.... RESEARCH NOTES AND COMMUNICATIONS

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Despite the relatively small number of Innovators in a potential market for a new product, they are often the main target of a firm's marketing efforts. Because the Innovators tend to influence the remaining potential adopters, that is, the Majority, firms tend to allocate more marketing efforts and resources toward the Innovators than toward the Majority. Using a two-stage game model with a diffusion effect, the authors analytically investigate whether this is always an optimal strategy. They identify several market and competitive conditions in which it might be optimal for firms to target the Majority rather than the Innovators. The managerial implications of these conditions for new product launch are discussed.

When Is It Worthwhile Targeting the Majority Instead of the Innovators in a New Product Launch?

Not all potential users of a new product or a new generation of a technology adopt the new product at the same time. Consequently, on the basis of the stage at which they adopt the new product, adopters traditionally are classified into five categories: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards (Rogers 1996). Assuming that the adopter distribution over time follows a normal distribution (see Figure 1, Part A), Rogers (1996) has suggested that, for every new product, 2.5% of the adopters are Innovators, 13.5% are Early Adopters, 34% are Early Majority, 34% are Late Majority, and 16% are Laggards. Unlike Rogers (1996), Mahajan, Muller, and Srivastava (1990) use the Bass (1969) diffusion model and suggest that the relative size of the various segments depends on the product type and ranges, in general, from .2% to 3% for Innovators, 9% to 20% for Early Adopters, 29% to 32% for Early Majority, 29% to 32% for Late Majority, and 21% to 23% for Laggards (see Figure 1, Part B).

As is depicted in Figure 1, Innovators tend to be the smallest segment of the five adopter categories. However, despite the relatively small size of the Innovator group, it is often the main target of the marketing efforts of firms that wish to sell a new product. The reason is that not only are Innovators, and to a certain degree Early Adopters, more willing to take a risk and purchase the new product, but, more important, they also influence the Early Majority and Late Majority in purchasing the new product (Rogers 1996). It is this considerable influence that the Innovators have over the Majority, who constitute close to two-thirds of the

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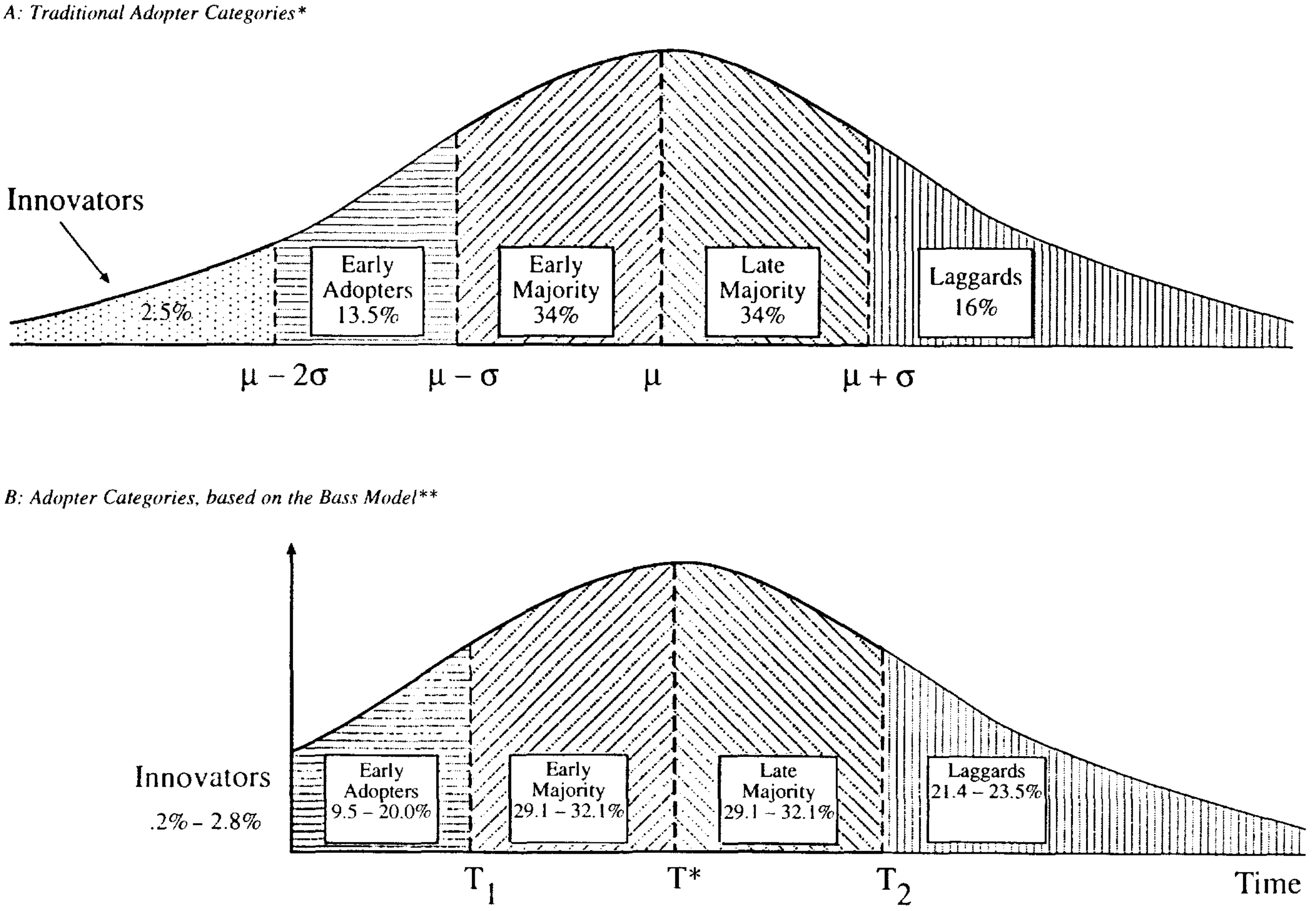
Figure 1
DIFFUSION AND ADOPTION DYNAMICS



*μ is the mean of the adopter normal distribution, and σ is its standard deviation.
**Source: Mahajan, Muller, and Srivastava (1990).

market, that makes them such favorable targets for the marketing efforts of firms.

In recent years, however, the strategy of targeting Innovators has been challenged. Moore (1991), for example, argues that effective targeting of Innovators for high-tech products does not necessarily lead to success of a new product. Because Laggards typically might not be important for a new product, he suggests combining the Innovators and Early Adopters into one group (the Early Market) and the Early Majority and Late Majority into a second group (the Mainstream Market). He argues that a major transition in communication and product strategies is required as the market evolves from the Early Market to the Mainstream Market. Hence, a lopsided marketing focus aimed at the Early Market is no guarantee for the success of the new product in the Mainstream Market.

Recent practices of some personal computer manufacturers seem to suggest that these companies are targeting the Majority segment of the potential market at the expense of Innovators (see, for example, Baig [1994] and Kirkpatrick [1994] on Compaq's strategy not to target Innovators in the personal computer [PC] market when the Pentium chip was introduced by Intel).

The objective of this article is to investigate analytically the market and competitive conditions in which it is optimal for firms to focus relatively more (in terms of marketing efforts and resources) on the Majority than on the Innovators. In particular, we wish to answer the following research question: Is it always optimal to allocate relatively more marketing efforts and resources to the Innovators than to the remaining market potential, the Majority?

The article is organized as follows: In the next section, we propose a diffusion modeling framework that assists us in deriving conditions for developing the optimal target market strategy. Managerial implications of these conditions are discussed next. We conclude with the model's limitations and extensions.

THE MODELING FRAMEWORK

To derive conditions in which it may be optimal for a firm to target the Majority rather than the Innovators, we base our modeling framework on three key assumptions. First, similar to Moore (1991), we assume that there are two major groups of adopters: Innovators and Majority. We combine the first two adopter categories of Innovators and Early Adopters and denote them both Innovators. We also combine the Early Majority and Late Majority into one group, the Majority. Because Laggards are usually not a viable marketing target, we drop this group without a loss of generality. Note from Figure 1 that for the normal distribution, according to our regrouping, Innovators constitute 16% and the Majority constitutes 68% of the target market. For the adopter categories, based on the Bass model, the size of the Innovator group ranges from 12.3% to 20.2%, and that of the Majority ranges from 58.2% to 64.2% of the target market.

Our basic framework is a two-period model in which a firm can target both segments of the potential market, Innovators and Majority. The firm's marketing efforts and resources are directed specifically toward the Innovators and/or the Majority. These marketing efforts, measured in monetary units (dollars), include the characteristics of the product, the degree of innovativeness of the product, packaging, advertising, and so forth. Let index p denote the Innovators, q denote the Majority, U_p = total monetary value of marketing efforts directed at the Innovators, and U_q = total monetary value of marketing efforts directed at the Majority. Thus, for a firm that directs its marketing efforts and resources more to the Innovators than to the Majority,

$$U_p > U_q. \quad (1)$$

For the firm that directs more marketing resources to the Majority than to the Innovators,

$$U_p < U_q. \quad (2)$$

We wish to identify market and competitive conditions in which the preceding strategies (i.e., Equations 1 and 2) are optimal.

Second, we assume that adoption by the Innovators is influenced by the relative marketing efforts of the firm introducing the new product, whereas adoption by the Majority segment is influenced by the previous number of adopters, as well as the relative marketing efforts of the firm. This assumption is consistent with general diffusion modeling literature in marketing (see, for example, Mahajan, Muller, and Bass 1990).

Third, similar to Easingwood, Mahajan, and Muller (1983), we assume that the intensity of the influence of the Innovators on the Majority may increase, decrease, or remain constant as penetration increases among the Innovators. We define the following parameters and variables: x(t) = cumulative number of adopters at time t, N = market potential, p = coefficient of external influence, q(t) = coefficient of internal influence at time t, and δ = nonuniform influence factor. Modifying the Bass (1969) diffusion model, Easingwood, Mahajan, and Muller (1983) suggest the following diffusion model:

$$\frac{dx(t)}{dt} = \left\{p + b\left[\frac{x(t)}{N}\right]^{\delta}\right\}[N - x(t)], \quad (3)$$

and $q(t) = b\,[x(t)/N]^{\delta - 1}$, where the parameter b is a constant.

Thus, the coefficient of internal influence q(t) is represented by the term $q(t) = b[x(t)/N]^{\delta - 1}$. This term represents the time-varying influence of previous adopters x(t) on the remaining market potential [N – x(t)]. The term p[N – x(t)] represents adoptions due to marketing efforts. If $\delta = 1$, the intensity of word-of-mouth influence remains constant over time and Equation 3 reduces to the Bass model (1969). A value of δ between 0 and 1 causes an acceleration of influence and leads to an earlier and higher peak in the level of adoptions. Conversely, values of δ greater than 1 delay influence and cause a later and lower peak in the level of adoptions.[1] The parameter δ also is related to the speed of risk reduction for the consumer. The faster the reduction of the perceived risk, the less a consumer has to rely on word-of-mouth information, and therefore, the smaller is δ, signifying a fast decline in the word-of-mouth effect.

Given the preceding assumptions, we identify conditions for the optimal target market strategy of the firm. We consider two different scenarios. The first assumes that the firm introducing the new product is a monopolist. In the second scenario, we assume that the market consists of two firms that sell competitive, substitute products.

Optimal Target Market Strategy for a Monopolist

To derive conditions for the optimal target market strategy for a monopolist, the following terminology is used throughout the article: N_p = the market potential of the Innovators; N_q = the market potential of the Majority; $N = N_p + N_q$ = the total market potential of the new product (excluding Laggards); x_p, x_q = number of adopters in the Innovator and Majority groups who adopt the product, respectively; α, β = the gross profit margins of a product targeted at the Innovators and the Majority groups, respectively; r = discount rate; and $f(U_p)$, $g(U_q)$ = the effectiveness of the marketing efforts, expressed in terms of the percentage of Innovators (in f) or the Majority (in g) who buy the product as a result of the marketing efforts. Letting $f = 1 - e^{-U_p}$ and $g = 1 - e^{-U_q}$, both f and g are increasing and bound between 0 and 1.

We assume that the Innovators purchase the product in the first period. Because in this period the Majority cannot yet rely on word-of-mouth activity, they do not purchase the product at all in the first period. Relying on the word of mouth from the Innovators, the Majority buy the product in the second period. The model can be ascertained using Table 1. If x_p is the number of adopters in the Innovators group and these Innovators are influenced only by the marketing efforts of the firm, then the number of adopters is given by $x_p = N_p(1 - e^{-U_p})$. Similarly, if x_q is the number of adopters in the Majority group, then a member of this group would purchase the product if he or she is reached by the marketing efforts of the firm and he or she is influenced by

[1]An important issue, which is not addressed in our two-stage model, is the question of the optimal duration of the time period during which the firm targets Innovators. This can be achieved through a continuous time model that is a natural extension of Horsky and Simon's (1983) formulation.

Add the marketing parameters U_p and U_q to the diffusion Equation 3 in the following manner:

$$dx/dt = pf(U_p)(N - x) + [qg(U_q)(x/N)]^{\delta}\,(N - x),$$

where f and g are the effectiveness functions of the marketing efforts. If we adopt Bass's (1969) original interpretation, the adoption among the Innovators is described by the first term of this equation, whereas the adoption among the Majority is given by the second term. There are several empirical and theoretical objections to this original interpretation (see, for example, Mahajan, Muller, and Srivastava 1990). If we follow this route, however, we can achieve some of the results that are reported subsequently in this article. A detailed addendum is available on request to interested readers.

the Innovators. Because we assume that this latter influence is nonlinear, as in Easingwood, Mahajan, and Muller's (1983) framework, with a nonuniform influence factor δ, this number is given by the following term:

$$(4) \qquad x_q = N_q(1 - e^{-U_q})(x_p/N)^{\delta}.$$

The profits of the firm that are due to the adopters in the Innovators group are given by $\alpha x_p - U_p$, whereas the discounted profits from the adopters in the Majority group are given by $[1/(1 + r)](\beta x_q - U_q)$. Total profits, therefore, are given by the following equation:

$$(5) \qquad \pi = \alpha N_p(1 - e^{-U_p}) - U_p + \frac{\beta}{1 + r} N_q(1 - e^{-U_q})\left[\frac{N_p}{N}(1 - e^{-U_p})\right]^{\delta} - \frac{U_q}{1 + r}.$$

To evaluate Equations 1 and 2, we must differentiate Equation 5 with respect to marketing efforts U_p and U_q and identify conditions that maximize total profits for the firm. These derivations are provided in the Appendix. Using the results reported in the Appendix as a basis, we provide the following propositions:

Proposition 1: If $\delta > 1 + r$, for all values of N_p and N_q, the firm targets its marketing efforts on the Innovators; that is, $U_p > U_q$.

Proposition 2: If $\delta < 1 + r$, the firm targets its marketing efforts on the Innovators if the following equation holds:

$$(6) \qquad \alpha N_p > \beta N_q[1 - \delta/(1 + r)].$$

Although we discuss the managerial implications of these propositions in the next section, the following observation on these propositions is warranted at this time: From the preceding two propositions, we show in the Appendix that if $\delta = 1$ and the discount factor r is small, then it is always optimal for the firm to target its marketing effort more on the Innovators than on the Majority.

At first, it seems counterintuitive that $U_p > U_q$, regardless of the relative size of the relevant populations (N_p and N_q). However, the adopters in the Majority segment purchase the product only as a result of interaction with the Innovators. Therefore, a dollar spent on Innovators has a double impact. First, it raises the likelihood of purchase for the Innovators, as measured by $(1 - e^{-U_p})$. Second, it raises the likelihood of adoption among the Majority segment, as measured by $(1 - e^{-U_p})(1 - e^{-U_q})$. Therefore, it is worth more than a dollar spent on potential adopters in the Majority segment, because the impact of a dollar spent on the Majority group cannot be leveraged to Innovators.

Optimal Target Market Strategy Under Competition

To evaluate further the conditions favoring Equations 1 and 2, we now assume that the market consists of two firms that sell competitive, substitute products. We use the same notations as in the previous section, with U_{pi} and U_{qi} denoting the marketing efforts of firm i (i = 1,2) that are directed at the Innovators and the Majority, respectively.

To simplify the equations, let x_1 denote the number of Innovators who buy the product of the first firm as a result of its marketing efforts, as well as the marketing efforts of its rival. The likelihood of the consumer to purchase the product of the first firm is an increasing function of the firm's own marketing efforts and a decreasing function of its rival's marketing efforts. Thus, x_1 is given by the following equation:

$$(7) \qquad x_1 = N_p f_1(U_{p_1})[1 - f_2(U_{p_2})].$$

Because the same principle applies to the Majority, the profit function of the firm is given by the following equation:

$$(8) \qquad \pi_1 = \alpha x_1 - U_{p_1} + \frac{\beta}{1 + r} N_q x_1^{\delta} g_1(U_{q_1})\left[1 - g_2(U_{q_2})\right] - \frac{U_{q_1}}{1 + r}.$$

With the same assumptions as in the previous section, that is, f and g are exponential, it follows that the profit function of the firm is given by the following equation:

$$(9) \qquad \pi_1 = \alpha N_p(1 - e^{-U_{p_1}})e^{-U_{p_2}} - U_{p_1} + \frac{\beta N_q}{(1 + r)}(1 - e^{-U_{q_1}})\left[\frac{N_p}{N}(1 - e^{-U_{p_1}})e^{-U_{p_2}}\right]^{\delta} e^{-U_{q_2}} - \frac{U_{q_1}}{1 + r}.$$

Table 1

THE MODEL FOR THE MONOPOLIST

	Categories	
Adopter Category Dynamic	*Innovators*	*Majority*
Market potential	N_p	N_q
Gross profit margins	α	β
Effectiveness of marketing efforts	$f(U_p) = 1 - e^{-U_p}$	$g(U_q) = 1 - e^{-U_q}$
Category adoptions	$x_p = N_p\left(1 - e^{-U_p}\right)$	$x_q = \left[\frac{N_p(1 - e^{-U_p})}{N}\right]^{\delta} N_q\left(1 - e^{-U_q}\right)$
Category profits	$\pi_p = \alpha x_p - U_p$	$\pi_q = \frac{1}{1 + r}(\beta x_q - U_q)$

The following propositions summarize the equilibrium conditions for the two firms' competitive game. For a proof, see the Appendix.

Proposition 3: If $\delta > 1 + r$, for all values of N_p and N_q, the equilibrium of the competitive game is such that both firms target their marketing efforts on the Innovators; that is, $U_{pi} > U_{qi}$ for i = 1,2.

Proposition 4: If $\delta < 1 + r$ and Equation 6 holds, then at least one of the firms targets its marketing efforts on the Innovators.

Note that Equation 6 is not firm specific because the parameters that appear in it are common to both firms. If we change this assumption so that the parameters of Equation 6 are firm specific, we would need Equation 6 to be true for both firms simultaneously for at least one of them to target the Innovators.

MANAGERIAL IMPLICATIONS OF CONDITIONS FAVORING TARGETING THE MAJORITY

The results derived in Propositions 1 through 4 suggest that a firm is likely to target the Majority if $\delta < 1 + r$ and Equation 6 is violated. Rearrangement of Equation 6 yields that a firm is likely to target the Majority if the following equation holds:

$$\delta < \left(1 - \frac{\alpha}{\beta}\frac{N_p}{N_q}\right)(1 + r). \tag{10}$$

Therefore, any term in Equation 10 that makes the right-hand side of Equation 10 larger is likely to lead the firm to focus on the Majority rather than on the Innovators. On the basis of Equation 10, the following conditions now can be identified as favoring targeting the Majority.

Changes in the effect of the Innovators on the Majority. The parameter δ captures the time-varying effect of the Innovators on the Majority. As we mentioned previously, if $\delta = 1$, the intensity of word-of-mouth influence remains constant over time. A value of δ between 0 and 1 causes the word-of-mouth effect to decline over time, and values of δ greater than 1 delay the influence and cause an increase in this effect. The smaller the value of the parameter δ, the faster the decline is in the effect of the Innovators on the Majority (see the time-varying coefficient of internal influence in Equation 3). The faster this decline, the less valuable is each successive Innovator to the firm, and the less the firm will be willing to spend on the Innovators. Therefore, with low levels of the parameter δ, the firm is more likely to target the Majority than the Innovators.

Consumers versus industrial products. To have a better sense of Equation 10, assume that the change in the price of the product, a decline in many cases, is followed by a similar decline in the cost of producing the product. Thus, the gross profit margins of the product directed at the Innovators will be similar to those directed at the Majority; that is, $\alpha = \beta$ in Equation 10.

Although estimates of the adopter categories for the nonuniform influence model proposed by Easingwood, Mahajan, and Muller (1983) are not available, approximate estimates can be obtained from the adopter categorization scheme, based on the Bass model, proposed by Mahajan, Muller, and Srivastava (1990) (see Figure 1, Part B and Table 2). Note from Table 2 that the average ratio of Innovators to Majority is 27.7%.[2]

Assuming a cost of capital of 10% for the firm, Equation 10 states that the firm targets the Majority if $\delta < .79$ (for $\alpha = \beta$, $N_p/N_q = 27.7\%$ and r = 10%). Table 3 includes the values of a nonuniform influence factor reported by Easingwood, Mahajan, and Muller (1981, 1983). Note in Table 3 that, except for dishwashers, the values of the nonuniform influenced factor are less than .79 for consumer durables. Similarly, except for CT head scanners, the values of the nonuniform influence factor are equal to or greater than .79 for industrial products.

From Table 3, it becomes evident that, ceteris paribus, we may find many more firms employing a strategy that targets

[2]The figures given in Table 2 are for pairs of parameters that belong to a particular product. This pairing of Innovators and Majority is lost in Figure 1, Part B, because it reports ranges of values. For example, the largest Majority size of 64.2% (Figure 1, Part B) teams up with 2.8% Innovators and 9.5% Early Adopters, yielding a total of 12.3% of what we denote as Innovators in this article. This corresponds to black-and-white television sets in Table 2. With the ratio of Innovators to Majority at 19.2%, the resultant δ is .89. What we have reported are the values of the parameter δ that correspond to the average ratio of Innovators to Majority, not the lowest ratio.

Table 2
RELATIVE SIZE AND THE ASSOCIATED TIME INTERVAL FOR INNOVATORS AND MAJORITY FOR THE BASS MODEL

Product	*Innovators (%)*	*Time Interval 1 (years)*	*Majority (%)*	*Time Interval 2 (years)*	*Innovators/ Majority (%)*
Black-and-white television sets	12.3	3.1	64.2	9.4	19.2
Home freezers	12.7	4.8	64	14.0	19.8
Steam irons	14.2	3.1	62.8	7.4	22.6
Water softeners	16.4	4.8	61.2	8.4	26.8
Coffee makers	16.7	4.9	61	8.2	27.4
Clothes dryers	17.3	4.6	60.6	7.0	28.5
Record players	18.1	2.9	60	3.8	30.2
Power lawnmowers	19.0	6.6	59.3	7.6	32.0
Room air conditioners	19.2	5.6	59.2	6.0	32.4
Electric bed coverings	19.2	9.6	59.1	10.6	32.5
Refrigerators	20.2	14.3	58.2	12.0	34.7
Average	16.9	5.8	60.9	8.6	27.7

Source: Mahajan, Muller, and Srivastava (1990, Table 1).

Table 3
ESTIMATED VALUES OF THE NONUNIFORM INFLUENCE PARAMETER (δ) FOR THE DIFFUSION MODEL

Product	*δ*
Consumer Products	
Black-and-white television sets	.3
Color television	.6
Clothes dryers	.72
Room air conditioners	.5
Dishwashers	1.54
Industrial Products	
Ultrasound	1.22
Mammography	1.12
CT body scanners	.79
CT head scanners	.66

Source: Easingwood, Mahajan, and Muller (1981, 1983).

the Majority in consumer product industries rather than in industrial product industries. This is because a proactive strategy that targets the Innovators is more feasible for industrial goods. Innovators, or lead users, as they commonly are called for industrial goods (von Hippel 1988), are usually ahead of the market with respect to the technology, and they are relatively easy to identify and reach. The product can be tested using this group, and the concept that results from these tests may have a better chance of acceptance. Thus, the Innovators play a more dominant role in industrial products, and a strategy that targets them specifically may be highly profitable. Several such examples are given by McKenna (1985) and Moore (1995), who cites cases such as Lotus Notes, Sun computers, PeopleSoft, and others that started selling to niche segments and diffused from these leading niches to "adjacent" niches by relying on active word-of-mouth activities.

Relative size of the Innovators and the Majority segments. Following Equation 1, we find that targeting the Majority is a more likely policy with smaller ratios of N_p/N_q. We illustrate this by using the estimates of N_p and N_q reported by Mahajan, Muller, and Srivastava (1990) and included in Table 2.

Recall from Propositions 1 through 4 that Equation 10 is needed only for $\delta < 1 + r$. If δ is large (i.e., $\delta > 1 + r$), targeting the Innovators is optimal for all values of N_p and N_q. If, however, δ is small, for example, $\delta = .75$ (and $\alpha = \beta$, $r = 10\%$), then for Equation 10 to hold, $N_p/N_q \leq 32\%$. Note from Table 2 that $N_p/N_q \geq 32\%$ only for the last four products: power lawnmowers, room air conditioners, electric bed coverings, and refrigerators. Therefore, of the products listed in Table 2, targeting the Innovators is optimal only for these four. For the remaining products, it is optimal to target the Majority. Thus, for a fixed level of the parameter δ, targeting the Majority will be optimal for low levels of the ratio N_p/N_q.

The relative profitability of the Innovators and the Majority segments. Following Equation 10, we find that targeting the Majority is more likely with smaller ratios of α/β. Recall that α and β measure the gross profit margins of a product targeted at the Innovator and Majority segments, respectively. The ratio of α/β measures the change in the gross profit margins as a result of the changes made in the product design in the first few years of its life cycle. This change depends on several factors, including the competitiveness of the market, increasing returns to scale, increasing returns to scope, experience effect (learning by doing), and the rate of diffusion of the base technology of the (high-tech) product. When the profit margins decline, the faster this decline is, given the same time span, the more profitable it becomes to sell to the Innovators. This is not because of the effect Innovators have on the Majority, but a result of the (relatively) high profit margins the firm enjoys by selling to this segment. Conversely, a slow decline or an increase in the ratio of profitability of a leading-edge product directed at the Innovators to profitability of one directed at the Majority will point to concentrating on the Majority as the optimal strategy.

The rate of market acceptance of technological innovations. The analysis so far has focused on a single new product, but it readily can be extended to the case of a new generation of an existing line of products with the same base technology. The speed at which the new generation substitutes for the old one can be captured by the speed of the product life cycle. If the market adopts the new generation quickly and is soon ready for an even newer generation, the product life cycle is fast. This is reflected in the time in which sales reach a peak and the time that marks the boundary between the Innovators and the Majority. The slower the rates of acceptance and technological innovations, the longer these boundary times are.

The competitive game formulated in this article has two periods, the lengths of which might be different from each other and from case to case, depending on the type of product category. Table 2 presents the average number of years each period lasts for various consumer durables. The average for the 11 products is 5.8 years for period 1 and 8.6 years for period 2. The ranges of these time periods are from 3 to 10 years for period 1 (with the exception of refrigerators, which have exceedingly long life cycles) and from 4 to 14 years for period 2. A proxy for the length of the first period is the cost of capital r. The longer the period, the higher is the cost of capital that should be used (throughout the analysis and, in particular, in Equation 10). The longer the period, the more likely the firm is to target the Majority. The intuitive reason is clear: The firm invests in the Innovators so that they will influence the Majority. The further into the future this influence takes effect, the less profitable it becomes to focus on the Innovators.

Cost of capital of the firm. The cost of capital differs among different firms and across geographical boundaries. In general, it depends on the particular conditions of the relevant national economy, the risk associated with the particular industry in which the firm operates, and the business and financial strategies of the firm. The cost of capital differs among various countries and might be much higher in developing countries than in the G7 countries. The higher the cost of capital is, the more likely the firm is to target the Majority. Therefore, while marketing a global product, a firm might not be able to afford to wait for Innovators in emerging countries, so will target the Majority from an early stage of the product life cycle.

CONCLUSIONS AND EXTENSIONS

Is it always optimal in a new product launch to allocate relatively more marketing efforts and resources to the Innovators than to the Majority? As we summarize in Table 4, our results suggest that if the intensity of influence of the In-

Table 4

CONDITIONS FAVORING MAJORITY TARGETING

A firm is likely to target the Majority in the following conditions:

a. Fast decline in the effect of Innovators on Majority, that is, low values of parameter δ, the nonuniform influence factor for the word-of-mouth effect.
b. The product is a consumer product.
c. Relatively low ratio of Innovators to Majority (low value of N_p/N_q, ratio of market potentials of Innovators and Majority).
d. Slow decline (or increase) in the ratio of the profitability of a product directed at Innovators to that of a product directed at Majority (low ratio of α/β, ratio of profit margins of Innovators and Majority).
e. Slow rate of market acceptance of the new product.
f. High cost of capital of the firm in the relevant international geographical area.

Table 5

VALUES OF $(N_p/N_q)^*$ AND δ^* SUCH THAT, IF $N_p/N_q < (N_p/N_q)^*$ AND JOINTLY $\delta < \delta^*$, THEN THE FIRM IS MORE LIKELY TO TARGET THE MAJORITY

	δ^*		
$(N_p/N_q)^*$	$r = 6\%$	$r = 10\%$	$R = 14\%$
70%	.32	.34	.35
60%	.43	.45	.46
50%	.54	.56	.58
40%	.64	.67	.69
30%	.75	.78	.80
20%	.85	.89	.92
10%	.96	1.00	1.03

novators on the Majority does not decrease (i.e., it remains the same or increases) as more consumers adopt the product, despite the small size of the Innovator group, it is always optimal for a firm to allocate relatively more of its marketing efforts and resources to the Innovators than to the Majority. Even in the presence of competition, it is optimal for all the competitors to target the Innovators. Only when the intensity of the influence of the Innovators on the Majority decreases as penetration increases should a firm consider targeting the Majority rather than the Innovators. Table 4 summarizes the conditions in which it becomes profitable for a firm to target the Majority.

Recent literature (e.g., Moore 1991) and the reported product launch strategies of some firms in the high-tech industry, such as Compaq (e.g., Baig 1994; Kirkpatrick 1994), however, suggest that there is sufficient concern among industries about blindly following the strategy of targeting Innovators at the expense of the Majority. With the help of Table 4, we can partially justify Compaq's strategy of targeting the Majority in 1994 with 486s when the Pentium chip was already available: The product was sold partly as an industrial product to firms and offices and partly as a consumer product to homes and individuals. According to Mahajan, Muller, and Srivastava (1990), the ratio of N_p/N_q for the PC market in the United States is 30.8%, an average ratio. Kirkpatrick (1994) cites an increase in the profitability of a product directed at the Majority, rather than one targeted at Innovators, as the reason for Compaq's strategy, because Intel's refusal to give Compaq preferentially low chip prices for its Pentium chip made the profitability of this product, aimed at the Innovators, relatively low. Finally, contrary to popular belief, the rate of market acceptance of technological innovations in the PC market was not fast. The 386 DX machines were introduced in 1985, and though the Pentium-based PCs were introduced in 1993, they did not really get off the ground until late in 1994 (see Baig 1994). Thus, there were only two generations of PCs, namely 386 and 486, during a period of almost ten years. We therefore can partially support the optimality of this strategy at that particular time by Compaq.

With respect to the implementations of the results reported in Table 4, an important question is the following: How can managers *ex ante* decide whether to target the Majority rather than the Innovators in a new product launch? Note from Equation 10 that the evaluation of this decision is based on the nonuniform influence factor δ, the ratio of the gross profit margins of the product for the Innovators and the Majority α/β, the ratio of the market potential of the Innovators and the Majority N_p/N_q, and the cost of capital of the firm r. Because the profit margins and cost of capital are estimated internally by the firm, what we require to implement Equation 10 are estimates of δ and N_p/N_q. However, N_p and N_q are product-specific parameters, whose values depend on the coefficient of external influence p and the coefficient of internal influence q in Equation 3 (see Mahajan, Muller, and Srivastava 1990; Table 2; and Figure 1, Part B). Estimation of δ, p, and q using Equation 3 will result in the implementation of the results reported in Table 4. Because no data are available prior to the launch of the product, we can use the analogical approach, based on historical data of related products, suggested and illustrated by Easingwood (1987, 1989).

Another way to illustrate when the Majority segment actually is targeted is demonstrated by a numerical analysis we performed on the parameters of Equation 10. The results appear in Table 5. In Table 5, we report the critical values for N_p/N_q and δ, such that, if the actual values of N_p/N_q and δ are below these critical values, then Equation 10 is true, namely, the firm is more likely to target the Majority. This was performed for three values of the cost of capital r. As is evident from Table 5, variation of the cost of capital has little effect on these critical values and, therefore, on the decision of the firm to approach the Majority. In addition, because in most cases we do not expect the ratio of the Innovators to the Majority to be less than 30%, we can conclude from Table 5 that, if the expected value of the nonuniform influence parameter δ is less than .75, the firm is better off targeting the Majority rather than the Innovators.

We hope this article will stimulate further discussion on the appropriateness of the conditions derived here and other conditions that our modeling framework might not have captured. Marketing literature (e.g., Mahajan, Muller, and Bass 1990) that advocates optimal marketing-mix strategies (e.g., for pricing, advertising, and so forth), assuming that the firms target the Innovators rather than the Majority, should be revisited. This is necessary to establish the appropriateness of these strategies when the assumption is not valid.

APPENDIX

Proof of Proposition 1

To prove Proposition 1, differentiate Equation 5 with respect to U_p and U_q to achieve the first-order conditions for optimality:

(A1) $$e^{U_p} = \alpha N_p + \frac{\delta\beta}{1+r} N_q \left(\frac{N_p}{N}\right)^{\delta} \left(1 - e^{-U_q}\right)\left(1 - e^{-U_p}\right)^{\delta-1}.$$

(A2) $$e^{U_q} = \beta N_q \left(\frac{N_p}{N}\right)^{\delta} \left(1 - e^{-U_p}\right)^{\delta}.$$

Assume, *a contrario*, that $U_p < U_q$. To achieve a contradiction, observe the following string of inequalities:

(A3) $$e^{U_p} = \alpha N_p + \frac{\delta\beta}{1+r} N_q \left(\frac{N_p}{N}\right)^{\delta} \left(1 - e^{-U_p}\right)\left(1 - e^{-U_q}\right)^{\delta-1}$$

$$> \alpha N_p + \frac{\delta\beta}{1+r} N_q \left(\frac{N_p}{N}\right)^{\delta} \left(1 - e^{-U_p}\right)\left(1 - e^{-U_p}\right)^{\delta-1}$$

$$= \alpha N_p + \frac{\delta\beta}{1+r} N_q \left(\frac{N_p}{N}\right)^{\delta} \left(1 - e^{-U_p}\right)^{\delta}$$

$$> \beta N_q \left(\frac{N_p}{N}\right)^{\delta} \left(1 - e^{-U_p}\right)^{\delta} = e^{U_q},$$

where the first equality follows from Equation A1 and the next inequality follows from the assumption that $U_q > U_p$, and thus, $1 - e^{-U_q} > 1 - e^{-U_p}$. The next inequality follows from $\alpha N_p > 0$ and $\delta > 1 + r$. The last equality follows from Equation A2. Thus, from Equation A3, we have $e^{U_p} > e^{U_q}$. This contradicts $U_p < U_q$. The proof for the case when $\delta = 1$ follows the same path, except that the last inequality in Equation A3 requires the discount rate r to be small to be valid.

Proof of Proposition 2

Following the proof of Proposition 1, we must establish the following inequality:

(A4) $$\alpha N_p + \frac{\delta\beta}{1+r} N_q \left(\frac{N_p}{N}\right)^{\delta} \left(1 - e^{-U_p}\right)^{\delta} > \beta N_q \left(\frac{N_p}{N}\right)^{\delta} \left(1 - e^{-U_p}\right)^{\delta}.$$

Equation (6) establishes this inequality by noting that $(N_p/N)^{\delta} (1 - e^{-U_p})^{\delta} < 1$.

Proof of Proposition 3

This proof follows the proofs of Proposition 1, *mutatis mutandis*.

Proof of Proposition 4

Because we must show that at least one of the firms targets its marketing efforts on the Innovators, the contrary assumption is that both firms target their marketing efforts on the Majority; that is, $U_{p_1} < U_{q_1}$ and $U_{p_2} < U_{q_2}$.

The equilibrium of the competitive game between the two firms is given by the following equations:

(A5) $$e^{U_{p_1}} = \alpha N_p e^{-U_{p_2}} + \frac{\delta\beta N_q}{(1+r)} \left(1 - e^{-U_{q_1}}\right) e^{-U_{q_2}} \left(\frac{N_p}{N} e^{-U_{p_2}}\right)^{\delta} \left(1 - e^{-U_{p_1}}\right)^{\delta-1},$$

and

(A6) $$e^{U_{q_1}} = \beta N_q e^{-U_{q_2}} \left(1 - e^{-U_{p_1}}\right)^{\delta} \left(\frac{N_p}{N} e^{-U_{p_2}}\right)^{\delta}.$$

To achieve the desired contradiction, following the proof of Proposition 2, we must establish the following inequality:

(A7) $$\alpha N_p e^{-U_{p_2}} > \beta N_q \left(1 - \frac{\delta}{1+r}\right) \left(\frac{N_p}{N} e^{-U_{p_2}}\right)^{\delta} \left(1 - e^{-U_{p_1}}\right)^{\delta} e^{-U_{q_2}}.$$

Equation A7 is equivalent to the following inequality:

(A8) $$\alpha N_p > \beta N_q \left(1 - \frac{\delta}{1+r}\right) \left(\frac{N_p}{N} e^{-U_{p_2}}\right)^{\delta} \left(1 - e^{-U_{p_1}}\right)^{\delta} e^{\left(-U_{q_2}+U_{p_2}\right)}.$$

Equation 6 establishes this inequality by noting that the last three terms in Equation A8 are smaller than 1, where the last term is smaller than 1 because of our assumption that $U_{p_2} < U_{q_2}$.

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