DECISION-SUPPORTING NEW PRODUCT FORECASTING

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(This is an ongoing column in The Journal, which is intended to give a brief view on a potential topic of interest to practitioners of business forecasting. Suggestions on topics that you would like to see covered should be sent via e-mail to llapide@mit.edu).

This column is written in support of this special new product forecasting issue of the Journal of Business Forecasting (JBF). My usual advice to forecasters of new product demand is to use Lifecycle Methods. I discussed these in my Spring 2001 JBF column titled, “A Simple Approach for Short Product Lifecycle Forecasting.” While I focused mainly on short-product lifecycle (one-time) products, I pointed out that the methods could be used during the launch phase of a new product to both initialize and then update its demand forecasts over time.

Lifecycle Methods assume that a new product’s cumulative demand will follow an “S” shaped curve that might be similar to one or more previously launched products, often referred to as the “like” products. The new product’s forecast is determined by estimating two parameters: the “shape” and “height” of the cumulative demand curve. A forecaster first estimates the “shape” of the curve using the prior product launches that might best resemble the demand pattern for the new product. Then he/she estimates the “height” that represents the total cumulative demand for the product over the lifecycle being forecast.

These Lifecycle Methods work well and I wholeheartedly recommend them when one has a lot of new items to forecast; as they are relatively easy to implement and update over time. However, one shortfall of them—and actually for almost all forecasting methods—is that they only address how well a product is selling and any updated information collected during launch is only used to update how well the new product might sell in the future. Basically they address solely what is happening with a new product, and generally don’t help in making decisions to improve its sales performance in the market. Important questions to address for these decisions include: “Why has the new product been successful or not?” Also “How can we improve its sales performance?” To answer these types of questions, forecasters need to utilize the new-product marketing models used by market researchers and marketing managers to do demand planning—that is, sales and marketing planning (not necessarily forecasting).

These types of models differ from traditional forecasting models in that they are trying to model consumer-level buying behavior, in contrast to aggregate sales patterns. Using these models for forecasting requires conducting extensive consumer research before and during product launch in order to develop an initial forecast and update it over time as sales are generated. However, and more importantly, the research needs to assess how the consumer reacts to the new product’s “Four Ps (4Ps)” of marketing decision-making: its Price, its Promotion, its Place, and the Product’s features.

In this column, I’ll first discuss two types of new product marketing models—the Trial-Repeat Rate Model and the Everett Rogers Diffusion Model—and then I’ll cover how they can be used to do new product forecasting that also helps support “4Ps” decision-making aimed at improving sales performance.

TRIAL-REPEAT RATE MODEL

Dr. Lapide is a Research Affiliate at MIT and a Lecturer at the University of Massachusetts, Boston Campus. He has extensive experience in industry, consulting, business research, and academia, and has a broad range of forecasting experiences. He was an industry forecaster for many years, has led forecasting-related consulting projects for clients across a variety of industries, and has researched as well as taught forecasting. He was also a market analyst researching forecasting and supply chain software.

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of my favorites because it belongs to a class of new product models that I extensively researched to write my doctoral dissertation, which was required to earn my Ph.D. The model basically says that the long-run market share for a consumable product will be equal to the multiplication of its Trial-Rate times its Repeat-Rate (i.e., Market Share = Trial-Rate × Repeat Rate). Trial-Rate is defined as the percent of consumers that eventually try the product for the first time, and Repeat-Rate is defined as the percent of these consumers that continue to buy it over and over. For example, if a new product is expected to be tried by 50% of all consumers and 40% of these continue to repeat purchase it, its long-run market-share forecast will be 20% (= 0.5 × 0.4).

To use the Trial-Repeat Rate Model for forecasting before product launch requires that consumer market research be done to estimate what percent of consumers might try the product and what percent of those consumers might continue to purchase it. This would involve researching the consumers’ reaction to the product’s “4Ps.” Research is needed to assess if the price is tempting enough to influence the consumers to try and then continue to buy it as well as if its promotional plan is going to foster sufficient trial and repeat purchasing. In addition, research is needed to assess whether its supply chain will ensure that it will be available at the places consumers shop, and lastly, that the product’s features are appealing enough to foster trial, and after consumption (or use) will the consumers think that it is worth buying again and again.

The model can also be used during a new product’s launch to update its market-share forecast, and potentially, to do something about improving it. Market research would be conducted to measure the Trial and Repeat Rates, as well as ascertain what prompted consumers to try and continue to buy the product. The research answers questions about why the Trial-Rate or the Repeat-Rate might be too low. Either might be low, for example, because one or more of the “4Ps” are hampering sales performance.

**EVERETT ROGERS DIFFUSION MODEL**

The Everett Rogers Diffusion of Innovation Theory postulates that consumers differ in their willingness to try a new product innovation before being tried by others. The more venturesome of consumers are willing to buy and try a new product as soon as it enters the market, while the most cautious will only try it after it has been proven by others. The theory defines five adopter types or cohorts of consumers. Per www.Wikipedia.com, the following are the salient characteristics of each adopter type along with the estimates of the percent of all consumers that fall into each:

1. **Innovators**—Venturesome, educated, leverage multiple info sources (2.5%)
2. **Early Adopters**—Social leaders, popular, educated (13.5%)
3. **Early Majority**—Deliberate, many informal social contacts (34%)
4. **Late Majority**—Skeptical, traditional, lower socio-economic status (34%)
5. **Laggards**—Neighbors and friends are main information sources, fear of debt (16%)

Figure 1 depicts how market share evolves over time as different adopter types buy and embrace the new product innovation, in the order listed above. This type of model is normally used for forecasting the sales of very innovative durable products, such as DVDs, iPods, iPhones, PDAs, and HD TVs. However, it can also be used to model the Trial-Rate for new consumable products. To use it to forecast sales, estimate (before launch) when and what percent of each adopter type will buy the product, and then as it starts to sell in the market, the estimates can be updated based on market research. The model is also decision-supporting because the research can also assess what is hampering greater adoption.
USING THE TRIAL-REPEAT RATE AND ROGERS MODEL

As I previously mentioned, while the Rogers Model is primarily used for durable products, it can also be used to forecast the Trial-Rate adoption for a new consumable product. An illustration of this is shown in Figure 2. The table in this figure shows a new product’s estimates by adopter type for a product to be introduced in May. It includes the month in which each adopter type is expected to first try the product, as well as a cohort’s Trial and Repeat Rate estimates. Also shown is the resulting long-run market share of each adopter type.

For example, it shows that 50% of the extremely important Early Majority Adopters are expected to first purchase the product in July and that 50% of these will continue buying it on a monthly basis thereafter. Consider that these estimates might be the ones made in advance of a new product’s launch, as well as the updated ones based on market research conducted during the launch. The graph in Figure 2 depicts the resulting monthly sales forecast for 100 consumers or the percent market-share based on the estimates shown in the table.

Let’s discuss why this type of forecasting is decision-supporting when compared to using Time-Series and Lifecycle Methods, or the Trial-Repeat Rate and Rogers Models on their own. The main reason it is decision-supporting is because it forecasts detailed consumer buying behavior rather than just aggregated total sales. The detail provides a plethora of useful marketing information.

For example, as can be noted, total sales peaks in July when the Early Adopters first try the product, and then declines, from there on leveling off to its long-run market share of 20%. A Time-Series Method of forecasting would extrapolate the first three months of sales and re-forecast a very successful product with rapidly growing share; when indeed, the underlying consumer buying behavior bodes badly for the new product.

Note that while the overall estimated market share is 20%, the market shares vary by adopter types. Early Adopter

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the error rate for new products is not nearly as good as it is for existing products, it is a good idea for companies to report accuracy separately for new products vs. existing products. This is especially important for companies that compare forecasting accuracy across businesses that have dramatically different portions of sales coming from new products, in order to avoid penalizing those units with more new products. The degree of newness of a new product is an indication of the amount of investment and risk being taken by the company. The more new and different a new product is for the company introducing it, the more resources have likely gone into developing the product and the more crucial it is for the forecast to be as accurate as possible. The degree of newness also impacts the forecasting techniques that can be used—the closer to existing products, more techniques are available.

There are really two different types of forecasts that are required for new products: the overall size of the opportunity and the shape and timing of demand. The size of the opportunity should be estimated throughout the new product development process so as not to surprise any of the functions once production is ready to begin. Once there is a good estimate of the overall opportunity, then a more specific forecast by month or week can be developed in order to both fill the pipeline for the distribution channels and meet ongoing demand.

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shares are higher relative to later adopters and that only 30% of Early Adopters repeat purchase. This information raises several questions. What was it about the product that turned these adopters off? Was it its price, the way it is being promoted, a glitch in its supply chain, or is there just something about the product’s features that these adopters don’t like? The model is uncovering a repeat-purchase problem with this cohort and one that might be the causing the lower Trial-Rates for later adopter types, such as the important Early Majority and Late-Majority. These latter adopter types typically wait to hear about earlier adopter-type experiences before buying a new product, and they may be getting bad product reviews. Answers to all these types of questions can be addressed by market research to help decision-making aimed at improving a new product’s long-run market share.

In summary, I believe that these types of new-product marketing models can not only improve forecast accuracy, they can also go one step further and become diagnostic tools for assessing new product sales performance at a detailed level. Thus, they can help make new products more successful by revising the 4Ps of a new product based on market research conducted both before and during product launch. That’s their biggest upside. One downside is that they require more effort on the part of forecasters since the models are more complex and need to be driven by customized market research. This makes them less suitable for forecasting environments that need to do forecasting for a large number of new products.

If they make sense for your forecasting environment, why not give them a try? Note that to implement them you’ll need to collaborate with the Market Research and Marketing departments inside your company. However, if you are successful in doing so, more of your company’s new products will be successful, and you and your collaborators will be company heroes.

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