a brand's market-level performance (e.g., brand sales, brand market share); while consumer mindset is largely ignored.

Typical marketing mix models calibrated using disaggregate data (e.g., household scanner panel data) posit that the behavior of individual consumers or households (e.g., brand choice, purchase quantity, share-of-wallet, etc.) is directly impacted by brands' marketing mix (promotions, price, etc.). Again, consumer mindset is largely ignored.

In a similar vein, consumer mindset with respect to brands is often studied in isolation of brand marketing mix investments and traditional brand-level performance metrics such as brand sales or market share. And, if metrics such as brand awareness, attitudes, and associations are related to a brand's marketing mix, it is almost always to advertising alone.

As longitudinal brand tracking data becomes more widespread, calibration of the brand-value chain becomes feasible. Further, where social media metrics can proxy consumer mindset measures, marketers may have a cost-effective way to calibrate brand-value chain models.

### **3.2 Hierarchical Models**

Hierarchical, or nested, data structures are common throughout many areas of marketing. These data structures have implications for the aggregating process used to collect individual observation units. Examples are found in consumer packaged goods (SKUs rolled up into sub-brands, sub-brands into brands, brands into categories), brand management (individual brands nested under family brands; family brand nested under corporate brands), sales force management

(salespeople nested under sales directors; sales directors nested under regional directors), retailing (SKUs nested into sub-categories; sub-categories nested under categories; categories rolled up to the store-level; stores are typically grouped into regions; regions rolled up to the national level), and shopping (purchases nested into baskets; baskets nested in stores; (Inman et al., 2009). Other types of marketing data such as repeated-measures data can also be viewed as a data hierarchy, as observations are nested within individuals.

Hierarchical, or nested, data present several challenges. First, observations that exist within hierarchies tend to be more similar to each other than observations randomly sampled from the entire population. The common argument advanced would be in the spirit of the following: SKUs in a particular shopper's basket are more similar to each other than to SKUs randomly sampled from transactions occurring in the store as a whole, or from the national population of transactions in all stores. This is because SKUs are not randomly assigned to stores, but rather are assigned to stores based on local market tastes and competitive considerations. Thus, SKUs within a particular store tend to come from a local market that is more homogeneous in terms of demographic make-up, tastes, etc. than the population as a whole. Further, SKUs within a particular store share the experience of being in the same store environment — the same store manager, physical environment, etc.

Because these observations tend to share certain characteristics (environmental, background, experiential, demographic, or otherwise), they are not fully independent. However, most analytic techniques require independence of observations as a primary assumption for the analysis. Because this assumption is violated in the presence of hierarchical data, ordinary least squares regression produces standard errors that are too small (unless these so-called design effects are incorporated into the analysis). In turn, this leads to a higher probability of rejection of a null hypothesis than if: (a) an appropriate statistical analysis was performed, or (b) the data included truly independent observations.

### **3.3 Accounting for Spatial Aspects in Market Response**

A number of problems in marketing have spatial aspects to them, and market response models are increasingly using spatial statistical

techniques to account for these (Bradlow et al., 2005). Spatial problems are characterized by the existence of a map containing each observation unit (e.g., individual, brands, or firms); observation units nearer each other in the space are assumed to be associated with similar outcomes. In marketing applications, dimensions of the map have been operationalized using (physical) geographic, psychographics, or descriptor (demographic) variables.

Using spatial aspects of data in an effort to account for poor or missing data is a common marketing problem that seeks to capitalize on geographic data. For example, Rust and Donthu (1995) argued that omitted variables in the context of retail store choice can be correlated with location. Their model estimated specification errors based on geography as a method for inferring the effects of omitted variables. Bronnenberg and Mahajan (2001) developed a model that allowed for a spatial dependence among marketing variables caused by retailers' unobserved actions. Bronnenberg and Sismeiro (2002) used spatial approaches to make predictions about brand performance in markets where there is poor data. Choi et al. (2010) apply a spatio-temporal model to study two types of imitation effects (geographic proximity; demographic similarity) in the demand evolution for an Internet retailer.

Marketers are often interested in understanding differences in responsiveness across geographies. For example, Mittal et al. (2004) use a geographically weighted regression to analyze geographical patterns of automobile dealerships' customer service quality and responsiveness of customers to those efforts. Ter Hofstede et al. (2002) relax the traditionally assumed approach of treating country-markets as segments and instead identified spatial segments based on other variables that allow for segments to exist within and/or across country boundaries. Farley and Lehmann (1994) argue that highly visible international differences in the mean levels of variables lead to an erroneous assumption of large parallel differences in responsiveness to marketing variables. Finally, Bronnenberg and Mela (2004) account for both the spatial and temporal evolution of retail distribution for frozen pizza.

Besides using spatial approaches to deal with geographic correlations on physical maps, market response models have used these

techniques to capture the effects of correlations between customers in their preferences. Yang and Allenby (2003) developed a Bayesian spatial autoregressive discrete choice model to study interdependent preferences of automobile buyers based on the assumption that one customer's preferences are influenced by other customers who are similar on a number of descriptors. Similar in spirit, Yang et al. (2006) developed a hierarchical Bayes model, and Yang et al. (2009) used the auto-logistic model, to estimate how members of a household influence each other's TV viewing behavior. The latter was also used by Moon and Russell (2004) to develop a product recommendation model based on inferred similarity among customers. Finally, Bezawada et al. (2009) use store layout to account for unobserved cross-category effects in brand sales.

### 3.4 Data Fusion

Increasingly, marketers have access to behavioral data on a large group of customers. A customer loyalty card program is an example. Survey data (being expensive to collect) is available for only a subset of the customers in the data. Data fusion refers to efforts to merge the two types of data: customer mindset measures collected via survey from a small number of customers in a customer base are merged with behavioral data on the full set of customers (e.g., customer loyalty card data). Merging behavioral data with survey data (e.g., Gauri et al., 2008; Horsky et al., 2006) allows the analyst to investigate why a behavior is observed.

One could argue that much of the merger and acquisition activity in recent years in the global market research industry has been not so much driven by efforts to buy books of business, but instead by efforts to put together offerings to clients that bring together data from multiple perspectives, and add value to clients by providing insights made feasible only through the ability to bring together data to form a truly comprehensive view of their marketplace. Data fusion represents an opportunity for scholarly research in marketing to make significant and valued contributions to marketing practices in the future.

### **3.5 Summary: Explicitly Accounting for the Process Linking Inputs to Outputs**

There are a number of avenues for making substantive contributions that relate to explicitly accounting for the process linking marketing mix inputs to performance outputs. Examples include modeling the mediating processes found in cascading or chain-link frameworks, accounting for interdependencies among observation units due to existence of a data hierarchy or spatial relationships, and data fusion efforts which conjoin data where a full process is observed to data where only a subset of the process is observed.

The next section discusses response or output variables, with an eye toward identifying under-studied and relatively “new” dependent variables that are of interest to marketers.

# 4

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## Response or Output: “New” or Under-Studied Dependent Variables

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Considering the recent literature, we identify four types of variables which have received some particular attention as criteria variables and which are relatively new or under-studied: (1) financial criteria as dependent variables explained by marketing factors, (2) some level of aggregation which have been shown to be relevant, (3) the representation of processes that allow taking into consideration that consumers may not purchase a brand or the product category, and (4) the modeling of new important intangible marketing variables.

### 4.1 Financial Variables

While Market Response Models have focused on sales and market share as dependent variables, few studies have studied the financial implications of marketing strategies. The impetus comes clearly from the desire to evaluate the bottom line effects of marketing activities. Even if sales and market share are not the “soft” metrics typical of communication strategy effectiveness, they do not necessarily translate into “hard” financial metrics (Villanueva et al., 2008).

#### 4.1.1 Profit

Profit is one of these financial implications that have received attention in the marketing strategy modeling field. This was in fact the goal for the creation of the PIMS database. Using the evidence from this database, Boulding and Christen (2003, 2008) show that pioneers have a short-term profit advantage but a disadvantage in the long term. Pioneering firms have an advantage in terms of purchasing costs but they have higher costs of production and higher Selling, General and Administrative (SG&A) costs. Therefore, pioneers must be ready to accept higher costs in the long term.

The decomposition of the profitability metric into returns on sales and various cost ratios has helped marketers understand how overall profitability is affected by market share (Ailawadi et al., 1999).

However, such research based on relatively short times series of cross-sectional (firm) data, suffers from the potential problems of endogeneity and unobserved effects that lead to the possible correlation of the error term with the explanatory variables. Potential bias can be avoided by autocorrelation of error terms, fixed effect, and instrumental variable estimation. However, these methods are not devoid of problems when the variance is contained mostly in the cross-sectional variations. Indeed, the PIMS data which is not atypical in strategic research where only 3% of the variance in the market share variable remains after removing the variance due to cross-sectional variations (Christen and Gatignon, 2009). Consequently, causal inferences remain difficult on the basis of only significant coefficients once the potential biases are removed.

Another issue when modeling profits as a function of marketing actions concerns the proper functional form of the relationships. Profits are typically analyzed using linear models, even if interaction terms are typically introduced to account for moderating effects (which lead to other sources of estimation issues due to model specification induced collinearity). However, marketing actions affect both revenues and costs in a non-linear relationship.

The recent focus on profit as a dependent variable is also to be noticed in business marketing situations where the unit of analysis is



the individual customer. Bowman and Narayandas (2004) detail the process leading to individual customer profits from the vendor effort. They decompose that process into a series of links: vendor effort to vendor attribute-level performance (link #1), vendor attribute-level performance to customer satisfaction (link #2), customer satisfaction to customer loyalty (link #3), and customer loyalty to customer profit (link #4). Model specification forms are compared for testing the non-linearity of the relationships for each of the links.

In summary, the recent trend in this research stream consists of decomposing the profitability measures used as the dependent variable into the various cost elements to gain insights into the operations of the firm where the benefits of a strategy may come from.

#### 4.1.2 Stock Market Valuation

The recent realization that the influence of the marketing department within firms may be decreasing (Verhoef and Leeflang, 2009) has triggered the development of a research stream that pays more attention to a critical variable that CEOs tend to focus on: stock market prices. Stock market prices reflect the changes in the long-term value of the firm as, if markets are efficient, the stock price at time  $t$  reflects the information about expected future cash flows. It then appears a critical factor to understand how marketing impacts these stock prices in order for top management to appreciate the value that is added to the firm by marketing activities. A recent review of that literature has been published in the *Journal of Marketing Research* (Srinivasan and Hanssens, 2009) with comments by a number of researchers in that field Kimbrough et al. (2009).

The dominant framework used in recent marketing work for assessing the impact of marketing actions on the unexpected valuation of the firm is the four-factor model. These four factors are determinants for the financial explanations of cross-sectional (firm) differences in stock prices (Carhart, 1997; Fama and French, 1992, 1996). The four factors are: (1) the market risk factor, i.e., the excess return on a broad portfolio, (2) the size risk factor, i.e., the difference in return between a large and a small portfolio, (3) the value risk factor, i.e., the difference

in return between the highest and lowest book-to-market stocks, and (4) the momentum, i.e., the notion that a stock that has performed well in the recent past will also perform well in the future. This fourth factor has received less support than the other three and results can be considered ambiguous (Srinivasan and Hanssens, 2009).

Given that this research stream builds on the work in the fields of accounting and finance, researchers have developed new models based on the foundations in accounting and finance. Srinivasan and Hanssens (2009) present four methodologies used for modeling the financial value of the firm. We briefly summarize them here.

#### 4.1.2.1 Four-factor Model

The general ideas of this approach, summarized above, are expressed through Equation (4.1) as follows:

$$R_{it} - R_{rf,t} = \alpha_i + \beta_i(R_{mt} - R_{rf,t}) + s_iSMB_t + h_iHML_t + u_iUMD_t + \varepsilon_{it}, \quad (4.1)$$

where

$R_{it}$  = Stock return of firm  $i$  at time  $t$ ;

$R_{rf,t}$  = Risk free rate of return;

$R_{mt}$  = Average market rate of return;

$SMB_t$  = Return of small versus large stocks;

$HML_t$  = Return of high versus low book-to-market value;

$UMD_t$  = Momentum: highest to lowest returns;

$\alpha_i$  = abnormal return associated with firm  $i$ ; and

$\varepsilon_{it}$  = additional abnormal (excess) returns associated with period  $t$  for firm  $i$ .

The risk associated with stock price volatility can be decomposed into the systematic risk (also called market risk or undiversifiable risk associated with aggregate market returns) explained by the four factors and the idiosyncratic risk. The idiosyncratic risk is the variance in the residual  $\varepsilon_{it}$ .

In order to compare two portfolios, one made up of focal firms with a particular marketing characteristic (e.g., introducing innovative new products) and the other made up of benchmark firms, the

unconstrained and the constrained models where the intercept terms are equal to zero and the slopes  $\beta_i$  are equal are estimated. Then, the null hypotheses correspond to  $\alpha_i = 0$  and the  $\beta_i$  to be equal for both portfolios. Focal firms have a superior performance if  $\alpha_i > 0$  and/or  $\beta_i$  is inferior to the benchmark.

The four-factor model has been used in Madden et al. (2006), McAlister et al. (2007), and Rao et al. (2004), to name a few.

#### 4.1.2.2 Event Studies

In event studies, the estimated residuals are computed from rewriting Equation (4.1) as:

$$\begin{aligned} \varepsilon_{it} = & (R_{it} - R_{rf,t}) - \alpha_i - \beta_i(R_{mt} - R_{rf,t}) \\ & - s_iSMB_t - h_iHL_t - u_iUMD_t. \end{aligned} \quad (4.2)$$

Then, the cumulative abnormal return is computed over a window period:

$$CAR_i = \sum_{t=1}^n \varepsilon_{it}. \quad (4.3)$$

Such modeling is found in Agrawal and Kamakura (1995), Chaney et al. (1991), Chaney and Devinney (1992), Geyskens et al. (2002), Gielens and Dekimpe (2001), Gielens et al. (2008), Horsky and Swyngedouw (1987), Joshi and Hanssens (2009), Lane and Jacobson (1995), and Tellis and Johnson (2007).

#### 4.1.2.3 Calendar Portfolio Theory

The standard error of the abnormal return estimates of the portfolio,  $\alpha_p$ , is not computed from the cross-sectional variance (as is the case with the event study method) but rather from the inter-temporal variation of portfolio returns.

Stocks are grouped into a portfolio and a single measure of returns is obtained for the entire group; therefore, it is not possible to use a cross-section regression model to analyze the relationship between financial performance and marketing drivers (e.g., marketing actions).

An example of calendar portfolio modeling is found in Sorescu et al. (2007).

#### 4.1.2.4 Stock Return Response Models

In a stock return response model, the four-factor financial model (Equation 4.1) is augmented with firm results and actions to test hypotheses on their impact on future cash flows. These are expressed in unanticipated changes (i.e., deviations from past behaviors that are already incorporated in investor expectations). The stock return response model is defined as follows:

$$R_{it} = ER_{it} + \beta_1 U\Delta REV_{it} + \beta_2 U\Delta INC_{it} + \beta_3 U\Delta CUST_{it} + \beta_4 U\Delta OMKT_{it} + \beta_5 U\Delta COMP_{it} + \varepsilon_{i2t}, \quad (4.4)$$

where,  $R_{it}$  is the stock return for firm  $i$  at time  $t$  and  $ER_{it}$  is the expected return from the four-factor model in Equation 4.1. The components of stock returns that are, to some extent, under managerial control are of three kinds: financial results, customer asset metrics (nonfinancial results), and marketing actions. Financial results include unanticipated revenues ( $U\Delta REV$ ) and earnings ( $U\Delta INC$ ), and nonfinancial results include metrics such as customer satisfaction and brand equity ( $U\Delta CUST$ ). Specific marketing actions are the unanticipated changes to marketing variables or strategies ( $U\Delta OMKT$ ). In addition, competitive actions or signals in the model reflect the unanticipated changes to competitive results, marketing actions, strategy, and intermediate metrics ( $U\Delta COMP$ ). The unanticipated components can be modeled as the difference between analysts' consensus forecasts and the realized value (in the case of earnings) or with time-series extrapolations using the residuals from a time-series model. Mizik and Jacobson (2008) use such a stock return modeling approach.

#### 4.1.2.5 Persistence Modeling

Advanced times series analysis models such as the Vector autoregressive (VAR) models have been also used to estimate the long-term effect of marketing actions on the stock value of the firms. The VAR model is

characterized by a recursive system of equations over time, as expressed in Equation (4.5):

$$\begin{bmatrix} y_{it}^1 \\ y_{it}^2 \\ y_{it}^3 \end{bmatrix} = C + \sum_{k=1}^K \beta_k + \begin{bmatrix} y_{it-k}^1 \\ y_{it-k}^2 \\ y_{it-k}^3 \end{bmatrix} + \Gamma \begin{bmatrix} x_{it}^1 \\ x_{it}^2 \\ x_{it}^3 \end{bmatrix} + \begin{bmatrix} u_{it}^1 \\ u_{it}^2 \\ u_{it}^3 \end{bmatrix} \quad (4.5)$$

An example of VAR modeling of stock returns in marketing is found in Pauwels et al. (2004).

#### 4.1.2.6 Marketing Models of Stock Price Returns

How can these methodologies be used to help in assessing the role of Marketing in explaining the valuation of the firm? Marketing actions which have been hypothesized to affect the unexpected part of stock prices include: (1) customer-based brand equity differences across firms, (2) shifts in strategy, (3) innovation announcements, and (4) the nature of new products brought to market. Srinivasan and Hanssens (2009) separate them into two categories: marketing assets and marketing actions. Because the distinction between these two categories does not appear totally clear to us, we prefer to review the findings from the literature according to the broad marketing mix activities concerned by marketing. However, rather than repeating the conclusions that they draw from these studies, we focus on the most recent publications and detail the issues regarding the marketing implications of the research. Apart from the evaluation of specific marketing mix decisions such as promotions (Pauwels et al., 2004; Slotegraaf and Pauwels, 2008) or distribution channel additions (Geyskens et al., 2002; Gielens and Dekimpe, 2001; Gielens et al., 2008), the literature covers two broad marketing aspects: (1) brand equity acquired over time and (2) the innovation strategy of the firm. Brand equity is usually acquired over time and is related to customer satisfaction and customer equity but these are typically the results of more direct marketing actions on the quality of the product and/or communication decisions that impact the brand image.

#### 4.1.2.7 Customer-based Brand Equity

Brand equity can be assessed in multiple ways (Simon and Sullivan, 1993). An important question for marketing strategy purposes concerns not only how to measure brand equity but also the identification of the drivers of brand equity which have an impact on the financial value of the firm. Indeed, that brands considered to be the best on some measures of brand equity assessed by the most competent firms in this sector such as Interbrand have a significant impact on the valuation of the firm is not particularly surprising (Madden et al., 2006). It is nevertheless critical that such brand valuations are significantly impacting share prices beyond the marketing and performance measures of the brand success such as market share, advertising, or brand margins (Barth et al., 1998).

Although we would expect that rational customers evaluate brands and products in terms of their intrinsic attributes and quality dimensions, perceptions are affected by a number of factors which are not always easy to identify and to assess the extent of their influence.<sup>1</sup> Moreover, investors consider alternative stocks to buy in very different categories where the physical attributes of the products are typically not comparable. Consequently, if any information is contained in the brands, it must be at a rather high level of attributes that can be compared across firms and product categories. Overall product quality was shown to be positively related to the stock returns (Aaker and Jacobson, 1994; Tellis and Johnson, 2007). This relationship is even larger for small firms than for large firms so that small firms benefit more from positive reviews of quality (Tellis and Johnson, 2007). In this study, “quality” is driven largely by (1) the utility of features, (2) the ease of use, and (3) product compatibility.

Mizik and Jacobson (2008) consider product attributes at a higher level of abstraction; they analyze the five “pillar” attributes of brands from Young & Rubicam Brand Asset Valuator. However, only two of

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<sup>1</sup>Brand equity is the result of delivering products with high quality and by creating positive associations through communication strategies (Aaker, 1991). It is also important to understand how perceived quality or perceived attributes can be influenced by objective product attributes (Mitra and Golder, 2006).

them, “Relevance” and “Energy” have an impact on the financial valuation of the firm. “Differentiation”, “Esteem”, and “Knowledge” do not appear to have an impact. This is relatively consistent with the prior study mentioned by Tellis and Johnson (2007). Indeed, “Energy” is defined as “the brand’s ability to meet consumers’ needs” which is similar to the attributes of utility of the features and ease of use although it is more oriented toward the future needs than the current ones and is more dynamic in that it is defined in terms of adaptation to changing tastes and needs.

The concept of “relevance” is more difficult to evaluate, as it is defined in terms of “personal relevance and appropriateness and perceived importance to the brand.” It is also characterized as a brand that “drives market penetration and [that] is a source of brand’s staying power.” The complexity of the “Esteem” pillar may explain its lack of significance on the bottom line firm valuation. On the other hand, it appears surprising that the Knowledge dimension that taps on the level of awareness of the brand has no effect on the firm valuation. The same insignificant effect for brand awareness was found in another study using quality and awareness data from EquiTrend by the Total research Corporation (Aaker and Jacobson, 1994).

Similarly, the lack of significance of competitive advantage through the “Differentiation” pillar does not correspond to the expected high “visibility” with investors of the competitive context surrounding the firms, unless these more economic factors are already included in the expectations from the accounting information. Moreover, this appears in contradiction with the findings that, using brand valuation data from Interbrand, brand value has been found to be associated with market share rather than sales growth and that it explains stock price beyond market share effects (Barth et al., 1998).

In a general way, if we assume that celebrity endorsement of brands is associated positively by consumers with the brands advertised, this brand equity which results from celebrity endorsement leads to higher stock prices, as indicated by positive cumulative abnormal returns surrounding such celebrity endorsement announcements (Agrawal and Kamakura, 1995).

Therefore, the stock market responds to the equity of brands and this effect of brand value extends to new products introduced with the brand name. The stock market responds positively to brand extensions which concerns brands with strong positive attitudes and which are well known, even if this positive effect tends to decrease for very high levels of familiarity and attitudes (Lane and Jacobson, 1995).

The concept of customer satisfaction is clearly related to the notion of brand equity and firm value. As discussed above, equity depends on the perceived quality of the products and services delivered by the firm. Customer satisfaction is particularly important because it appears to be a central explanation for other aspects of a firm strategy like innovation capability and corporate social responsibility policy. Luo and Bhattacharya (2006) show that the value of a firm, especially stock returns, respond positively to a corporate social responsibility program when the firm is innovative but negatively related in the absence of innovative capability. The central mediating explanation for this effect is the satisfaction about the company. The importance of satisfaction is even clearer when considering the opposite, i.e., the dissatisfaction expressed by consumers. Luo (2007) shows that the stock market reacts strongly (and negatively) to publicly available data on complaints in the airline industry. This information is clearly considered seriously by investors and analysts, as it explains in part the firm idiosyncratic stock returns.

#### **4.1.2.8 Innovation and Value Creation Strategies**

There have been a relatively large number of studies assessing the role of innovations on the value of the firm. These studies complement a rich literature that demonstrates the role of innovations in explaining firm performance measured by variables like Return on Investments or Returns on Assets. Research and development expenditures are a direct input into the innovation process and the relationship to ROI has been documented in particular in Capon et al. (1990). The effect of R&D investments has been evaluated also in terms of its impact on the ability of the firm to charge higher prices or monopoly rents (Boulding and Staelin, 1995). Searching for empirical generalizations about



factors explaining differences in R&D effectiveness, they especially find an interaction between R&D expenditures and market position and competitive intensity.

Studies considering the impact of innovations on the stock prices generally tend to support a positive impact, in spite of the risks involved in new product development which tend to be high given the rate of new product failures, high costs, and long delays. Chaney et al. (1991) are among the first to study the impact of announcements about new products on stock returns. Using an event study methodology, the cumulative average excess returns of an announcement is highly significant and represents on average a value of \$26 million in US dollars 1972. Original new product introductions are found to have a significantly greater impact than new products which are reformulations or repositioned existing products. The announcement of an introduction does not have as much impact as the announcements during the prior developments stages, especially for such events as announcements of prototypes, patents, or preannouncements (Sood and Tellis, 2009). This can be explained by the fact that by the time of the announcement of the launch, information had already spread to the investment community so that stock prices may have already taken into account the value of the launch. In other words, the information content of the announcement of the launch may be low and perceived as having little reliability. Sorescu et al. (2007) refer to “specificity” and “reliability” and find “specificity” to influence significantly the impact of the announcement. On the other hand, firms try to keep secret the discovery of prototypes or patents which may explain the unexpected information which could not be reflected in the efficient stock prices before this type of announcement is made. The even stronger impact of negative information at this stage of development (delays, performance problems, or denial of patents) corresponds to the assumption in efficient markets that the information about the expectations of the new products had been incorporated and the strength of disappointment is typical of the value of negative versus positive information in general.

Therefore, these studies tend to demonstrate that the stock market values innovations and the new product development investments they

require. These strategic decisions are difficult to forecast and, even if efficient, the market does not anticipate firm actions which are recognized as important information when it becomes available. Furthermore, even if the announcement of new products contain little new information for the market, the actual changes that are brought to market, especially entries into new markets have an immediate and long-term effect on stock prices (Pauwels et al., 2004; Srinivasan et al., 2009). This can be contrasted with the effects of promotions that appear negligible on stock prices, perhaps because there is no new additional information provided to the market beyond the financial results of the firm (through sales and profits).

Nevertheless, in spite of these results which match the reasons why firms engage in such expensive projects, the positive effect of innovative activities is somewhat mitigated by the findings of Mizik and Jacobson (2003) that value appropriation strategies emphasizing advertising creates more value for the firm than R&D. Although these results hold more or less strongly depending on industries and depending on the profitability of the firm (Returns on Assets), they appear to hold rather generally. Even if this result does not deny the importance of R&D activities especially to develop and create new markets, it outlines the balancing that may be constrained on management due to limited resources. However, the form imposed for that analysis (i.e., a simple ratio) does not reflect the complementary nature of R&D and Advertising (or at the more general level of value creation and value appropriation strategies) and may neglect the dynamics of these two strategies that presumably follow from the life cycle. It could also suffer from the aggregate analysis at the firm level where these dynamics may not be visible. Indeed, when focusing on a single industry, Srinivasan et al. (2009) find that the stock market responds strongly to pioneering innovations in growing product categories when they are backed by substantial advertising support. Similarly, in the movie industry, movie introductions with higher advertising budgets exhibit higher stock prices for the studio launching them, indicating that investors may take as a positive signal advertising budgets that are higher than what they may have expected for the type of movie being introduced (Joshi and Hanssens, 2009).

#### 4.1.2.9 Conclusion on Stock Market Valuation as Dependent Variable

How do investors get information about the marketing of firms? Srinivasan et al. (2009) identify a number of factors that limit the transmission of marketing information to investors in a way that this information could be used by them. In spite of these difficulties, the empirical evidence reviewed above clearly indicates that the investment community pays attention to the marketing activities and strategies of the firm. Even if R&D strategies go beyond the boundaries of the Marketing function, the role of Marketing in the development of new products has been shown to be critical. Brand equity and communication strategies are also fundamental to Marketing.

Nevertheless, even if this research stream counts a significant number of publications, it is not clear yet that we understand how these factors interact and the process that leads to these effects. Profitability and marketing investments do not appear to go together (Larréché, 2008). In fact, firms that have higher marketing expenditure ratios tend to have lower returns on investments: the pushers (i.e., firms that increase their marketing spending ratios the most) tend to create less firm value than the pullers (firms that increase their marketing spending ratios the least). This would be explained by the dynamics of the momentum effect (Larréché, 2008).

Increasing marketing spending may be a poor reaction if the momentum conditions do not exist but would appear to be a consistent behavior for the pushers without succeeding to bring value for the firm. It is not surprising that, in such firms, Marketing may not be viewed as a long-term investment. In a survey, 79% of CFOs are willing to cut advertising expenditures to avoid missing short-term earnings benchmarks (Graham et al., 2005). The key issue therefore is to understand the dynamics leading to the momentum which makes investments in marketing activities more effective. The momentum concept therefore involves a deeper understanding of the complementarities of the firm's actions over time, especially as it involves value creation strategies and value appropriation strategies. Brand equity development strategies through marketing activities can only be effective when the firm

has been successful with the development of a quality product creating value for the customer as well as for the firm. Therefore, these value creation and value appropriation strategies are complementary. However, this complementarity is likely to follow cycles which we need to better understand.

## **4.2 Under-Studied Levels of Aggregation**

Aggregation is an issue which has been a concern for several decades in the market response modeling literature. Most of this literature deals with the level of the individual versus market or market segment as the unit of analysis or with the time unit definition of the variables being modeled. However, more recently, some new levels of aggregation have been considered: (1) geographical units within the country boundaries, (2) models of individual behavior with aggregate data only, and (3) richer accounting of portfolio of products and/or customers.

### **4.2.1 Geographic Within a Country-Market**

Market response models found in the academic journals are typically estimated at the national level. The impact of the level of aggregation over time received much attention in the late 1970s and early 1980s, especially in the context of the study of advertising effects (Bass and Leone, 1983; Clarke, 1976) and for diffusion models (Putsis, 1996). However, recent work distinguishes between the immediate versus the long-run effects of price but also taking into account the difference in nature between price changes that occur frequently (in short cycles) as promotions, and changes in regular prices. These models indicate that regular price changes explain most of the variation in prices (Bronnenberg et al., 2006) and while deep price discounts may increase the immediate price sensitivity of consumers, it is the changes in regular prices that increase sales, even if not immediately after the price change (Fok et al., 2006). Vector autoregressive models appear to shed better light on these timing issues than regression-based market response models.

Other recent analyses performed at different aggregation levels of the data point out neglected sources of variation of the market share of

brands. These include regional differences within national boundaries and the effects due to chain decisions (Ataman et al., 2007; Bronnenberg et al., 2007). Although perhaps subject to several interpretations, the interaction brand-time calls for market response models which acknowledge the dynamics of brand effects. The interaction effect of brand-chain is also suggesting that market response models should pay more attention to the role played by chains in explaining market share, a rare object of analysis in academic marketing work. However, while there is empirical evidence of these effects through ANOVA models, they do not reflect a theoretical response model specification that would provide an explanation of the role played by the distribution chains. That question remains an important one to address in future research, as store chains are critical intermediaries with a recognized market power.

#### **4.2.2 Aggregate Versus Individual Models with Aggregate Data**

The notion of aggregate as opposed to individual-level models is becoming blurry. Traditionally, market response models using data where the unit of analysis consists of sales or market share of a brand at a time period has been contrasted with the choice made by an individual or a household. Aggregate models intended to predict sales or market share while individual-level models explained factors determining an individual's choice to buy or not to buy, which brand was bought and how much of the brand was bought.

This dichotomy according to the data used (aggregate, market-level versus individual or household-level) is not as clear with current response models. Indeed, as stated by Chen and Yang (2007) or Musalem et al. (2008) in positioning their models, inference about individual, micro-level behavior can be made without individual-level data. Starting with the random coefficient logit or probit model, the model is specified at the individual level with individual-level parameters summarized with aggregate level statistics (Rossi and Allenby, 1993). Finite latent class models where segments of consumers are represented can be considered as disaggregate models even though only aggregate data/information are used for their estimation. Bayesian estimation is

particularly effective for resolving this issue, as the algorithms provide simulation methods to augment the aggregate data with unobserved (simulated) individual-level behaviors (e.g., sequences of choices and coupon usage as in Musalem et al., 2008), consistent with the aggregate data. When only aggregate data are available, these new methods are “a step forward for marketing researchers and their ability to make managerial decisions under a broader range of conditions (Musalem et al., 2008, p. 728).”

These Bayesian methods are also very helpful to model at the individual-level response functions which have been typically performed at the market level. Recently, Bucklin et al. (2008) propose measures that characterize distribution intensity at the individual level. They consider accessibility of the distributor/dealer, the concentration of dealers, and their spread. The results of a logit choice model estimated with Bayesian methods provide significant insights about the role played by each of these distribution characteristics and their importance. They estimate the distribution intensity elasticity to be 0.6. Another contribution is the presentation of a market-level response function calculated from the simulated market share values based on the individual-level logit choice model. The ability to use the individual choice results to develop market-level response functions is extremely appealing to develop a theory-based understanding of consumer decisions and to summarize the findings at the level at which management makes their marketing decisions.

#### **4.2.3 “Richer” Accounting of Portfolios from Customer Perspective**

Another area where recent studies show a promising trend concerns the analysis of the patterns of consumption across product categories and especially among complementary products usually considered independently. Duvvuri et al. (2007) find consistent patterns of correlations of own-price elasticities among complementary products. This pattern of elasticity and cross-elasticity correlations provide insights about the trade-offs consumers make in choosing items to purchase. The hierarchical Bayesian multivariate probit model and Markov Chain Monte

Carlo (MCMC) methods and the Metropolis–Hastings algorithm associated with these methods allow simulating parameter draws from the posterior distribution (Rossi et al., 2005). These draws can then be used to assess particular patterns.

More can be learned from these methods regarding the pattern of behaviors about latent responses from consumers. This would build a richer basis of consumer behavior where work across categories is sparse and difficult. These patterns have also critical implications for managerial decisions which should take into consideration the trade-offs made by consumers and the implications of pushing drivers of consumer response such as a price elasticity which would impact their responses for other related products. Therefore, expanding on the product line marketing mix decisions such as pricing (e.g., Reibstein and Gatignon, 1984), the optimal marketing mix depends on the interrelationships among these parameters. An example is provided for discounts in Duvvuri et al. (2007).

### **4.3 Better Accounting of Processes That Do Not End in a Purchase**

Whether explaining aggregate or choice of household brands, little attention has been paid to reasons for zero sales of a brand or of an SKU. Briesch et al. (2008) provide several reasons for why sales may be observed to be zero. They argue that structural zeros should be treated differently from non-structural zeros. These non-structural zeros can be due to (1) small share brands with few buying households, (2) can be the result of stock outs following successful promotions of the brand in question, or (3) can result from the success of competing brands promotions making the other brands temporarily unattractive. These zero brand sales are on top of the fact that a household may not purchase any brand at a purchasing occasion which is typically modeled by a no-buy option with zero utility. Briesch et al. (2008) demonstrate the bias on price elasticity estimates introduced by failing to account for these zero brand sales. They propose two models and find that a model with a selection process perform best and produce more accurate price elasticities.

Another issue with the absence of purchase is due to the consumers' behavior in terms of stores they visit. It is clear that they can only purchase the item in one store if they visit that store. This is especially critical in areas where stores compete very hard for their customers; these environments are typically characterized by price wars. van Heerde et al. (2008) study spending patterns in such environments where they decompose the effect of price war on store choice visits (through a multivariate probit model) and a separate equation for the quantity purchased conditional on a choice visit. This enables new insights into the purchase behavior of consumers. While a price war initially increases consumer spending, ultimately, spending per visit drops because consumers redistribute their purchases across stores. One of the results is that the price war makes consumers more price sensitive in the long term. Not all the chains, however, are affected equally: the mid-level rivals and high-end chains are the losers in the war. Consequently, it may still be profitable for some chains to create such price wars to weaken some competitors, although it appears as a risky game to play in the long term.

However, this work remains strongly focused on key aspects of the purchasing process. A more global perspective is presented by Smith et al. (2006). They propose that the process of marketing-sales effects to be reflected in an Integrated Marketing Communication system should recognize key complexities which include (1) the dynamics of endogenous (with mutual influence on each other) multiple objective variables (such as leads and lead conversion), (2) the time differential impact of communication variables on these multiple objective variables (with different leads and lags) and the interrelationships or interactions between marketing variables (for example synergies or complementarity of efforts).

Even though these three components have been studied independently, there are few studies that integrate these three components. The dynamics of communications in terms of leads and lags have been extensively studied, especially in terms of advertising effectiveness (e.g., Clarke, 1976). However, there is more limited evidence about the other components. The role of leads has been studied in the context of advertising such as in Hanssens and Weitz (1980) or trade



shows (Gopalakrishna and Lilien, 1992). While studies of marketing mix interactions have received more attention, our knowledge of the complementarity and synergies among marketing instruments in different contexts (e.g., new product introduction versus mature products, or service versus technological products) remains limited. Gatignon (1993) provides a synthesis of the literature. Smith et al. (2006) indicate a few more publications on the subject but each study tends to be limited to the interaction between two marketing variables, especially sales force and advertising (Gopalakrishna and Chatterjee, 1992) or trade show and sales force complementarity (Gopalakrishna and Williams, 1992; Smith et al., 2004).

Consumers and their choice process have dominated the literature for understanding the underlying processes leading to particular market responses. However, a critical element of the process leading to the possibility for the consumers to choose at all is that the product is accepted by the distribution channels to be included in their references. The gate keeping role played by large retailing chains is well established. Consequently, market response models interested in explaining the market response to new products should not ignore the decision process of distribution channels. Lan et al. (2007) propose to incorporate the retailer's acceptance criteria directly into the development process of the new product.

#### **4.4 Intangible-Dependent Variables**

We have discussed earlier the impact of brand equity measures on stock market returns. These effects have not only been identified on the stock price but also on the long-term effectiveness of promotions (Slotegraaf and Pauwels, 2008). In part because of the importance of this effect, recent research intends to understand better the drivers of brand equity. Both of these streams of research, where brand equity is an explanatory variable or a dependent variable, require that valid measures of this intangible variable are available. While the concept of brand equity is well accepted, the definitions and the measures are not as clearly widely adopted. A number of proprietary methods for evaluating brand equity at the market level have been adopted in recent research. These have

been mentioned in the section on the impact of brand equity on stock returns. However, models relating brand equity to its drivers are at the individual level. In spite of some well-accepted scales of consumer mindset at that individual level, the confusion is more accentuated at this level of analysis. Especially a number of similar concepts have been proposed such as brand attachment where the directionality of the structural links among the constructs, if truly different, is not totally demonstrated.

It is particularly important to understand the drivers of such a concept, especially as it relates to factors that are in the hands of marketing managers to enhance the value of the brand. Another intangible concept which has received attention in the recent literature is customer equity. Related to the lifetime value of a customer (CLV), which is defined at the individual customer level, customer equity reflects the aggregate CLV value for a specific cohort of customers. Villanueva and Hanssens (2007) distinguish further between static (the sum of CLVs) and dynamic customer equity (discounted sum of both current and future cohorts). In their review of the state-of-the-art of research on customer equity, they identify various types of antecedents or drivers of customer equity: the acquisition effort, customer retention, and add-on selling. The reader is referred to this recent exhaustive literature review on this specific topic which identifies remaining issues and research potential.

#### **4.5 Summary: New or Under-studied Dependent Variables**

There are a number of avenues for making substantive contributions that relate to dependent variables in a market response model. One opportunity lies in new (or under-studied) output variables. Four broad types of variables have received some attention: financial criteria; some level of aggregation which have been shown to be relevant; representation of processes that allow taking into consideration that consumers may not purchase a brand or the product category; and, modeling new important intangible marketing variables.

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## Under-Studied or Emerging Contexts

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In this section, we review a number of contexts that have provided the motivation for new marketing research. We start with a couple of industries which have provided a context in which a significant number of studies have been performed, specifically the movie and the pharmaceutical industries. We also synthesize the knowledge Marketing has gained into the particular context of a recession which is especially relevant in today's economic environment. We then discuss models that have included spatial effects, especially in the contexts of within country geographical areas and also across countries. Then, we consider models that reflect the richer opportunities to shop and buy through multiple touch-points or channels, especially with the addition of the Internet as a channel. We briefly identify the imbalance regarding business market response models, especially as it involves longitudinal (versus cross-sectional survey) analyses.

### 5.1 Increasing Receptivity for Some Industry-Specific Contexts

Two industries have received particular attention in the marketing literature: pharmaceuticals and movies.

**Pharmaceutical industry.** Modeling the effectiveness of detailing in the pharmaceutical industry is not new (e.g., Montgomery and Silk, 1972). However, recent studies have benefited from very broad data sets encompassing multiple product categories and brands in multiple countries. This has broadened the research questions addressed beyond single country-single brand analysis of marketing mix effectiveness to the investigation of more strategic issues.

This industry as a context for marketing research has just been thoroughly reviewed by Stremersch and Van Dyck (2009). Consequently, there is no need for repeating a synthesis of the research to date. It is clear, however, that, in spite of the specificities of the context (e.g., the regulatory nature of the industry or the extraordinary long delays in new product development), the nature of the marketing decisions parallel those in more typical business contexts. Indeed, Stremersch and Van Dyck (2009) classify the major marketing decisions faced by firms in this industry as: (1) Therapy creation (New product development): therapy pipeline optimization; innovation alliance formation; and, therapy positioning decisions. (2) Therapy launch (New product launch strategy): global market entry timing; and, key opinion leader selection decisions. (3) Therapy promotion (Communication, Promotion and Marketing management): sales force management; communication management; and, stimulating patient compliance.

We identify four streams of research where this industry provide insightful information: (1) new product development, (2) the role of regulatory policies in the diffusion of drugs, (3) the changing model of communication through more complex networks of patients and physicians, and (4) strategies for patient compliance.

Considering the new product strategy development process, Chandy et al. (2006) provide an example of the recent trends in this area of research. Using a cross-national sample of pharmaceutical firms over a relatively long period between 1980 and 2001, the authors are able to show that firms that: (1) focus on a moderate number of ideas, in areas of importance, and in areas in which they have expertise; and (2) that are deliberate for a moderate length of time on promising ideas are better able to convert ideas into drugs that actually end up being launched into the market. According to the authors, this has been made possible

because of the industry context they have chosen — the pharmaceutical industry: “Researchers have access to reliable data . . . in this industry. On the output side, pharmaceutical regulatory bodies provide detailed data on all drugs that have been approved for launch within their areas of jurisdiction. On the input side, some institutional characteristics of the pharmaceutical industry facilitate the collection of accurate, comprehensive, and comparable data on the promising ideas in individual firms (p. 495).”

Considering the pharmaceutical industry in its international context is primordial to understanding the marketing and management questions that the industry faces but also to assessing the impact these strategies may have for the spread of medical products throughout the world and especially in low income countries with the social and humanitarian benefits it brings them. One of the critical types of factors contained in country characteristic concerns state regulations. Analyzing 15 new drug sales across 34 countries, Stremersch and Lemmens (2009) show that manufacturer price controls do have a positive effect on sales growth. Other regulatory policies such as restrictions on physician prescriptions and prohibition of direct advertising to consumers have the negative effect that would be expected.

The role of opinion leaders is perhaps more strongly structured than in other industries and often, because of regulations, drug manufacturers can only access directly the opinion leaders (prescribers) and not the ultimate users. Although this issue arises in other business contexts, especially through new communities communicating worldwide through the Internet, the management of communication through these opinion leaders has been the focus of the marketing strategies of the pharmaceutical firms. Trends appear to indicate changes in the ties between patients and physicians toward a greater reciprocity of the relationships to a shared decision-making model (Camacho et al., 2008). These trends result from several factors including: (1) demographic and lifestyle changes, (2) technological advances such as the growth of Internet use and E-health, or (3) changes in the regulatory environments such as the greater flexibility of regulations toward Direct-to-Consumer Advertising in a number of countries (Camacho et al., 2008). For Direct-to-Consumer advertising to be effective as it becomes

more prevalent, a better understanding of its effects is required. Amaldoss and He (2009) investigate the role of drug specificity and price sensitivity in that process.

The firm focus on the need to secure patient compliance in this industry is probably stronger than in other industries. Failure to use the drug properly may threaten the life of the beneficiaries of the drug. Therefore, the responsibilities of the manufacturers are heightened relative to the manufacturers in other industries where relationship management with customers may be more geared toward enhancing the customer loyalty and therefore its customer lifetime value. However, understanding compliance behavior is quite a challenge. Bowman et al. (2004) provide a rare example of the complexities involved. They identify different groups of consumers or segments of patients who behave differently and in particular exhibit different inherent (unconditional) levels of compliance. In some segments, advertising has a positive effect on compliance while the effect is negative in other segments. They also show that compliance varies by drug category beyond the factors for which they control. In general, they also find that patients whom ask for the drug, are more likely to fail to adhere to the regimen.

In summary, the pharmaceutical industry, or more generally the life sciences industry as discussed by Stremersch and Van Dyck (2009), provides a rich context to investigate major strategic issues faced by the firms in global, rapidly changing environments, even if the nature of the products involved with their high level of risks for the consumers and the regulatory environment in which they operate prevent a complete generalization of the results.

***Movies industry.*** The movie industry may not reflect a typical product category either; nevertheless, it offers an interesting variety of products of multiple genres serving different consumer preferences for entertainment. The major studios also enjoy a global market throughout various parts of the world. Movies as well as their stars receive a lot of attention in the media with a large social contagion of word-of-mouth communication throughout the populations. The diffusion is quite rapid and the life cycles are typically extremely short, although more recent movie support such as videotapes and video disks have extended their

lives and have made the full revenue streams to studios more complex to model. Even though preferences may differ across cultural contexts, the products are standardized in a global market where opening days are frequently simultaneous. We do not intend to review all the work that has been published on the industry. The reader is referred to the review by Eliashberg et al. (2006) and the various commentaries that follow (Krider, 2006; Shugan, 2006; Swami, 2006; Weinberg, 2006). The research opportunities they identify, organized around the value chain stages of production, distribution, and exhibition are still fruitful avenues for resolving interesting research questions. Instead, however, we will focus on the knowledge recently developed on these topics.

Two streams of research use the movie industry as a context without necessarily claiming insights that would not have been obtained in other industries. Nevertheless, the availability and the richness of the data make these studies noteworthy. The first of these streams concerns the development of demand forecast models. The models developed by Eliashberg and Sawhney (1994) and Neelamegham and Jain (1999) are individual-level models of preferences useful for assessing the future performance of a movie when released. Other models are intended also as forecasting models of revenues, and can be used to assess possible distribution strategies. These include Eliashberg et al. (2000, 2009), Krider and Weinberg (1998), Neelamegham and Chintagunta (1999), Sawhney and Eliashberg (1996) and Swami et al. (1999).

Greater theoretical knowledge has been developed in the area of the role of various determinants of movie choice, market share, or sales (audience size). Five different determinants have been studied: not only has advertising and distribution been analyzed as traditional marketing variables but also the specifics of the movie industry has allowed us to gain knowledge about the role of word-of-mouth, the role of opinion leaders (critics or reviews), and the role of a very atypical product attribute, i.e., the actors or stars in a movie.

First of all, the role of advertising is clearly demonstrated as being positively related to stock market (Joshi and Hanssens, 2009) or revenues, although the effects are not necessarily straightforward as exemplified by the interaction between advertising and sequels found by Basuroy et al. (2006) or by the indirect effect through exhibitors of

advertising (Elberse and Eliashberg, 2003), even during the Super Bowl rather than direct advertising effect on box office revenues (Ho et al., 2009).

Second, the richness of the distribution data has allowed distinguishing between the lead and lags concerning the simultaneity question of distribution and sales. The evidence provided by the interesting modeling approach of Krider et al. (2005) is that movie exhibitors monitor box office sales (which are easily observable) and then respond accordingly with screen allocation decisions.

Actors, or the presence of stars in movies, are a feature of the product that is specific to the industry. The role of stars may appear trivial at first hand but the research shows indirect effects through the signals it provides to the exhibitors about potential sales and therefore which leads to higher screen showings, as well as less consistent direct effects (Ainslie et al., 2005; Elberse and Eliashberg, 2003).

The role of word-of-mouth in the diffusion of movies is clearly established as a social entertainment good at the aggregate level. More recently, the availability of word-of-mouth information on the Web has allowed researchers to identify better its role (Larceneux, 2007). It is most critical during the pre-release period and during the opening week but it is only the volume that matters and not the valence of the information (Liu, 2006). However, the communication strategies differ substantially in the presence of expected negative versus positive word-of-mouth (Mahajan et al., 1984).

Finally, although they may be assimilated into reviews consumers report, the role played by movie reviews written by professional movie critics is of a different nature. Reviews are widely available through the Web and the data tend to show a causal influence on box office results (Larceneux, 2007). The parsing out of the real information contained in the review, as opposed to the intrinsic quality of the movie enables Boatwright et al. (2007) to assess separately the impact of a good versus a poor critic.

The area of multichannel distribution has also been enriched by the study of the movie industry. The various product forms constitute different channels for spreading a movie. The question of the timing of entry into these different channels constitutes an important component



of that research. The research to date suggests that the studios would benefit from more simultaneous release, although other parties than the studios such as theater chains would suffer from such policies (Hennig-Thurau et al., 2007a; Lehmann and Weinberg, 2000). Another facet with recent research of that multichannel distribution system is the pricing of rented films versus films to buy (Knox and Eliashberg, 2009).

In addition to this new knowledge that has been recently established, it should be pointed out a few other areas where work is starting, although the knowledge base would benefit from additional work. The first area concerns the new product development process. Although a cultural good may not follow the typical patterns of new product diffusion, the early potential forecast based on scripts is a clear challenge, as in any prediction of new product prototypes. The model proposed by Eliashberg et al. (2007) provides an innovative approach to this complex problem.

Another challenge facing the industry concerns the threat of lack of property rights protection with the technological capabilities for consumers to easily share files through Internet. The analysis of German data by Hennig-Thurau et al. (2007b) is a fascinating attempt at estimating the impact of such illegal behaviors on the revenues from all product forms of a movie and at understanding the determinants of such behavior.

## **5.2 Marketing in a Downturn Economy**

The world economic crisis of 2008–2009 has brought a number of questions from management regarding the most appropriate marketing strategies to follow in such times. Few studies provide some answers to these questions. These studies propose market response models which account for changes during periods of recession. Therefore the data required for such analysis are necessarily long periods where times of growth and recession periods can be observed. The global character of the crisis has also generated questions about whether the effects of such downturn recessions are universal or not.

First, what are the effects for marketing such recessions? In a study comparing a broad set of (24) consumer durables, Deleersnyder et al.

(2004) developed a two-stage model where the first stage identified the business cycles and the second stage quantified the sensitivity of sales to business cycle fluctuations. Consumer durable businesses are more sensitive to business cycles than the general economic activity. Furthermore, the sales of consumer durable goods fall much quicker during downturn periods than they recover during the growth phases. In addition to these effects on sales, an important component of marketing activities, advertising, is also affected by such cycles. In fact, advertising appears to be much more sensitive to business cycle fluctuations than the economy as a whole (Deleersnyder et al., 2009). There are, however, differences across countries. Advertising is less cyclical in countries high on uncertainty avoidance (one of Hofstete's cultural factor), but advertising is more sensitive to business cycles in countries that are characterized by significant stock market pressure and less dependent on foreign-owned multinationals. Therefore, the more developed the economy, the more advertising is sensitive to fluctuations in business cycles. Deleersnyder et al. (2009) also provide evidence that such patterns of advertising spending have long-lasting effects: (1) the growth of the advertising industry itself as a whole suffers and (2) the stock price of firms that are sensitive with their advertising to business cycles are lower.

Considering global currency crises on aggregate consumption, Dutt and Padmanabhab (2009) also find strong effects that last until after the crisis has ended but to a different extent for OECD and non-OECD countries. The smoothing effect appears to go beyond a temporal effect within a category, as it characterizes the inter-category consumption patterns, beyond income and price effects that accompany a crisis (Dutt and Padmanabhab, 2009). In a regression model of per capita consumption over a lengthy period (1960–2003) in a large number of countries using data from the World Bank, a crisis period dummy variable shows a significant decline (negative coefficient) as well as for the two lagged crisis variables indicating that the effect persists two years beyond the crisis period. In fact, the crisis impact lasts longer in developing economies than in developed ones. The decline in consumption expenditures is even stronger than the drop in incomes in 70% of developing economies. But these declines in consumption are not the same

across categories. By modeling the share of consumption by category for 54 countries through the period 1990–2006 using Euro Monitor data, Dutt and Padmanabhab (2009) show that consumers in OECD countries modify their spending allocated to different categories during the year of the crisis but regain their priorities immediately after the end of the crisis. The change in consumption patterns by category of consumers in non-OECD countries lasts an extra year, except for services. The change in priority pattern differs also for OECD versus non-OECD countries. Durables are more affected than services but non-durables and semi-durables keep the same share of consumption in OECD countries. However, in non-OECD countries, consumption of durables and semi-durables suffers more than non-durables. They also find that the patterns of durables consumption within categories differ for OECD versus non-OECD countries (intra-category consumption smoothing). Cars and motorcycles are more strongly affected in OECD countries. In non-OECD countries, it is “medical equipment” that captures the priorities of consumers’ budgets to the detriment of “audio-visual, photographic and information processing equipment” or “jewelry, silverware, watches and clocks, travel good” items. For non-durable goods, it is no surprise that “food” takes a larger share of consumption in all countries. It is interesting that savings are realized in the “tobacco” category across the world in such periods.

Apart from these analyses at a macroeconomic level, a few recent studies have attempted to understand consumers’ changes in behavior at a more detailed level during recession periods. In particular, the role of store brands (or private-label brands) has been a major challenge for manufacturers of frequently purchased consumer goods bought in grocery stores. Using aggregate value share of private labels in Belgium, the UK, West Germany, and the USA during a period spanning almost 30 years over the four countries (1975–2004), Lamey et al. (2007) are able to diagnose interesting patterns during such periods. They follow a process similar to the model mentioned above with the preliminary step to identify the cycles with a time series filter and then assess the extent of the cyclical sensitivity of private-label sales. Beyond the confirmation that private-label sales increase during recessions, this effect is long lasting because consumers switch more and faster to private-label brands

during recessions than they switch (back) to national brands after the recession ends. In fact, not all switchers during the recession return to buying national brands when bad economic times are long over. The effect is consequently dramatic for manufacturers who see the trend toward private labels strengthened during difficult times, thereby reinforcing even more the power of the distributors. Indeed, they also find that distributors/retailers invest more strongly in their private-label program when the economy deteriorates. Surprisingly, many manufacturers cut back on their marketing expenses during recession periods, which exacerbate the trend.

In these contexts, what can firms do? A number of marketing strategy response models offer some insights into this question. The observation that “most managers seem to adjust their behavior in response to economic downturns by cutting advertising budgets, scaling back innovation activity, and lessening price-promotional activity” (Lamey et al., 2008) may not be optimal. However, the answer to the question must consider the simultaneous allocation to multiple marketing instruments. For example, sales force investments may increase their value through increased effectiveness in difficult contexts (Gatignon and Hanssens, 1987). The interactions among mix instruments must be modeled in the response function in order to assess the appropriate allocations, as demonstrated in the example of the US Navy recruitment effort where more sales force effort is optimal relative to advertising in territories where the propensity to enlist is weaker (Gatignon and Hanssens, 1987). Innovation would appear as a reasonable reaction to differentiate products, especially from generic products in periods of economic crisis. However, delays in the new product development process suggest that downturn periods may not be the times to increase R&D investments. Indeed, by developing and estimating a marketing strategy model relating the stock of R&D investment and of advertising accumulated by a firm, Srinivasan and Lilien (2009) find that R&D investments in recession times hurts profits while advertising investments in such periods contributes to profit increases in B2B and B2C industries (these results did not apply to the service sector which was tested but seems not to respond to different factors). These results offer a serious level of generalizability as the study uses a panel data of 3,804

publicly listed US firms (Standard and Poor's COMPUSTAT database to collect data on publicly listed US firms) from 1969 to 2007, when there were six recessions (1970, 1974, 1980, 1982, 1990, and 2001). However, responding proactively during a recession pays off if the firm is well prepared ahead of time (Srinivasan et al., 2005). In other words, R&D investments prepare the firm for the future, and when having the right products at the right time, the firm can then make use of these capabilities and assets. Then, these firms are able to derive benefits from a proactive marketing response during the recession. This is consistent with Larréché's momentum effect discussed above (Larréché, 2008).

Therefore, it may not be a question of reducing overall brand support in a recession (which enhances the success of private labels during and beyond the recession as shown in Lamey et al. 2008), but more a re-allocation of marketing investments which cannot ignore the optimal timing of these investments. Anticipation is even more critical to be prepared to face a downturn economy than in growth periods. While the extant literature provides some important insights into these issues, it is relatively sparse as a research stream. The evidence being strong, in particular, about the use by large retailers of their market power to reinforce it through the push of their private label products, there is an opportunity to devote more detailed research to what are successful strategies for manufacturers in such hard times.

### **5.3 Across-Country and Spatial Market Response Models**

There is no doubt that Marketing research has become more international in the use of data from multiple countries and in the country of origin of the authors publishing in major international journals (Stremersch and Verhoef, 2005). Perhaps more critical for the understanding of global marketing is also the trend to analyze similarities and differences in market response across countries. While differences in country characteristics are undeniable, it is much less clear that the responsiveness to marketing mix variables differ strongly across countries. In fact, Farley and Lehmann (1994) find that while they may differ somewhat, the differences are more likely due to the technical

characteristics of model specifications and to product/market specifics than to true differences in response coefficients. They provide a review of studies that compare marketing mix coefficients across countries in a meta-analysis. In particular, they provide typical price, advertising and distribution elasticities that appear to generalize across countries.

Another issue concerns marketing management at the global level which requires considering the interconnectedness of today's world markets.<sup>1</sup> Market response models rarely recognize the presence of spill-over effects across countries, sometimes also referred to as "lead" or "lag" effects. International diffusion models are an exception. Cross-border communication about a new product — either through personal conversation or through exposure to foreign mass media, including the Internet—may improve consumers' awareness of the innovation before it is introduced in their own country and may reduce the risk they perceive in adopting early. The success of a product in the lead country may also continue to influence consumer opinion and adoption behavior in other (lag) countries after the product has been introduced in these countries. Such effects have been reported in a number of studies. For instance, the penetration in the lead country has been found to affect the number of adoptions in the lag country (Kumar and Krishnan, 2002; Takada and Jain, 1991). Also Talukdar et al. (2002) found that the coefficient of imitation tended to be higher in countries where a product was introduced later than in other countries. Puzzlingly, Talukdar et al. (2002) also found a negative effect of lag on propensity to innovate, which might indicate that firms enter later in countries characterized by lower propensity to innovate. The estimation of these cross-country effects is critical for developing an appropriate global (or regional) entry strategy. Strong cross-country spill-over effects favor a simultaneous entry strategy because it reduces the costs of marketing communications in the lag markets. Instead, by using a sequential strategy, the company can rely on the free spill-over effect from the lead market to generate awareness and a positive attitude toward the new product in the lag markets. However, there are important caveats in considering the impact of these spill-overs. First, spill-over effects

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<sup>1</sup>This section is adapted from Gatignon and Van den Bulte (2004).

may not be universally positive. Evidence of the opposite effects has been found. For example, one study reported that lag time is positively related to propensity to innovate and negatively related to the importance of social influence like word-of-mouth (Helsen et al., 1993). Second, there are some questions about whether these effects exist at all. Faster speed of adoption in a lag country need not result from cross-country communication. The lead-lag effect may simply reflect the passage of time and the concomitant changes in product design and quality, the availability of new, more advanced media vehicles and communication systems, and the general trend toward higher purchasing power (Van den Bulte, 2000). If that is the case, there isn't really an international snowball effect at work. Finally, lead-lag effects might not be genuine at all but simply a methods artifact (Van den Bulte and Lilien, 1997).

Spatial modeling methodology has been applied recently to this cross-country diffusion (Albuquerque et al., 2007). Comparing the diffusion of two certification standards (ISO9000 and ISO14000), the cross-country contagion mechanism is found to be different across the two standards. Diffusion of ISO9000 is driven primarily by geography and bilateral trade relations, whereas that of ISO14000 is driven primarily by geography and cultural similarity.

This type of modeling applies as well to regions of large countries. For example, Bronnenberg and Mela (2004) propose a model of the spatial and temporal coverage for new packaged goods through the USA. Manufacturers do not enter all geographical markets simultaneously, nor do they enter randomly. In fact, "manufacturers enter markets sequentially based on spatial proximity to markets already entered (spatial evolution), and on whether chains in these markets adopted previously elsewhere (market selection)" (Bronnenberg and Mela, 2004). Similarly, retail coverage by retailers is not independent of the manufacturers' entry decisions. "Retail chains adopt new brands based on the adoption timing of competing chains within their trade territory (competitive contagion) and on the fraction of its trade area in which the new brand is available (trade area coverage)" (Bronnenberg and Mela, 2004). The diffusion of the new products and the role played by other marketing mix variables (apart from distribution coverage)

need to recognize these interdependencies. Spatial models provide a new approach to modeling these effects. Bradlow et al. (2005) further discuss opportunities offered by such models in Marketing. They review a few applications of spatial models that can help better understand the geographical patterns of marketing variables, but they remain rare. They also identify a number of effects that apply especially to market response models involving time series of geographical cross-sections: spatial lags, spatial autocorrelation, and spatial drift. Therefore, these issues provide important research opportunities for spatial models.

In summary, the opportunities for cross-country and spatial response models abound as global databases become more readily available, although many conceptual and methodological issues remain to be resolved. Nevertheless, the implications for global marketing management can be significant.

## **5.4 Accounting for New (Internet) and Multichannel Contexts**

The Internet has created a new channel for firms to directly or indirectly sell their products. New modeling efforts can be grouped into four categories: (1) research studies that attempt to understand the differences in the perceptions of the channels in order to better segment consumers, (2) studies that analyze the factors which affect customers' response in Web channels, (3) models for explaining changes of channel by consumers (channel migration), and (4) models of consumer networks or communities on the Web.

### **5.4.1 Differences of Perceptions of Web Channels**

Channels have been compared to assess the extent to which consumers perceive differences among them. The perceptions of the Web as a channel has received particular interest in terms of a key difference it presents compared to other channels, i.e., that it is technology driven. Therefore, it is natural to attempt comparing its features according to the characteristics explaining the adoption of a new technological product. In a study of online grocery shoppers, adopters of the Web channel consider that it offers higher compatibility, higher relative advantage,



more positive social norms, and lower complexity than consumers who have never bought anything on the Internet yet or who have purchased only other goods or services than groceries (Hansen, 2005). They also find that online grocery shopping adopters have higher household incomes than non-adopters, consistent with the usual characteristics found among innovators.

Another key difference for marketing activities concerns the price comparison between channels. Internet prices tend to be lower than in other channels (Zettermeyer et al., 2006). As an example, a study of books and CDs comparing a large number of Internet and conventional outlets (41) estimates the price difference to be 9–16% lower in Internet channels, the range depending on whether taxes, shipping and shopping costs are included in the price (Brynjolfsson and Smith, 2000). However, given the variety of retailers, it is important to also consider the dispersion within channel type (conventional versus Internet). While Internet shows a larger dispersion, indicating perhaps greater specialization in that channel, once the prices are weighted by the retail outlet sales volume, the price dispersion in Internet channels becomes smaller than in conventional retailing outlets. This reflects in part the dominance of very large Internet outlets in these product categories. These results do show, however, the importance of considering the structure of the channel composition, taking into account the specialization and the size of the outlets which affect the competitive context, partly reflected by the difference in prices which, in turn, determines consumer choices.

In a different industry, the automobile market, which presents some peculiarities in terms of customer negotiation behavior, Zettermeyer et al. (2006) provide two reasons for the lower prices paid by consumers. First, the Internet informs consumers about the dealers' invoice prices so that they can choose a lower price dealer. Second, it facilitates an information exchange with other consumers about the prices paid at various dealerships. As mentioned above, the specificity of the negotiation practices in that product category makes the consumer's response to differ depending whether the consumer dislikes bargaining or not. Zettermeyer et al. (2006) show that those who do not mind bargaining do not benefit from the additional information obtained through the

Internet. However, the others do pay on average 1.5% less than they would if they had used the traditional channel.

In summary, responses to marketing instruments should be expected to differ across channels as consumers perceive clear differences among the channels and their purchasing processes differ through different levels of information that they acquire.

#### **5.4.2 Factors which Affect Customers' Response in Web Channels**

The Internet is another channel which can be compared with other channels in terms of the same properties, some of which have been mentioned above (Hansen, 2005). However, it is also characterized by dimensions that are specific to the site design. One can distinguish text and graphics, the type of site (e.g., News, Portal, Service) and functional features (e.g., buttons or functions to choose language, page layout, e-mail contacts, etc.) (Danaher et al., 2006). What makes the Internet so different, however, is (1) the ability to insert ads from other products and (2) the ability to make recommendations, both made on the basis of information about the specific consumer (demographics, socio-economic, or prior purchases).

Similarly to models that have been built for identifying effective ads, Danaher et al. (2006) explain the time a site is watched, the number of pages of the site viewed by a consumer and the time spent on each page as a function of the site's characteristics. Very much like for an effective advertising, most characteristics are not equally effective for every consumer. A major result obtained in that study concerns the interactions between age and site characteristics on what seems to work best: older consumers tend to spend more time on sites that have a high text content and advertising content. Many functionalities of the site are detrimental to the time spent and the pages viewed by older consumers.

The particular issue of the advertising content through banners has been studied by Manchanda et al. (2006). In a hazard model of the probability that current consumers have to repurchase, which they estimate through hierarchical Bayesian methods, they find that greater exposure

to the ads increases repurchase probabilities (with a decreasing return) but diversity of ad creative has a negative effect on repurchase probabilities. The interaction between copy wear out and the importance of repetition of exposures for learning remains an interesting question to investigate, especially in this Internet context.

The last specificity of the Internet that has been investigated is the ability to propose recommendations adapted to each individual customer. Bodapati (2008) proposes a unique response model to compare the recommendation system used by a site. He especially compares recommendation systems based on an estimated probability of purchase of the product recommended versus a system based on the extent of the sensitivity to purchase the recommended action. Given the prominence of such recommendations in many commercial sites, this topic should correspond to a fruitful area for future response models on the Internet.

### 5.4.3 Channel Migration Models

The Internet being a relatively new channel that competes with existing channels, another stream of models investigates the changes in consumers' channel choice. Ansari et al. (2008) developed a model of channel selection and purchase volume (frequency and order size) to analyze the migration to the Internet channel. They suggested that marketing efforts can be used to complement exogenous customer behavior trends to stimulate the formation of a specific segment of consumers purchasing on the Web. Such a group has a higher sales volume of purchase. However, this is not generally the case because the purchasing volume on the Web is inferior to the volume bought from other outlets. It is likely to be due in part by the behavior of individuals in the trial stage of the adoption process. In fact, electronic channels receive more business from consumers for products with low quality uncertainty and that are rare (Overby and Jap, 2009). This is consistent with our understanding of diffusion theory (Gatignon and Robertson, 1985). An intriguing result concerns a large number of communication media interactions within and across media types (e.g., catalogue  $\times$  catalogue or e-mail  $\times$  e-mail as well as catalogue

× e-mail). These provide sources of investigation for building future models.

Another aspect of analyzing the switching behavior of consumers concerns the fact that the Internet channel, as well as other telecommunication channels through which individuals can buy product and services, involves not only the content provider but also the Internet service provider which may charge a fee. This feature of the Internet channel has not received much attention yet, with the exception of Dewan et al. (2000), although the development of direct communication messages to the cell phone of the individual consumers should require new models appropriate for these contexts.

#### **5.4.4 Models of Consumer Networks or Communities on the Web**

The models discussed above use relatively traditional modeling specification approaches, even if the estimation methods such as empirical Bayesian methods enable to deal with the large data subject to multiple sources of heterogeneity (e.g., individuals, Web sites, etc.). They do not, however, model explicitly what makes the Internet so distinct from other media, i.e., the interconnectivity among individuals. Recent modeling efforts are building in that direction. Stephen and Toubia (2009) develop a model written as a mixture of probabilities capturing the evolution mechanism of the social network that remains tractable? at the individual level. With a new modeling approach, Katona and Sarvary (2008) model the Web as a directed graph where sites purchase advertising on other sites (in-links). In an extension of the model, sites can also establish outgoing links (out-links) so that the consumer can be directed toward other sites of relevance to them. The model explains how higher content sites tend to purchase more advertising links while selling less advertising links themselves, leading to a specialization across sites in revenue models where “high content sites tend to earn revenue from the sales of content, whereas low content ones earn revenue from the sales of traffic (advertising)”. In addition, they find that there is a general tendency for out-links to be toward sites that have higher content.

The interconnected networks of individuals form user communities which are starting to be exploited. Participation in these communities is modeled as a function of explanation based on behavioral research, i.e., using antecedents from cognitions, affect and social considerations (Bagozzi and Dholakia, 2006). The behavioral consequences of the formation of such communities are also beginning to be the subject of analysis as in Bagozzi and Dholakia (2006). However, in order to understand how these communities are formed and how they work, requires the discovery of the appropriate network structures and how their characteristics can help identify groups of individuals that have strong internal relationships (Zubcsek et al., 2008). The modeling of such communication networks such as in Zubcsek et al. (2008) appears more useful for marketing than more general models of network closure.

## **5.5 Business Market Response Models**

There is still a real imbalance in the knowledge base we have developed in terms of response model parameters between consumer markets and industrial or business markets (including business services). While there is a huge literature about business markets, most of the work concerns the test of industrial buyer behavior theories using survey data and there is much less work geared toward developing market response models where the effectiveness of marketing instruments is explicitly estimated. At least, these models do not reach the level of detailed modeling as it has been done for consumer markets. Part of the difficulty may be due to the lack of availability of data at the customer level over time, such as has been the case for panel data of consumers. Indeed, building market response models requires longitudinal (versus cross-sectional) analyses. Even if theories of industrial buying behavior can validly be tested with survey data (as thoroughly discussed in Rindfleisch et al., 2008), times series are required for reaching the level of modeling one can find in consumer market response models. Focusing on these time series of cross-sections in business markets and especially business services beyond annual surveys could benefit from greater attention of market response modelers.

## **5.6 Summary: Under-Studied or Emerging Contexts**

Context can provide an avenue for making a substantive contribution in marketing mix modeling. The movie and the pharmaceutical industries are two industries where a number of studies have been conducted. The knowledge Marketing has gained into the particular context of a recession is especially relevant in today's economic environment.

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## Conclusions

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Market response models can be classified as: (a) those directly linking marketing response stimuli or inputs to market response outputs, and (b) those that also model a mediating process. Inputs include marketing instruments (i.e., marketing mix variables) and environmental variables. Trends and research opportunities are classified as falling under four broad areas: (1) “New or under-studied inputs and/or “richer” measures of inputs constructs; (2) Explicitly accounting for the process linking inputs to outputs; (3) “New” or under-studied-dependent variables; and (4) Under-studied or emerging contexts. Within these four areas, we have presented the extant literature and we have summarized the conclusions that can be drawn from this research. In Table 1.2, column four offers a list of work that characterizes each area and sub-areas (column 3) within the four broad areas (column 1). Based on our analysis of the extant research, we also identified for each sub-area a number of potential opportunities for future investigations. These opportunities are listed in column 5 of Table 1.2.

This review demonstrates that response models can help marketers understand how customers collectively respond to marketing activities, and how competitors interact. When appropriately estimated, they can

be a basis for improved marketing decision-making. The recent trends in response models go clearly deeper into several directions for improving marketers' ability to use response models to help marketing decision-making. While traditional marketing mix models remain the foundation of market response models, the availability of new data, the development of advanced methodologies, and the apparition of new societal and marketing phenomena contribute to a rich future for advanced response modeling.



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