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Marketing modeling for e-business

Vijay Mahajan [a,*], R. Venkatesh [b,1]

[a] *Department of Marketing, McCombs School of Business, The University of Texas at Austin, CBA 7.202, Austin, TX 78712, USA*
[b] *Katz Graduate School of Business, University of Pittsburgh, 332 Mervis Hall, Pittsburgh, PA 15090, USA*

Abstract

The emergence of e-business is opening up new challenges and opportunities for marketing modelers. Drawing on an illustrative pool of recent articles we seek to convey two points in this note. First, that available theories and approaches may be insufficient in tackling many e-business problems. Second, that marketing modeling for e-business can enrich our field quite remarkably in terms of new theories, data and methods.

Keywords: Marketing models; e-business; Internet marketing

1. Introduction and positioning

Few are likely to disagree with the assertion that marketing modeling efforts over the next decade will reflect the Internet's growing influence on consumer behavior and marketing strategy. While marketing issues facing the likes of Folgers, Intel, Microsoft, Nestle, P&G, Sony and Wal-Mart dominated our journal pages, the future is likely to see more of the issues that concern "new age" companies such as Amazon.com, eBay, Netscape, Palm, Priceline, Webvan and Yahoo, whose success is intertwined with the nature and extent of consumers' adoption and use of the Internet.

Leeflang and Wittink (2000) offer an insightful critique of extant marketing modeling efforts and propose fascinating avenues for future research. They have also delineated an accessible model building process. Leeflang and Wittink maintain a slant toward models dealing with grocery products that involve UPC scanner data. Grocery products have several distinct characteristics. They are typically in the mature stage of the product life cycle. Marginal costs are not insignificant relative to consumers' willingness to pay. Network externalities are normally absent. The products are repeat-purchased. Data sources are rich, and marketing models in this context are strongly grounded in econometric and statistical methods. Branding, pricing, promotion and physical distribution are key variables in marketing grocery products. Looking ahead, we see Leeflang and Wittink's (2000) blueprint yielding valuable answers for firms such as Coca Cola, IRI, Nielsen, P&G, Peapod and Webvan.

We seek to complement Leeflang and Wittink's efforts by emphasizing modeling efforts related to Internet-driven products and activities. (By "Internet-driven" we mean that a significant component of the buying process (e.g., information search, order-

* Corresponding author. Tel.: +1-512-471-0840.
E-mail addresses: vmahajan@mail.utexas.edu (V. Mahajan), rvenkat@katz.pitt.edu (R. Venkatesh).
[1] Tel.: +1-412-648-1725.

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Table 1
Summary of illustrative articles on e-business

Study	Genre	Key question(s)/issue(s)	Approach/model	Key finding(s)/recommendations
Ansari et al. (2000)	Data; method	What is an appropriate methodology for an Internet recommendation system for movies and other such consumer products that have unobserved heterogeneity?	Bayesian model based on *EachMovie* dataset containing customers' and critics' ratings of movies.	• Model based on unobserved customer heterogeneity and unobserved product heterogeneity performs well on a data set involving 2000 customers and 340 movies.
Bakos and Brynjolfsson (1999, 2000)	Theory: analytical	What is the optimal form of offering digital information goods on the Internet? How does size affect market power of information providers?	Math. statistical approach based on law of large numbers.	• For information goods with zero marginal cost, the pure bundling strategy is optimal for a monopolist. • Among competing providers of information goods, the one with the larger bundle would be able to outbid the rivals for exclusive rights to market a new good.
Balasubramanian (1998)	Theory: analytical	How can the competition between direct and conventional retail channels be modeled? What are the implications?	Circular market model with a direct marketer and multiple retailers.	• When information can be freely disseminated on the Internet, it may be optimal for a seller to provide lower levels of information. • The impact of entry of a local retailer (or direct retailer) affects strategies and profits of local retailers (or of all retailers).
Bradlow and Schmittlein (2000)	Method	How can the performance of Internet search engines be modeled and measured? Which engines search the best and why?	A probabilistic "proximity" model based on distance between a URL and a search engine. Data from search engines.	• Altavista and Northern Light locate the most URLs for business terms. The size of the search engine in terms of the number of web pages indexed influences its search performance.
Brynjolfsson and Smith (2000)	Theory: empirical	Is the Internet an efficient, "frictionless" market?	Full factorial research design. Price data collected from websites and from retailers.	• The Internet offers less friction than conventional markets, characterized by lower prices and fine price adjustments. • Yet heterogeneity in consumer awareness and trust is still a source of sizable dispersion in online prices.
Degeratu et al. (2000)	Theory: empirical; data	Does a consumer's choice behavior differ across online and offline transactions?	Brand choice model based on panel data from Peapod and IRI.	• Factual, non-sensory information affects online choice more strongly than sensory cues. • Features that restrict consumers' consideration sets such as Peapod's Personal Lists may keep price sensitivity lower online than offline.

Haubl and Trifts (2000)	Theory: empirical	How do recommendation systems for preliminary and advanced screening influence expended effort and decision quality?	Full factorial experimental design. Shopping data from subjects.	• Recommendation systems for *both* preliminary and advanced screening help consumers make better decisions with less effort.
Hoffman and Novak (2000)	Theory: conceptual	"How to acquire customers on the web?"	Case study of CD Now's advertising policies including performance metrics.	• Use advertising strategies that link payment to ad performance and not to mere exposure. • Building numerous alliances with associate websites is economical and effective.
Lal and Sarvary (1999)	Theory: analytical	"When and how is the Internet likely to decrease the level of price competition between firms?"	Duopoly model involving vertically integrated firms. Product attributes are digital or non-digital.	Price competition expected to decrease when: • A large proportion of consumers are internet users. • Non-digital attributes are limited in importance. • Consumers are favorably disposed toward current brands.
Lynch and Ariely (2000)	Theory: empirical	Do lower online search costs increase or decrease price sensitivity? Does higher price sensitivity for commonly available merchandise affect that for unique merchandise?	Full factorial, between subjects design. Electronic experiments involving wine preferences.	• Although lower online search costs for price information increase price sensitivity, lower search costs for quality information reduce price sensitivity. • Increase in price sensitivity is for commonly available merchandise only; not for unique merchandise.
Moe and Fader (2000)	Data	How can customers' visit behavior on the Internet be modeled and interpreted? Is visit frequency systematically related to purchasing propensity?	Stochastic model of individual visit behavior. Calibrated with clickstream data from Media Metrix's household panel.	• Ability to capture both the visits and purchase incidence with clickstream data is demonstrated. • Visit frequency and purchase propensity are positively correlated.
Mittal and Sawhney (2000)	Theory: empirical	How do process-oriented knowledge and content-oriented knowledge of customers affect their usage of web-based services?	Quasi-experimental design to manipulate knowledge type. Use of a website assessed.	• Neither one of the knowledge bases by itself has a positive influence on usage of Web-based services. • The knowledge bases have a positive interactive effect.
Novak et al. (2000)	Theory: empirical	When do customers experience "flow" — a highly involved state of Web usage?	Structural model linking flow with its antecedents. Tested with online survey data.	• Factors such as skill at using the Web, perceived control, challenge of browsing, and arousal are positively related to "flow" while using the Web. • Currently, product search on the web does not have enough challenge or arousal for a "truly compelling [online] customer experience".

(continued on next page)

Table 1 (*continued*)

Study	Genre	Key question(s)/issue(s)	Approach/model	Key finding(s)/recommendations
Shankar et al. (1999)	Theory: empirical	What factors determine online price sensitivity? How does their impact on online price sensitivity differ from that on offline price sensitivity?	Hypotheses testing based on survey data from online and offline shoppers of a hospitality service.	• Ease of Web search is positively related to online price sensitivity; perceived depth of information at the Website and extent of bundling are negatively related to online price sensitivity. • Great depth of online information and availability of large assortments online may keep online price sensitivity lower than its offline counterpart.
Shapiro and Varian (1998a)	Theory: conceptual	How should costless digital information be offered to consumers who are heterogeneous in their valuations?	Conceptual discussion based on anecdotal examples from the hi-tech sector.	• The information should be offered in different versions that appeal to different types of customers. • Versioning, a type of product line stretching, is well suited for digital goods.
Venkatesh and Chatterjee (2000)	Theory: analytical	Under what product market conditions should a print magazine publisher offer online products? What are the optimal forms of and pricing strategies for online and offline versions?	Model of product bundling assuming heterogeneity in consumers' Web preference. Application based on survey data.	• Optimal form and pricing decisions depend on consumers' valuations and relative advertising attractiveness of online and offline versions. • Offering free online content is often profit eroding. Offering print versions only, unbundling online and pure bundling have distinct domains of optimality.
Werbach (2000)	Theory: conceptual	How syndication can be a powerful business model for the information economy.	Conceptual discussion and categorizing framework distinguishing content originators, syndicators and distributors.	• Syndication works well with information goods that can be costlessly duplicated. • Information goods are modular — a key requirement for syndication. • Syndication works well only if there are many independent distribution points — a special characteristic of the information economy.
Zettelmeyer (2000)	Theory: analytical	How does the extent of penetration of the Internet influence a firm's pricing and communications strategies online and offline?	Duopoly model involving firms operating via both online and conventional channels.	• When Internet's penetration is "small", less information is provided on the Internet although online prices are likely to be lower. • When Internet penetration is high, no significant differences are expected between online and offline pricing/communication strategies.

ing) of a non-trivial segment of consumers occurs on the Internet.) We draw on an illustrative pool of recent marketing articles to highlight the opportunities for exciting new research in the area. We restrict ourselves to B2C marketing. We seek to convey two important and interrelated points. One, existing marketing theories and approaches may be insufficient and/or inappropriate in tackling many emergent problems in e-business. Therein lie the *challenges* to marketing modeling for e-business. Two, as the Internet powers its way into our lives, the marketing field can gain *new insights* by way of whole new theoretical extensions, databases and methodologies if more attention is devoted to modeling e-business issues.

We categorize key challenges for and new insights from marketing modeling for e-business under four heads. One, those rooted in the setup of the model (Section 2). Two, those related to theory (Section 3). Three, those arising out of new types of data (Section 4). Four, those related to the method (Section 5). To be sure, there could be some overlap among these four categories. In that sense, our demarcation is subjective. The academic articles on e-business that we draw on are summarized in Table 1. We will draw on an article in the section(s) where it is most relevant. We begin with issues in setting up a model.

2. Model setup-related challenges and new insights

Several challenges and new insights are rooted in the distinguishing aspects of the set up of marketing models for e-business. We discuss these issues under five categories.

2.1. Product

The product could be digital or non-digital. The product may be traditional but e-tailed (e.g., wine) or it may be an offshoot of e-business (e.g., a search engine). Unlike most conventional products, digital information products have negligible marginal costs *and* high first copy cost (cf. Shapiro and Varian, 1998a,b). Products may have short life-cycles and "multiple generations" may be the appropriate planning horizon.[2] Some products such as magazine content may take hybrid form — a physical form as for print magazines and a digital form.

2.2. Competition

Competition may be more intense online than offline as search costs are lower (cf. Brynjolfsson and Smith, 2000). Hyper-competition is frequent and so, a monopoly or even a duopoly assumption may be moot. Also, competition in e-business is tiered (e.g., Balasubramanian's, 1998, mail versus mall distinction).

2.3. Channel

Whereas past channel research has focused primarily on order fulfillment (i.e., physical distribution) through the retail channel, it is now necessary to distinguish between online and offline channels and between the channels' roles for order procurement and order fulfillment. For products distributed through the Internet, the channel for order fulfillment may be short as with direct delivery. But the channel for order procurement is often long with intermediaries such as Internet service providers, search engines and infobots.

2.4. Market

As before, consumers are heterogeneous. However, in contrast to most traditional settings, consumers often gain by network effects. Network externality may even be linked to the Internet medium — the size of the pool of Internet users (cf. Zettelmeyer, 2000).

[2] "Conventional" products such as Intel microprocessors and IBM mainframes may also meet this description (see Mahajan and Muller, 1996, and Norton and Bass, 1987, for related modeling efforts). So how is this unique for e-business? The uniqueness comes by way of the interaction among this characteristic, zero marginal costs and network effects (discussed later). This combination may encourage a seller to offer the first version at a deep discount to establish the base and use later versions to recover revenues.

2.5. Seller's objective

Profit maximization has been the preferred objective with traditional models. Long-term profit maximization (adjusted for risk) is arguably (one of) the most important objective(s) for a for-profit company. While this continues to be key in most e-business situations, a few new caveats become necessary. Firms in e-business typically seem more concerned with maximizing customer share in the short term. This new objective may be appropriate when network externalities are sizable and/or in "winner take all" product markets. However, in most instances, a lopsided focus on maximizing customer share may challenge the survivability of the firm because of inadequate profits and/or cash flow. Balancing these divergent short- and long-term objectives is essential to arrive at the optimal solutions. To the extent that such objectives have not been factored into traditional marketing models, the normative guidelines from them have to be interpreted with caution. Moreover, marketing modelers in e-business who may rely on just a single objective should, at a minimum, discuss the implications of alternative objectives for their main results.

What about the customer's objective? Is surplus maximization still appropriate? If so how are costs and benefits measured in view of issues such as minimizing effort, maximizing satisfaction and so on?

To summarize, a key challenge to applying available models and/or results arises out of the changed fundamentals of the emerging problems. We see issues in setup yielding some new modeling approaches (e.g., dynamic models that balance divergent objectives) and many new theoretical insights.

3. Theory-related challenges and new insights

3.1. Product

The area of product bundling has received a fair amount of attention (e.g., Bakos and Brynjolfsson, 1999, 2000). Bundling is relevant and popular for new-age products. The conventional bundling wisdom that mixed bundling is generally the optimal strategy (cf. Schmalensee, 1984) has been challenged in the context of digital information goods whose marginal cost is (near) zero and which can be easily offered as aggregates of thousands of components or bits. Bakos and Brynjolfsson use the law of large numbers to show that consumers' valuations of composites of numerous component items are concentrated around the mean and, therefore, pure bundling is the profit maximizing strategy for a monopolist in such situations.

In the context of marketing information goods, Shapiro and Varian (1998a) propose versioning — the strategy of "offering the information goods in different versions designed to appeal to different types of customers". Versioning has elements of price discrimination (cf. Kotler, 2000, pp. 473–474) and product line stretching (Kotler, 2000, pp. 403–404) but is on a broader scale — possible only with information goods that are modular and have a negligible marginal cost of reproduction. A modeling question would be: given a set of product market conditions, what is the optimal number of versions that the seller should introduce? Or should there even be a cap on the number of versions offered? At what prices and with what content should alternative versions be offered?

In a departure from the conventional understanding and treatment of products, Venkatesh and Chatterjee (2000) focus on *hybrid* products that are gaining prominence due to the Internet. An example is a magazine. Consumers may value a print magazine differently from an online replica of that magazine. And depending on the medium, the content may take a different product form — a composite booklet in print form and customized modules in online form. They discuss how the optimal forms of hybrid products are tied to pricing, advertising and channel issues.

3.2. Price

Marketing scholars have traditionally emphasized the importance of differentiation and the futility of price competition from a seller's standpoint. Commodities drive prices to marginal costs and sellers' profits approach zero. Will e-business make pricing too simple? Theory development in e-pricing has largely focused on price competition and price sensitivity online relative to those offline. The widespread

belief that search costs are lower online has sparked much interest among researchers in finding ways of lowering online price consciousness and creating differentiation. In this sense, e-pricing models are both descriptive and normative.

Lal and Sarvary's (1999) normative model of price competition — in a duopoly — distinguishes between digital attributes (those easily communicated online) and nondigital attributes (those that require physical inspection) and makes an interesting point that the Internet pricing may actually approach monopoly pricing when, among other things, the proportion of Internet shoppers is sufficiently high and nondigital attributes are not overwhelming.

Interesting empirical contributions to theory have begun to appear. Brynjolfsson and Smith (2000) show that commerce on the Internet has relatively less friction than conventional retailing. Degeratu et al.'s (2000) study based on data from Peapod, the online grocery service, and IRI finds that although search costs for price information are lower on the Internet, price sensitivity can be lower for online shoppers due to factors such as self-restricted consideration sets online (as for Peapod's customers using customized Personal Lists) and the weak point-of-purchase activities online. Making a case for differentiation by carrying unique merchandise, Lynch and Ariely (2000) find that while price sensitivity for overlapping merchandise may increase online that for unique merchandise is unaffected. Shankar et al.'s (1999) survey-based study from the hospitality industry underscores that offering large assortments of products can dampen price sensitivity.

The empirical studies on pricing open up a relevant pool of parameters for setting up normative pricing models that offer optimal pricing guidelines for e-tailers. For example, building on Shankar et al. (1999), can we show that a broad-based e-tailer such as Amazon.com should charge higher prices than narrowly focused eToys and BN.com? If so, how much? Building on Lynch and Ariely, how should optimal prices be varied based on the number of e-tailers, the length of their product lines and the extent of overlap in their offerings?

3.3. Place (distribution)

While all of e-business is in a buzz, the channels aspect of it is arguably at the forefront thanks in part to powerhouses such as Amazon.com and Dell. Not surprisingly, marketing e-modeling has mirrored this trend. To be sure, several of the articles in this category also examine pricing implications for channel members.

Unlike traditional channel models that have examined competition among bricks-and-mortar outlets only, new-age models should reckon retail and e-tail competition. Balasubramanian (1998) models the tussle between the retail and direct marketing channels. Using a stylized, spatial model and assuming that the consumers are not averse to the direct channel per se, he shows that when information can be freely disseminated (on the Internet), it may be optimal for a seller to provide lower levels of information to control the intensity of competition in the multichannel marketplace. Unlike the above study, Zettelmeyer (2000) examines a scenario in which a firm can sell through *both* the retail and e-tail channels. Using a duopoly model, Zettelmeyer shows that pricing and communication strategies are tied to the Internet's penetration in the marketplace. As the penetration increases, online and offline strategies will converge.

The Zettelmeyer model is interesting for the following reason. The Internet is an evolutionary medium. Therefore, unlike in conventional models, capturing the dynamics of market evolution is especially important for e-modeling, a point made earlier. With this study, one can figure out the optimal strategies at different stages of evolution of the new economy.

Werbach (2000) articulates the central role that syndication can play in e-business. Werbach's interpretation of syndication suggests that the Internet is likely to foster a loose and vast network of partners as distinct from the formal and narrow relationships in traditional business. How can models such as those of Balasubramanian (1998) and Zettelmeyer (2000) be adapted for syndication? What implications can be drawn for channel competition?

Collectively, the articles in the channels area echo the need for a "portfolio of channels" approach, a concept first propounded by Wind (1982).

3.4. Advertising and sales promotion

Accepted rules on advertising are being challenged in the new economy. In their conceptual

paper on web advertising, Hoffman and Novak (2000) argue that the traditional approach of linking advertising fees to exposure (e.g., CPM, "exposure based cost-per-thousand pricing") should not be applied to web advertisements. Unlike with a traditional ad, one can "precisely" track the effectiveness of a web-ad up to the point of purchase. Hoffman and Novak, therefore, suggest that advertisers form a wide web of affiliates and compensate them based on "performance" (e.g., actual sales). Much work has been done on traditional advertising policies spanning frequency, reach and strength (e.g., Mahajan and Muller, 1986). How should extant theory be adapted given the new performance metrics on the Internet?

There has been relatively little theory-building thus far on e-promotions. We speculate two reasons. First, as suggested by Degeratu et al. (2000), online promotions are perhaps less appealing than in-store promotions as it is almost impossible to replicate the punch of in-store, visual, point-of-purchase promotional activity in online settings. Second, most of the online promotional activity is price based and is perhaps subsumed in pricing models. Nevertheless, this area needs closer attention in future studies.

3.5. Consumer behavior

From a large store to a small computer, from physical lists and shopping carts to e-Personal Lists and cart-like icons, from store-to-store searches to infobots, consumer shopping habits are changing remarkably with the advent of e-business. Therefore, it is probably not much of stretch to say that theories of consumer psychology and, especially, consumer behavior must be revisited to help in the development of better marketing e-models.

Novak et al. (2000) have refined the notion of "flow" — a highly involved, "truly compelling [online] customer experience". They link flow to antecedents such as skill in web use and consequences such as the extent of exploratory behavior. Can aspects of flow help us better understand issues such as price sensitivity discussed earlier? It seems to us that Novak et al. have opened a new window to explore complex relationships in web usage.

It is well documented that opinions and recommendations of "others" such as friends or experts influence consumer attitudes and behavior (cf. Feick and Price, 1987; West and Broniarczyk, 1998). The Internet is heralding the arrival of computer packages as "Recommendation Agents" (cf. West et al., 2000). These agents are different in the sense they are unknown, non-human, have a huge knowledge base and offer dynamic and individualized recommendations. Haubl and Trifts (2000) hypothesize and empirically verify that such recommendation systems are effective (i.e., help make better decisions with less effort) at both the preliminary and advanced screening stages. The growing relevance of such systems opens modeling opportunities in terms of suggesting appropriate search and recommendation methods (for an example, see Ansari et al., 2000).

In their study on consumers' process- and content-related knowledge of web sites, Mittal and Sawhney (2000) find that it is the interactive effect of these knowledge bases that enhances web usage.

In summary, new theoretical insights have already started coming in at a sharp pace. The channels area is probably leading the other areas in theory building. This may be partly due to the greater reliance on empirical models in the other sub areas of marketing for which new databases are just trickling in. We will discuss them in the next section.

4. Data-related challenges and new insights

Bucklin and Gupta (1999) have surveyed the phenomenal impact that UPC scanner data-based models have had on academics and practitioners alike. If the few databases that have appeared on customers' shopping behavior on the Internet are any indication, the marketing field may witness even greater advances in empirical modeling with new-age databases.

Degeratu et al.'s (2000) panel data set from Peapod is appealing because it not only provides choice data but also the choice process, namely, whether customers used Peapod's Personal Lists or "browsed" the aisles. Researchers can assess price effects better as a consequence.

The recommendation system proposed by Ansari et al. (2000) is based on a dataset from *EachMovie* on ratings from over 2000 customers on 340 movies. Whereas the importance of modeling unobserved customer heterogeneity has been underscored in ex-

tant choice models, Ansari et al. are able to account for both unobserved customer heterogeneity and unobserved product heterogeneity in their model.

An appealing element of Moe and Fader's (2000) study is the clickstream data that they use from Media Metrix. The data can provide the date, time and duration of every page browsed by each user. The volume of data from such sources is truly overwhelming and may pose additional challenges to researchers.

In using new data sources, a certain similarity exists between traditional direct marketing (e.g., catalog sales) and e-tailing. Insightful models such as those of Gonul and Shi (1998) and Hess and Mayhew (1997) are available in the context of direct marketing. What roles can these models play in the e-tailing context? What adaptations would enhance their relevance? On a related note, it must be recognized that firms in e-business really have to manage data from their channel portfolio. For example, a firm that operates through bricks-and-mortar, clicks and catalog channels would have data on prices, consumer preferences and sales from all of these channels. Marketing models for these firms should use such rich, assorted data in proposing optimal, integrated marketing strategies.

To sum up, the nature of the Internet medium lends itself to collecting rich data in creative ways and in realistic settings. Whereas syndicated data thus far has predominantly been choice (or outcome) based, new data sources are opening windows for validating new theories on the underlying processes as well. Given the generous and overwhelming supply of data in e-business settings, we speculate that most new modeling *techniques* are likely to be data driven.

5. Method-related challenges and new insights

To say that traditional marketing models have focused on offering insights for marketers sounds almost trivial. Yet it is true that for too long we have assumed axiomatic behavior on the part of consumers and offered guidance only to the sellers. A significant feature of the Internet is the impetus that it has given for "buyer-driven commerce" (Elkind, 1999). Sites like Priceline.com and eBay have redefined the meaning of pricing. We are moving from mass marketing to mass customization (cf. Wind and Mahajan, 2000). We now need models that help both sellers and buyers make better decisions.

The studies of Ansari et al. (2000) and Bradlow and Schmittlein (2000) symbolize this evolution. Ansari et al. develop a hierarchical Bayesian recommendation system that can suggest movies for consumers. The system can make use of various types of information on products and consumers to make suitable recommendation. As a Bayesian model, the system incorporates "learning". Bradlow and Schmittein's proximity model helps users assess the relative performance of Internet search engines. The authors calibrate a probabilistic, spatial distance model based on the performance of six search engines looking for 20 marketing phrases.

In sum, the transformed focus from the aggregate to the micro appears to be a strong stimulant for new methodologies. As we move from mass marketing to mass customization, notions such as "best overall fit" are obsolete and estimating individual level utility functions are perhaps more relevant. And, more important than clinching a sale is the notion of customer satisfaction and the need to estimate and extract the customer's lifetime value.

6. Conclusion

Leeflang and Wittink (2000) have presented a detailed and compelling roadmap for future modeling work in marketing. Through our short note we have sought to place an added emphasis on marketing modeling for e-business in B2C settings. As illustrated in this note, the rationales for an e-business focus go beyond the growing importance of this sector in our global economy. Let us recap two such rationales.

For one, available results from extant models simply may not hold in a large number of e-business situations. For instance, most extant models are based on the objective of profit maximization. Long-term profit maximization is appropriate for e-business firms as well. Yet, conflicting objectives such as increasing customer share and realizing profits and/or cash flow may be important in the short term. Thus, e-business models may have to balance

the divergent short- and long-term objectives. Therefore, extant guidelines may not apply. At a minimum, models have to be recast to meet the new objective(s).

For another, if preliminary work on e-business is any indication, there is a tremendous opportunity to enrich our field in terms of new theory, data and methods. For example, Bakos and Brynjolfsson (1999) have demonstrated that optimal bundling strategies for digital information goods are different from those for most traditional products. The works of Moe and Fader (2000) and Degeratu et al. (2000) direct us to databases that are likely to interest and challenge modelers more than scanner data that launched a revolution. The new databases contain not only consumers' choice information but also the search processes that they adopted prior to choice (cf. Degeratu et al.'s Peapod data).

The few articles that have appeared thus far on e-business have already brought in fresh insights. Yet these represent the proverbial tip of the iceberg. For the future, e-modelers should position their work carefully against traditional models. For example, what is new about their problem in terms of theory, substance and methodology? What theories continue to hold in their study's setting? What theories do not hold and why? Several sources of differences between traditional and e-business problems have been highlighted in this note. This is intended in part to urge caution in applying an available approach to address a new problem in e-business.

Recent papers on e-business seem notable more for their theoretical and substantive contributions than for their methodological novelty. At least so far, this trend is unlike what we have seen in the seventies (with conjoint analysis) and the eighties (with scanner data-based choice modeling approaches). Given new types of rich data (cf. Degeratu et al., 2000; Moe and Fader, 2000), there are many untapped opportunities for developing new approaches.

In essence, the dawn of e-business promises great opportunity for marketing modelers. Let us look forward to this future.

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