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NEW PRODUCT FORECASTING MODELS
Directions for Research and Implementation

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Abstract: Given the importance of forecasting the performance of new products and services in the marketplace, numerous new product forecasting models have been developed over the years, both in industry and academia. This paper evaluates strengths and weaknesses of these models and outlines a research agenda to enhance their implementation and further development.

1. Introduction

Forecasting the performance of new products and services is one of the most difficult and critical management tasks. The actual market performance of a new product depends on a large number of factors. Such factors include not only consumer attraction to and satisfaction with the product but also environmental conditions (e.g., economy), the degree of trade support for the product and the nature of competitive actions and reactions. Assessing these uncertainties makes the forecasting of new product performance much more complex than the forecasting of the sales, share and profitability of established products. Yet, accurate forecasting of new product performance is a *must* and constitutes a major input to most business and marketing decisions.

Given the importance of accurate forecasting of new product performance and the intellectual challenge of developing 'better' models, numerous new product forecasting models have been developed over the years both in industry and in academia. These models, as summarized in table 1, are designed, in addition to estimating long term and short term sales (and market share), (a) to diagnose the impact of marketing mix variables, competitor's and trade reactions and environmental conditions on the new product's sales estimates and (b) to evaluate the impact of the new product introduction on the firm's profitability and the sales of its current products (cannibalization effect).

New product forecasting models vary not only with respect to their objectives and users but also with respect to their data bases. In general, these models use one or more of the following data sources:

(1) Management and expert judgments: management's or experts' subjective estimates are used to forecast new product's likely performance;
(2) Analogous products: a product with similar characteristics to those of the new product under consideration is used to forecast its likely performance;

Table 1
Expected output of new product forecasting models by user type.

User type	Desired output								
	Sales (market share) estimates			Diagnostic impact on sales (market share) of				Impact on the firm's	
	Long term	Annual	Monthly	Marketing mix variables	Trade reactions and actions	Competitors' reactions and actions	Environmental conditions (e.g., economy)	Financial health	Other products (cannibalization)
Internal stakeholders									
Top management	×			×	×	×	×	×	×
New product manager	×	×		×	×	×	×		
Procurement/production manager		×	×						
Other brand managers or SBUS				×	×	×	×	×	×
External stakeholders									
Security analysts	×	×						×	×
Firm's competitors (competitive intelligence)	×	×		×	×	×	×	×	×
Stockholders	×							×	
Media	×	×						×	×

(3) Consumers: based on consumer responses, likely performance of a new product is derived by estimating its awareness, trial and repeat.

The three types of forecasting models, especially the consumer-based models, vary with respect to the stage in the new product development process for which they are most appropriate. Management's subjective estimates and analogy type models are usually used at the idea/concept screening stage, prior to the undertaking of a consumer-based concept evaluation study. If this initial evaluation suggests a 'Go' and a concept test is conducted, the next stage often is a forecasting model based on data generated in a concept testing study. Again, assuming a 'Go' decision, a product is developed and a simulated test market (or simplified in-home use test) can be designed, the results of which serve as the basis for a pretest market forecasting model. If a *Go* decision is reached again and a test market is undertaken, the data from the test market could serve as the basis for a test-market-based forecasting model. Finally, if the product is introduced (regionally or nationally), the early sales results can be used as the basis for an early-sales-based forecasting model.

The various models, despite their close association with the various stages of the new product development process, are not *pure* models. Past experience of marketing managers and their subjective estimates can be incorporated with other, say, concept testing based models. Furthermore, a forecasting model structured for test market type data (i.e., requiring, for example, information on awareness, trial, repeat, and amount used by regular users) can be used at a simulated test market stage combining actual results of the simulated test market (on trial, repeat, and amount of usage, for example) with estimates from previous introductions (e.g., analogy) on the awareness level and its dependency on the advertising, promotion, and distribution activities of the firm.

Given the large number of available new product forecasting models, efforts have been made in recent years to compare and evaluate these models. However, these efforts have not been integrated and their scope has been limited to a specific class of models. The objectives of this paper, therefore, are to (a) briefly assess strengths and weaknesses of the currently available new product forecasting models and (b) to outline an agenda enhancing the further development and implementation of these models. Our focus is limited to consumer-based new product forecasting models.

The organization of this paper follows the two objectives. The following section briefly provides an overview of the current status of new product forecasting models including summary tables of the major strengths and weaknesses of the various classes of models. The second section outlines an agenda suggesting directions for future research and implementation.

2. Current status of new product forecasting models

Forecasting the potential results (sales, profit, and share) of a new product should be undertaken at each stage in the new product development process. In the early development stages, the forecast is tentative and broad. As management narrows its product and marketing options, the forecasting task can and should be done more precisely, narrowing the range of likely results. Consumer-based models are designed to assist management in evaluating concept-product options and forecast their likely performance. A general discussion of such models has been included in a number of recent books [e.g., Urban and Hauser (1980), Wind (1981), Wind, Mahajan and Cardozo (1981)]. A comparative evaluation of these models has also been provided by several recent review papers. Table 2 summarizes eight such review papers indicating the models compared and criteria used for comparison in the respective papers and briefly commenting on their conclusions. An examination of these review papers, and the actual models reviewed in them, suggests a number of conclusions concerning the current status of new product forecasting models:

Table 2
Summary of review articles.

Type of models reviewed	Review article	Criteria used	Specific models included	Remarks
Multiattribute approaches to product/concept	Shocker and Srinivasan (1979)	Methods used to operationalize the following 5 stages in the concept evaluation and generation framework are evaluated: (1) Determination of relevant product markets, (2) Identification of determinant attributes, (3) Creation of perceptual space, (4) Modeling individual or segment decision making, (5) Evaluation of/search for new product concepts.	Johnson (1971) Lehmann (1971) Shocker and Srinivasan (1974) Rao and Souter (1975) Husted, et al., (1975) Urban (1975) Hauser and Urban (1977)	The article identifies the approaches suggested by Kuehn and Day (1962), Wind (1973), and Myers (1976) as methods which do not explicitly model individual customer decision making, but rather rely on the decision themselves and on aggregate responses. The comparison is restricted to the various analytical approaches employed by the different concept evaluation/generation models. No best model is identified, and no indication of forecasting efficiency is provided. A simulation comparison of some of these approaches is provided by Sudharsham et al. (1987). The industry utilization of these approaches has been questioned by Tauber (1981) and Dodson and Brodsky (1987), who state that the traditional concept testing approaches are still in vogue in industry.
Pretest market models	Robinson (1981)	37 variables related to the following 12 aggregate characteristics are used: (1) Scope of test product configuration, (2) Scope of test marketing plan, (3) Scope of test environmental conditions, (4) Measurement of buyer purchase behavior, (5) Conditions of exposure environment, (6) Competitive context, (7) Conditions of measurement, (8) Sampling procedure, (9) Projectability of results, (10) Assumptions used, (11) Model specification, (12) Operational characteristics	PURCHASE ACTION (ASI Marketing Research Inc.) ASSESSOR (Silk and Urban 1978) COMP (Burger, Gundee and Lavidge 1981) LTM (Yankelovich, Skelly and White 1981) SPEEDMARK (Robinson Associates) MICROMARKET (Tele-Research)	The article does not include several new simulated test market services currently offered in the marketplace such as LITMUS (Blackburn and Clancy 1983) and BASES (Burke Marketing Services 1984). The comparison, although very comprehensive, is highly subjective. Clustering analysis results suggest that conventional test-markets and limited rollouts are more closely related to each other than to any of the simulated test market procedures. SPEEDMARK is identified as the procedure which approaches this pairing proximity.

				No indication of the forecasting efficiency of these approaches is provided. Levine (1981) has argued that these approaches need to be validated before they will be accepted by industry.
Pretest market models	Shocker and Hall (1986)	14 characteristics are used for comparison: (1) Type of model, (2) Data sources, (3) Product categories, (4) Forecast by time period, (5) Marketing plan inputs, (6) Cannibalization effects, (7) Competitive reactions, (8) Respondent screening, (9) Output, (10) Diagnostics, (11) Sensitivity/optimization, (12) Average sample size, (13) Time to complete, (14) Approximate cost	BASES II (Burke Marketing Services 1984) ASSESSOR-FT (Information Resources 1985) LITMUS-II (Blackburn and Clancy 1983) NEWS/PLANNER (Pringle, Wilson and Brody 1982)	The article provides an overview of pretest marketing models including their historical development, and strengths and weakneses. A descriptive comparison of four pretest market models on selected dimensions is also included. No best model is identified.
Pretest and test market models	Larreche and Montgomery (1977)	(1) Structure, a) Adaptability, b) Completeness, c) Ease of testing, d) Ease of understanding, e) Robustness (2) Expected value, (3) Initial cost, (4) Usage characteristics, (5) Usage context, (6) Validation history	DEMON (Learner 1965) Hendry (Butler and Butler 1971) STEAM (Massy 1969) NEWS (Pringle, Wilson and Brody 1982) NW Ayer (Claycamp and Liddy 1969) SPRINTER (Urban 1970)	The models are evaluated as part of a larger Delphi study on the evaluation of marketing models. NEWS and NW Ayer's model scored highest (4) on a 5-point scale of likelihood of acceptance.
Pretest and test market models (repeat purchase diffusion models)	Mahajan and Muller (1982)	(1) Model formulation (deterministic vs. stochastic), (2) Use of integrated adoption/diffusion framework, (3) Model distinguishes between: a) Unaware potential, b) Types of information, c) Depth of repeat, (4) Model includes: a) a-word-of-mouth, b) impulse purchase, c) decay, d) recycle	Fourth and Woodlock (1960) Parfitt and Collins (1968) NW Ayer (Claycamp and Liddy) (1969) Nakanishi (1973) STEAM (Massy 1969) NEWPROD (Assmus 1975) SPRINTER (Urban 1970) Midgley (1976) TRACKER (Blattberg & Golanty 1978) Dodson and Muller (1978) Lilien, Rao & Kalish (1981)	The comparison is limited to the adoption/diffusion structure of the models. The article ignores all other important considerations related to the implementation of the models. Although the article does not identify the best model, the comparison suggests that SPRINTER scores highest on most of the selected dimensions.

Table 2 (continued)

Type of models reviewed	Review article	Criteria used	Specific models included	Remarks
Pretest and test market models (awareness models only)	Mahajan, Muller and Sharma (1984)	(1) Features of models (marketing mix variables considered, word-of-mouth, forgetting, initial awareness, maximum level of awareness), (2) Forecasting accuracy	TRACKER (Blattberg and Golanty 1978) NEWS (Pringle, Wilson and Brody 1982) LITMUS (Blackburn and Clancy 1983) Dodson and Muller (1978) AYER (Claycamp and Liddy 1969)	Using actual data, this article provides an empirical comparison of awareness models included in five new product introduction models. Analytical similarities among the models are derived. All the models are shown to perform equally well with TRACKER marginally leading the compared models.
Test market models	Narasimhan and Sen (1983)	(1) Model objective, (2) Stages modeled, (3) Consideration of marketing, (4) Level of model complexity, (5) Type of sales data required, (6) Diagnostics, (7) Number of applications reported at time of publication, (8) Degree of commercial acceptance	Fourt and Woodlock (1960) Parfitt and Collins (1968) STEAM (Massy 1969) SPRINTER (Urban 1970) Eskin (1973) Nakanishi (1973) NEWS (Pringle, Wilson and Brody 1982) NEWPROD (Assmus 1975) TRACKER (Blattberg and Golanty 1978)	The comparison, although very comprehensive, is subjective. It identifies TRACKER and NEWS as the best test market models on the selected dimensions.
Early sales models (first purchase diffusion models)	Mahajan and Muller (1979)	Inclusion of marketing mix variables in: (a) Coefficient of internal influence, (2) Coefficient of external influence, (3) Total number of potential customers	Bass (1969); Chow (1967) Fourt and Woodlock (1960) Mansfield (1961) Hendry (1972); Lackman (1978) Lekvall and Wahlbin (1973) Robinson and Lakhani (1975) Horsky and Simon (1983) Bass (1978) Peterson and Mahajan (1978) Mahajan and Peterson (1978) Mahajan, et al. (1979) Dodson and Muller (1980)	The article does not include the models developed in industry although the model developed by Lawrence and Lawton (1981) can be shown as a special case of the Bass (1969) model. No indication of the predictive efficiency of the models is provided. Heeler and Hustad (1980) suggest that the long term predictive ability of these models is questionable in international settings. A state-of-the-art assessment is available in Mahajan and Wind (1986).

(1) There are a very large number of new product forecasting models. The eight review papers include no less than 40 models.
(2) There is no agreement on the criteria that should be used for evaluating these models.
(3) There is no agreement as to the 'best' model(s) within each class of models.
(4) Most of the review papers evaluate the models on their structural characteristics. Little attention has been given to a careful examination of:
   - the external validity of the models and, in particular, their predictive accuracy under various conditions; and
   - their implementation costs and problems (e.g., required skills, data, time and cost for model development and maintenance, sensitivity of results to the various assumptions, etc.).
(5) There are no published empirical comparisons of the performance of the various models except for a very limited comparison of awareness forecasting models provided in the review paper by Mahajan, Muller and Sharma (1984).
(6) Within each class of models, there is significant variability in terms of marketing mix variables included and the other model features.

Although the development of new product forecasting models have occupied much of the attention of academic marketing researchers, research suppliers and corporate forecasters, management acceptance of these models could be improved [Business Week ((1987), Tauber (1981), Levine (1981)].

To better understand the various new product forecasting models currently available to the various users identified in table 1, table 3 presents a summary of strengths and weaknesses of the four classes of the models on several key characteristics. Adding to the conclusions from table 2 mentioned earlier, an examination of table 3 suggests the following additional observations:

(1) Most of these models are applied under very restrictive conditions and generally lack external validity;
(2) Pre-test market and test-market models are mostly appropriate only for frequently purchased products in established categories. On the other hand, early sales models are generally appropriate for consumer durables.
(3) Concept-test, pre-test market and test-market models do not project the life cycle of the product;
(4) Other than test-market models (and some sophisticated applications of other models) the other models, in their basic form, provide limited diagnostic information with respect to marketing mix variables and competitive actions and reactions.
(5) Most of the models provide limited assessment of the impact of new product on the company's financial health or other product offerings.

Although the above weaknesses of the new product forecasting models suggest avenues for future research for each model type and have been discussed in the review papers summarized in table 2, the next section outlines a general agenda for directions for research and implementation.

It is important to note, however, that weaknesses identified in table 3 refer to 'typical' types of models in each of the four types of models. Within each class of models, however, there are specific models that overcome some of these weaknesses.

3. Directions for research and implementation

Table 4 highlights twelve areas of future research and implementation, six areas to improve the implementation and utility of the currently available model and six research directions to broaden their scope. These twelve areas are briefly discussed below.

Table 3
Key characteristic of new product forecasting models.

Characteristics	Type of models			
	Concept testing	Pre-test market	Test market	Early sales models (diffusion models)
I. Setting				
1. Product most appropriate for	All	Frequently purchased consumer products	Frequently purchased consumer products	Consumer durables
2. Conditions most appropriate for	These models are generally appropriate for established product categories and are *not* appropriate when (a) assessment of competitive retailiation and trade support are essential to develop accurate sales or share estimates, (b) product diffusion is highly dependent upon word-of-mouth effect (c) measurement of depth of repeat is essential to obtain "loyal" market shares, (d) retail promotion, in-store displays and media can significantly influence product sales, (e) period by period sales estimates are required for financial planning, and (f) new product is an innovative breakthrough.	These models are *not* appropriate when (a) product class is new; (b) market for the product category is growing; (c) assessment of competitive retailiation is essential to develop accurate sales or share estimates; (d) it is difficult to measure repeat purchase intentions (e.g., products with longer repeat cycles or products that are used at special or seasonal occasions); (e) it is necessary to ascertain trade support; (f) measurement of the word-of-mouth effect is essential to measure product success; (g) retail promotion, in-store displays and media other than TV or print significantly influence product sales; and (h) measurement of depth of repeat is essential to obtain "loyal" market share.	These models are *not* appropriate when (a) desired results can be obtained from pretest market models, (b) there is a high likelihood of competitors' "rigging" the test-market and hence the results, (c) surprise in results is critical and (d) cost (and time) is prohibitive.	These models are *not* appropriate when (a) new product is a seasonal or a cyclical product, (b) unit of analysis is not an adopter or unit/dollar sales cannot be converted into number of adopters, (unless specifically handled by the model), (c) data are contaminated with repeat or replacement sales, and (d) situation analyzed is not a monopoly (unless specifically handled by the model).

II. Output				
3. Sales (market share) estimates				
–Time period (long or short term)	Short to intermediate term	Mostly annual (first year)	Mostly annual (first year)	Long term
–Reported validated forecasting accuracy	Limited	Limited	Limited	Limited
4. Diagnostic insights and sensitivity analysis with respect to:				
–Changes in marketing mix	Moderate	Moderate	Yes	Limited
–Competitive actions and reactions	Limited	Limited	Moderate	Limited
–Environment conditions	Limited	Limited	Some	Limited
–Market Segment Responses	Yes	Yes	Yes	Limited
5. Impact on the firm's				
–Financial health	Limited	Some	Some	No
–Other products	Limited	Some	Some	No
III. Implementation				
6. Required expertise	Moderate	High	High	Moderate
7. Cost of development and maintenance	Moderate	Moderate	Very high	Moderate
8. Ease of understanding	High	High	High	High

Table 4
Directions for research and implementation.

I. Improving the utility of existing models

1. A comprehensive analytical and empirical comparison of the models (like the M-competition for the time-series models)
2. External validation of the models
3. Combination of forecasts
4. Identification of conditions for skipping forecasts at the various stages of the new product development process
5. Integration with financial criteria of product success
6. Combination of models

II. Broadening the scope

7. New product models for truely innovative breakthrough products
8. Models based on the newly available data bases
9. Development of models incorporating offensive and defensive strategies
10. Development of forecasting expert systems
11. Incorporation of the concept of marketing hype
12. Models for global markets

3.1. Improving the utility of currently available new product forecasting models

3.1.1. Model comparison: the M-competition for new product forecasting models

Given the large number of available new product forecasting models, an analytical and empirical comparison of these models is essential to understand the basic differences and similarities among them. Although limited in its scope (providing a comparison of only awareness forecasting models embedded in their respective new product introduction models), the empirical study by Mahajan, Muller and Sharma (1984) was made possible by an active cooperation from the various research suppliers who provided both the data and unpublished analytical details of their models. We echo here the call by Lewis G. Pringle of BBDO, Inc. [Pringle, Wilson and Brody (1984)] that more studies using richer data bases and including other purchase variables such as trial, repeat and sales are needed to further understand the forecasting efficacy of the various models. In that regard, our proposal is in the spirit of the M-competition where 1001 times series were used by the developers of the various time-series models for forecasting comparison [Makridakis et al. (1982)]. In case of new product forecasting models, however, such as comparison is not feasible without cooperation from the various research suppliers and their clients.

To further examine the forecasting efficiency of the various models it will also be fruitful to conduct a meta-analysis [Farley and Lehmann (1986)] within and across the various classes of forecasting models. Such an analysis will assist in isolating variables that seem to cause or relate to consistent differences in the forecasting efficiency of the various models including variables that reflect the differences in the nature of products, marketing mix strategies, market conditions and specific model characteristics.

3.1.2. External validation of the models

In spite of a general trend towards the greater sophistication of new product forecasting models, the percentage of successful new product introductions has not improved in the last two decades. A recent survey by Booz, Allen and Hamilton (1982) indicates that the percentage of new product introductions that met company-specific financial and strategic criteria for success has not improved significantly in the last two decades.

Although several reasons can be put forth to explain this finding by Booz, Allen and Hamilton [Wind and Mahajan (1988)], we believe that external validation of new product forecasting models is a must to further enhance their contribution in picking winners and losers. With the cooperation of various research suppliers and their clients, an empirical study should be undertaken to track the fate of products that were given a go/no go signal. Such a study whould especially track the fate of products that in spite of a no-go decision by the forecasting models were still introduced in the marketplace.

3.1.3. Combination of forecasts

The recent literature in forecasting is replete with studies indicating that forecasting accuracy improves when combining results from the various models as compared to forecasting with the individual models. In summarizing results across eight such studies on combining forecasts, Armstrong (1986) found forecast error reductions which varied from zero to 23 percent. In fact, Makridakis and Winkler (1983) has reported a 7.2 percent error reduction with as few as two models in combination, with a maximum 16.3 percent error reduction for five models in combination.

The above trend in the forecasting literature suggests that we need to explore the utilization of combining results for new product forecasting. Such combinations may include results based on judgmental models [e.g., Analytic Hierarchy Process (AHP), see Wind and Saaty (1980)] analogs [see, for example, Thomas (1985)] and the models based on consumer responses (i.e., table 2). Forecasts based on combinations will exploit special features of each model and enhance management understanding and confidence in the forecasts.

3.1.4. Combination of models

In addition to the market share that a firm may capture, it is also interested in projecting the rate of penetration of a new product or the time span that will be required to attain a certain level of market share in the marketplace. For example, in evaluating two new products with identical market share estimates, the time period required to attain the market share for each product could impact the no go/go decision.

In order to obtain such information for a new product it is, however, necessary to integrate concept-test, pre-test and test-market results with diffusion models. For example, concept-test studies using conjoint analysis provide results related to the sales or market share that a new product can be expected to capture in the marketplace under conditions of 100% awareness, knowledge and distribution. On the other hand, it has been reported [e.g., Heeler and Hustad (1980)] that forecasts provided by diffusion models are sensitive to the ultimate market share (ceiling) estimates used in these models. Integration of the two types of models, therefore, will enhance the utilization of both types of models providing management forecasting results that are more meaningful and useful.

3.1.5. Skipping stages in the new product development process

Given the competitive environment and shorter life cycles, there is generally a bias towards action. More specifically, our experience with several consumer packaged companies indicates that there is a bias towards new product introduction as quickly as possible by-passing several steps of the formal new product development process outlined in fig. 1.

As outlined in fig. 1, a firm could make a go decision to launch a product skipping the pre-test and test market steps or it could make a go decision to launch after pre-test market results. Leaving aside the time and financial constraints, the key question is how much accuracy in forecasting results does one lose by skipping the various stages in the formal development process? When is it appropriate to skip the various stages before product launch? How much incremental improvement does one obtain from stage to stage in the formal process? Answers to these questions again demand

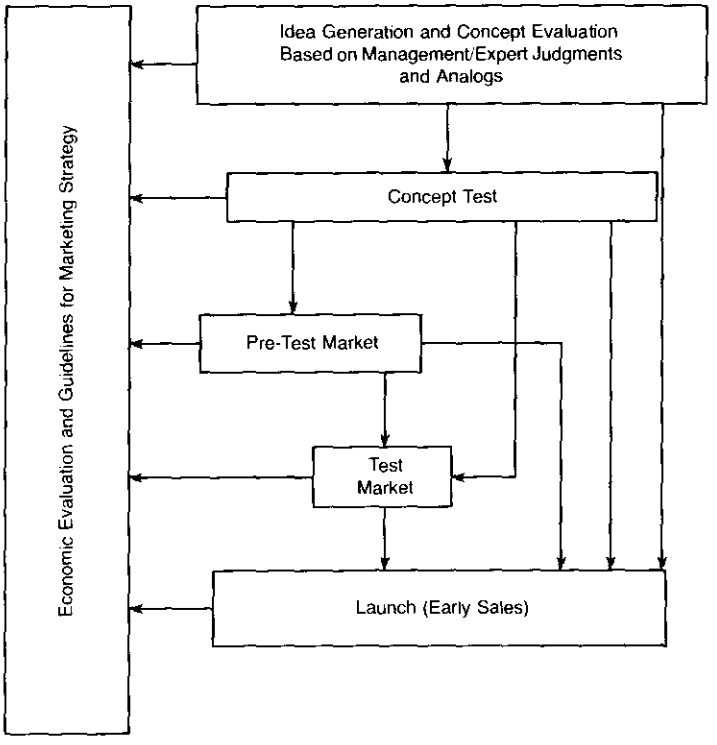

Fig. 1. New product evaluation process.

a comprehensive empirical study with the cooperation of research suppliers and their clients. A first study investigating this issue has been reported by Urban and Katz (1983). Their data indicate that products successful in pre-test market have about an 80% chance of succeeding in test market.

3.1.6. Integration with financial criteria of product success

As outlined in table 1, top management and external stakeholders are predominately concerned with the impact of the new product introduction on the firm's financial health. Such an analysis, however, is not feasible unless the sales forecasts can be integrated with the financial commitments and financial gains over time. Such an integration will assist management to evaluate the strategic role of the new product in its product portfolio and develop a mission for the product to protect or gain the desired position in the marketplace.

3.2. Broadening the scope of new product forecasting models

3.2.1. New product models for truely innovative breakthrough products

An examination of table 2 indicates that the currently available new product forecasting models are predominately developed for established products in stable markers. Could these models forecast the success of major breakthroughs identified, for example, in the study by Arthur D. Little? (These products include VHS-format video cassette recorder, 3M corporation's Post-it note pads, microwave oven, federal express, Tagamet ethical drug, athletic footwear by Nike, exercise machines by Nautilus, Inc.; see Nayak and Ketteringham (1986) for details).

How can consumer based models be extended or reformulated to forecast success of truely innovative breakthrough products? This is particularly important since the study by Booz, Allen and

Hamilton (1982) has indicated that 30% of truely innovative products (either to the company or to the world) accounted for 60 percent of the 'most successful' new products in the sample examined. Initial efforts in this area by the authors used videocassettes 'educating' the respondents as to the nature and likely impact of the innovations. Following this educational stage a conjoint analysis based concept test was conducted resulting in meaningful responses and valid forecasts.

3.2.2. Models based on newly available data bases

With the exception of early sales models, most of the consumer based models included in table 2 are based on some kind of consumer survey data. Recent technological innovations are, however, changing the way we collect data from and on consumers. Examples include people meters (electronic audience measuring devices to profile TV viewing habits) and scanners. The wealth of data provided by these innovations when applied to test market or early sales stage studies offer an emerging opportunity to develop timely and accurate new product forecasting models.

3.2.3. Models incorporating offensive and defensive strategies

Defensive marketing strategies are the strategies developed by a firm to retain its customers (by minimizing brand switching from its brand to competing brands). Offensive marketing strategies are strategies designed by a firm to increase its customer base (by maximizing brand switching from competing brands to its brand). Since the market performance of a new product can be influenced by offensive and defensive strategies designed by a firm and its competitors [Hauser and Shugan (1983)], their incorporation is essential in developing forecasts for a new product.

Consider, for example, the impact of new product related announcements on consumer purchase intentions. Product related announcements, whether released prior to the introduction of a new product or during its life span and whether created by design or accident, can influence consumers' perceptions, attitudes, intentions and purchase behavior. For example, a manufacturer may announce a new product well before it is ready for the marketplace hoping to get consumers to wait for its new product rather than buy a competitor's product in the interim. In fact, following Mahajan, Muller and Kerin (1984), in a recent empirical study, Burke et al. (1988) has demonstrated that positive and negative brand related, product category related and industry related information can be used to influence consumers' purchase intentions for micro-computers. New product announcements are also being used by firms to assess the feasibility and consumer interest in their product concepts.

Recent empirical evidence also suggest that the sales of a new product can also be influenced by its timing of entry into the marketplace as compared to its competitors. Schnaars (1986), for example, has documented case histories of products where pioneers or late entrants gained and maintained dominant position in the marketplace. Empirical evidence for market share pioneering advantage has also been provided by Urban et al. (1986). These studies clearly indicate that the sales or the market share captured by a firm can be influenced by the timing of its entry.

Given the empirical evidence on the influence of offensive or defensive strategies on product sales, it is imperative that such strategies by the firm and its competitors be explicitly considered in developing forecasts for a new product.

3.2.4. Development of forecasting expert systems

Expert systems offer a remarkable technology to capture the expert power and available theory and empirical findings in analyzing and forecasting the impact of marketing decisions. It has been reported that expert systems are currently being used to help design advertising commercials [Rangaswamy et al. (1987)], to screen potential customers and their purchases by companies like American Express and to check the quality consistency in canned foods by Campbell Soup [Kupfer (1987)]. Expert systems are also being made available to consumers to analyze their product

preferences and shop for products like running shoes, washing machines, touring bikes and cars [Business Week (1987)].

We anticipate development of expert systems for new product forecasting where a user could interact with a system to develop forecasts for a new product based on rules reflecting cumulative industry experience, company experience and other theoretical or empirical findings relevant to the type of product under consideration.

3.2.5. Marketing hype

Marketing hype is a set of predominately prelaunch activities leading to the creation of a market environment most conducive to the acceptance of a new product [Wind and Mahajan (1987)]. This environment includes:

- the distribution channels that stock and promote the product;
- the providers of support products and services whenever these are critical for the acceptance of the product;
- the media, including specialized vertical publications and newsletters as well as the general media;
- the opinion leaders, financial analysts, independent testing and evaluation groups who, through their word of mouth and credibility, could significantly affect the perceived value of the product.

The success of a new product in the marketplace, therefore, depends on the support of multiple stakeholders as well as their influence (positive or negative) on each other and the consumer. Consequently, the introductory prelaunch marketing program of a new product should be geared to all these actors and not just at the consumer. Adapting from Wind and Mahajan (1987) fig. 2 illustrates the difference between a conventional marketing launch and a marketing hype-driven launch.

As depicted in fig. 2, in a conventional product launch effort, the manufacturer's key decisions are the selection of a target consumer segment and developing for it a new product with its associated marketing mix programs. In contrast, the marketing hype driven introductory strategy focuses not only on the target customer segment but also on the relevant segment(s) of each of the key stakeholders and developing for each the most effective prelaunch and launch marketing programs.

The importance of having a receptive market environment for the adoption of a new product has major implications for the development of new product forecasting models. The concept-test and pre-test models, for example, need to explicitly consider the influence of the various stakeholders (e.g., positive support by key experts) on consumers' purchase intentions and choices. The early sales models, on the other hand, need to develop and empirically validate diffusion models to capture diffusion patterns dominated by the various stakeholders (e.g., distribution channels). Incorporation of marketing hype-driven strategies in the new product forecasting models should make them more realistic and practical.

3.2.6. Models for global markets

In recent years, an increasing number of key industries such as automobiles, motorcycles, agricultural equipment, aerospace, military hardware, telecommunications, electronics and consumer luxury products are becoming global in scope. There has been a consistent trend towards internationalization and integration of markets for many consumer and industrial goods and services. Management consultants like Ohmae (1985, p. 32) have even suggested that given the shorter life cycles for new products and global competition for worldwide markets, a firm should follow a 'sprinkler' model (i.e., introduce a new product simultaneously in all the worldwide markets) rather than a 'waterfall' model (i.e., introduce a new product sequentially in the various markets).

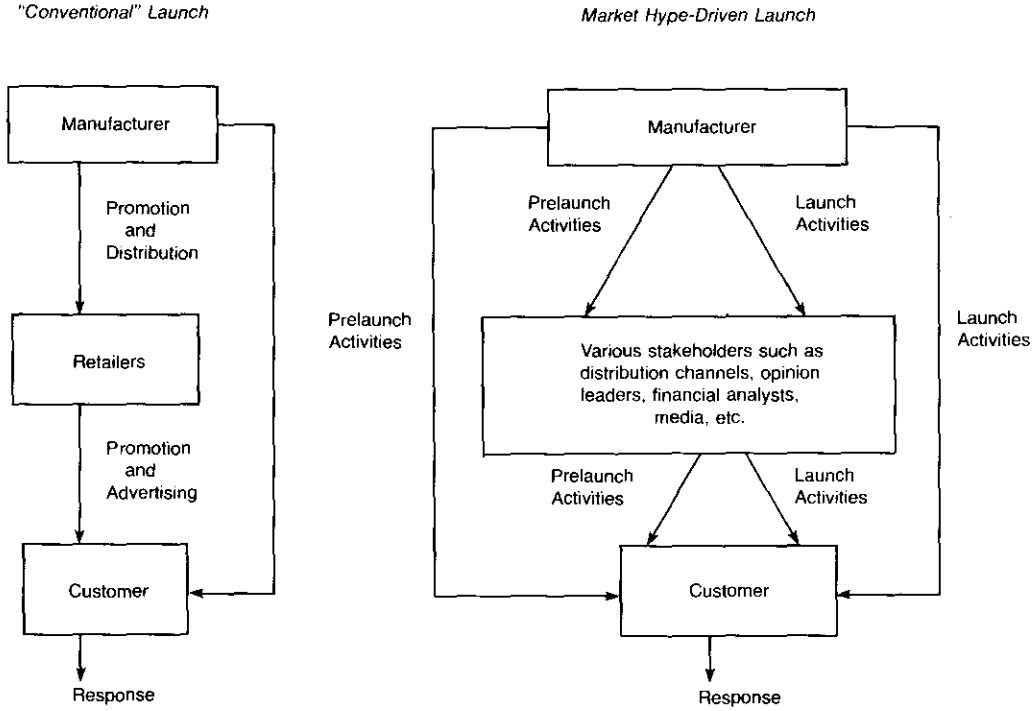

Fig. 2. A comparison of a conventional and marketing hype drive product launch.

Following the lead of companies like Coca-cola, Marlborough and Levi-Strauss, it has been suggested that the key to worldwide success is the development of global standardized products that will appeal to markets worldwide [Levitt (1983)]. On the other hand, in order to take advantage of the idiosyncratic characteristics of each segment and country, it has been proposed [Wind and Douglas (1987)] that companies should develop a portfolio of customized products that tailor the products to the needs of each segment/country and the relevant marketing infrastructure of the various countries, while assuring coordination and integration of efforts across countries.

Irrespective of which of the two strategies is followed by a company in its global market, it is to be recognized that new product introductions overseas by the U.S. companies constitute the largest segment of international business blunders [Ricks (1983)]. Although the recent development of global advertising agencies (e.g., Saatchi and Saatchi) may assist companies in better planning their global new product introductions, this trend, however, offers an emerging opportunity to develop new product forecasting models that can assist companies forecast global demand for their products. This will require considerations such as (a) selection of participants in concept-testing and other consumer based new product forecasting models (consumers as well as other actors as required by the marketing hype concept), (b) evaluation of the comparability across countries of data collection procedures and models in pre-test, test-market and early sales new product forecasting models and (c) selection of sample of countries to facilitate new product forecasting across countries from a sample rather than from the census of all countries. Like the trend towards globalization, new product forecasting models also need to be 'global' in scope in their data collection and modeling efforts while recognizing idiosyncratic country characteristics and facilitating integration and coordination of efforts across countries.

4. Conclusions

New products generally constitute a sizeable portion of the total profits of a firm [Booz, Allen and Hamilton (1982)]. Rapid technological advances, changing market conditions and global market competition have made it imperative for companies to be more focused and innovative in their search for and development of new products. Each new product is expected to play a key strategic role in the marketplace – either to defend a market share or to gain and maintain a market share. In this context, new product forecasting models have and can play a critical role in reducing the odds against failure in the marketplace.

After briefly reviewing strengths and weaknesses of the various types of currently available new product forecasting models, this paper outlined twelve areas of research and implementation that can help (a) practitioners improve the existing models to enhance their utilization in evaluating new product decisions and (b) researchers develop models that better meet the needs of users of new product forecasting models.

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