

FIRST-MOVER (DIS)ADVANTAGES: RETROSPECTIVE AND LINK WITH THE RESOURCE-BASED VIEW

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This article reflects upon and updates our prize-winning paper, 'First-mover advantages,' which was published in SMJ 10 years ago. We discuss the evolution of the literature over the past decade and suggest opportunities for continuing research. In particular, we see benefits from linking empirical findings on first-mover advantages with the complementary stream of research on the resource-based view of the firm. © 1998 John Wiley & Sons, Ltd.

We were honored to receive the 1996 prize of the Strategic Management Society (in cooperation with John Wiley & Sons) for our 1988 paper, 'First-Mover Advantages.' It is customary for the award recipients to write a brief article reflecting on the original work. As our paper aimed to provide a unified conceptual framework and critical assessment of the literature, we have chosen to write a somewhat longer piece to update our survey and suggest opportunities for continuing research.

Our prize-winning paper began as a series of healthy disagreements between the authors, which took place over brown bag lunches during the summer of 1986. 'First-mover advantage' (FMA) was a term widely invoked in strategic management, marketing, and economics. We found, however, that our interpretations of the concept differed greatly. We wondered if our disagreements stemmed from the contrast in our disciplinary backgrounds, or if they reflected a broader lack of consensus among business scholars.

During a sabbatical at Northwestern University,

Lieberman asked various colleagues for their interpretation of 'first-mover advantages' and was surprised to find idiosyncratic responses spanning an even wider range than what had surfaced in our earlier discussions. It became clear that an effort to bring coherence and precision to the 'first-mover' concept would be helpful. We therefore set out to write our journal article, designed to assess the nature of first-mover advantages, categorize the causal mechanisms, and draw together a diverse set of relevant literature. We received helpful input at a conference organized by Cynthia Montgomery in conjunction with the first special issue of SMJ. In the years since publication, we have been pleased to see our article become a useful resource for business scholars in several fields.

The literature on first-mover advantages has expanded greatly since the publication of our paper a decade ago. Nevertheless, many of the fundamental conceptual problems that we discussed remain unresolved. We continue to be concerned that 'as a focus for empirical research, the concept of first-mover advantage may be too general and definitionally elusive to be useful' (Lieberman and Montgomery, 1988:52). How, then, might further work on this topic be productive? We believe that the greatest opportunities may lie in forging links with the complemen-

Key words: first-mover advantage; pioneer advantage; follower advantage; resource-based view; market entry
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tary body of research on the ‘resource-based view of the firm’ (RBV). Historically, the RBV and FMA have evolved as prominent but independent research streams. Taken separately, each suffers from serious deficiencies. We see a strong potential for synergy: the first-mover literature offers empirical knowledge to fill major gaps in the resource-based view; and conversely, the framework of the RBV can aid the design of more sophisticated studies on the timing of entry. Our goal is to serve as marriage broker (or at least to initiate some serious dating).

The next part of this paper describes the links between first-mover advantages and the resource-based view of the firm. The last part of the paper updates our survey of the FMA literature.

FIRST-MOVER ADVANTAGES AND THE RESOURCE-BASED VIEW

In recent years strategic management scholars have expressed enormous interest in the resource-based view of the firm. A previous winner of the SMJ best paper award, Birger Wernerfelt (1984), was one of the first to articulate this perspective on strategy. Later contributions include Barney (1986), Rumelt (1987), Dierickx and Cool (1989), Prahalad and Hamel (1990), Conner (1991), Amit and Schoemaker (1993), Peteraf (1993) and Teece, Pisano, and Shuen (1997), among others. While our survey paper did not explicitly recognize the resource-based perspective, our main focus was on the dynamics of resources and capabilities in the context of market entry.

The RBV has often been criticized for its lack of an empirical base, and particularly, of studies that consider how resources and capabilities evolve over time.¹ Yet when the literature on first-mover advantages is repositioned within the boundaries of the RBV, the body of empirical research becomes vastly larger. Every applied study of first-mover advantages provides evidence on the accumulation of resources and capabilities by market entrants. We believe that wider recognition of this isomorphism may help to resolve the empirical deficit faced by the RBV.

¹ Porter (1991) gives such a critique. These deficiencies of the RBV are increasingly being addressed; for example, see Henderson and Cockburn (1994) and Helfat (1997).

Two fundamental questions characterize the interaction between resource accumulation and the timing of market entry (see Figure 1). First, *under what conditions can early entry enhance the firm’s accumulation of superior resources and capabilities?* This is the primary question considered in our survey article and in the FMA literature. A second question, less deeply explored, relates to the selection of pioneers vs. followers: *Do the initial resources and capabilities of a firm affect its optimal (and actual) timing of entry?*

Our 1988 paper utilized terminology different from what has since become standard under the RBV. The term, ‘resources,’ is now used to denote the firm’s stock of tangible and intangible assets, including employees’ individual skills. ‘Capabilities’ or ‘competencies’ represent the organization’s collective capacity for undertaking a specific type of activity. Our 1988 paper referred to ‘assets’ (rather than ‘resources’) and ‘proficiencies’ (rather than ‘capabilities and competencies’), but otherwise the paper fits closely within the RBV framework. Below, we build upon our prior work to highlight the linkages between first-mover advantages and the RBV.

Are resources and capabilities enhanced by early entry?

The bulk of the FMA literature focuses on the potential for pioneering firms to acquire superior resources and capabilities. Early entry into an emerging market may facilitate such accumulations. But pioneers often miss the best opportunities, which are obscured by technological and market uncertainties. In effect, early entrants may acquire the ‘wrong’ resources, which prove to be of limited value as the market evolves.

Our survey paper argued that early entrants may be able to preempt resources of various types. These include superior positions in geo-

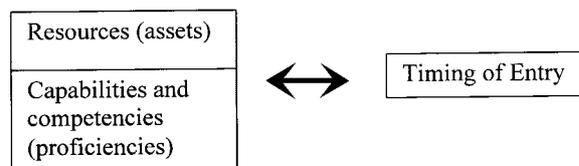


Figure 1. Interaction between entry timing and firm resources

graphic space (e.g., prime physical locations), technology space (e.g., patents), or customer perceptual space. Pioneers may be able to expand and defend their position by blocking product space with a broadening product line. Preemption of superior human resources is also possible, but employee mobility makes such an advantage difficult to sustain.

Equally important but less widely recognized, early entrants may be able to mold the cost structure of customers. This can occur in three main ways. First, there is evidence (e.g., Carpenter and Nakamoto, 1989) that customers' perceptual space may evolve in a manner that favors the initial position of the pioneer. Second, customers may develop switching costs as they accumulate experience with the pioneer's product. Third, 'network externalities' may establish the pioneer's product as the industry standard. In the latter case, customers enjoy lower costs (or greater benefits) when using the standard product, which allows compatibility with the largest base of external users. (Here, the firm's resource is the size of its customer base.) In all three cases it is interesting to note that the superior resources do not reside within the pioneering firm; rather, they exist at the level of customers, whose preferences have been shaped to favor the pioneer's product.

The mechanisms described above relate to preemption of resources. Early entrants may also gain a head start in developing a set of organizational capabilities that are key to the product or service in question. In our 1988 article we emphasized capabilities in manufacturing or marketing, often referred to as learning or experience curve advantages. The 'Yale appropriability survey' (Levin *et al.*, 1987) and its recent extension (Cohen, Nelson, and Walsh, 1997) show that such learning and lead time advantages are typically more important than patents and other commonly recognized factors.

There is, nevertheless, no guarantee that these potential advantages of pioneers will be sufficient to ensure a strong position as the market evolves. Early entrants are often overtaken by competitors with more potent resources or capabilities. Ultimately, the sustainability of a first-mover advantage depends upon the initial resources captured by the pioneer, plus the resources and capabilities subsequently developed, relative to the quality of resources and capabilities held by later entrants.

Resources and capabilities influence the timing of entry

Faced with a decision about when to enter a new market, the optimal timing often depends upon the strengths and weaknesses of the firm's existing resource base. Our 1988 paper proposed that pioneering is likely to be a desirable strategy for firms whose relative skills are in new product development, whereas firms with relative strengths in marketing and manufacturing may prefer to enter later, after the initial market and technological uncertainties have been resolved. In many cases, the timing of entry may not be subject to managerial choice, as firms with weaker innovative capabilities may be forced to positions of late entry. Such entrants can prevail if they hold valuable resources or capabilities lacked by the pioneer. Moreover, later entrants may be able to acquire pioneers, thereby linking their own resource base with the pioneer's market position, resources and skills.

In our 1988 survey we supported these arguments with anecdotal evidence. In recent years a number of systematic studies have appeared. These suggest that a firm's resource base tends to influence the likelihood and timing of entry, but in ways that are complex and still poorly understood.

Moore, Boulding, and Goodstein (1991) extended the empirical model of Robinson and Fornell (1985), allowing for the possibility that market pioneering is endogenous (i.e., entry timing is a choice variable of the firm). They detected significant endogeneity, particularly in equations for market share.²

Robinson, Fornell, and Sullivan (1992) tested for differences in resources and capabilities among entrants at alternate stages of the industry life-cycle. Their data sample included 171 entrants, typically representing the diversification efforts of *Fortune* 1000 firms. They found that market pioneers had significantly different skill and resource profiles than later entrants. As predicted, firms with greater marketing skills and shared manufacturing tended to be followers, but surprisingly, R&D skills had no discernible effect

² Murthi, Srinivasan, and Kalyanaram (1996) later found that after accounting for such unobserved, firm-specific factors there remained a robust positive effect of pioneering on market share.

on entry timing. Moreover, the overall quality of resources did not differ substantially between pioneers and followers, implying a lack of support for our speculation that 'first-movers may be intrinsically stronger or more proficient than later entrants.' An opportunity remains to extend such analysis to include independent startup companies.

Recognizing that brand image is a key resource for many established firms, Sullivan (1991) investigated the entry order of brand extensions. She found that brand extensions tend to enter later than new-name brands. Moreover, extensions of brands with large customer bases typically enter later than extensions of brands whose base is small. For brand extensions, later entry increases the likelihood of survival. These findings are consistent with incentives to avoid damage to brand equity, given that greater uncertainty exists during earlier stages of the market.

In an industry where a new product generation arises, the resource base of incumbents may affect the timing and success of their entry into the new generation. Critical determinants are the degree of product change between generations and the extent to which existing resources and capabilities have continuing value. Thomas (1995, 1996) found that in the ready-to-eat cereal industry, where most new product generations are incremental, larger incumbents were typically the first to enter. However, Henderson and Clark (1990) and Henderson (1993) assert that if the shift to the new generation is radical enough, incumbents will be hampered by their existing capabilities; i.e., they will be unable to adapt. Their argument is supported by evidence from the photolithographic equipment industry. Similarly, Christensen (1993) found a common pattern of late entry by incumbents into new generations of computer disk drives.

Mitchell (1989) considered entry into new technical subfields of the medical imaging industry. He found a tendency for firms with industry-specialized resources, such as distribution networks, to enter earlier and with higher probability. Industry incumbents were more likely to enter early if their core products were threatened but their experience base retained its value in the new technical area.³ Further, Mitchell (1991)

observed that the effects of entry timing on market share and survival differed substantially between industry incumbents and *de novo* entrants.

Taken together, these findings suggest that the effects of incumbent resources on the likelihood and timing of entry are highly nonlinear with respect to the degree of radicalness of the new generation and the quality of incumbent resources and capabilities. In general, though, the studies suggest a high degree of incumbent inertia; i.e., difficulty of transforming existing capabilities and developing a new resource base.

Linking the two research streams

The above discussion has touched upon some salient connections between first-mover advantages and the resource-based view of the firm, which have coexisted as parallel but independent research streams. We invite others to seize the opportunity to further draw these streams together. The literature on first-mover advantages provides a useful body of empirical knowledge and a potential research agenda for the RBV. Moreover, we believe that researchers studying first-mover advantages should reposition their work within the broad theoretical framework provided by the RBV.

LITERATURE UPDATE

We now consider the literature on first-mover advantages that has emerged over the past decade.

Survey articles

Since the appearance of our 1988 paper, various other surveys of first-mover advantages have been published in the strategy and marketing literature (e.g., Kerin, Varadarajan, and Peterson, 1992, Robinson, Kalyanaram, and Urban, 1994, Kalyanaram, Robinson, and Urban, 1995, Zahra, Nash, and Bickford, 1995, and Mueller, 1997). In addition, we published a chapter in the *Handbook of Business Strategy* (1991), which gives case examples to illustrate points raised in our 1988

enter in one generation and contemporaneous with new entrants in two others. In each generation the incumbents' initial products were inferior, but the firms survived if their complementary assets retained value.

³ In a related study of product generations in the typesetter industry, Tripsas (1997) found that incumbents were first to

SMJ article. We refer the reader to these surveys but do not review them in any detail.

New methodologies

Meta-analysis

Vanderwerf and Mahon (1997) applied the technique of meta-analysis to identify possible biases in tests for first-mover advantages in published empirical studies. Their data sample includes 90 tests for first-mover advantages contained in 22 separate studies. They assessed whether the finding of first-mover advantage (positive and significant, positive but not significant, negative) was related to the methods employed in the original study. In particular, they investigated whether findings were influenced by: (1) use of market share as the dependent variable, (2) industry selection by the investigator (possible bias toward industries with stronger first-mover advantages), (3) failure to control for entrant capabilities, and (4) omission of nonsurvivors.

Vanderwerf and Mahon found an exceptionally strong tendency to detect FMAs when market share was the dependent variable, confirming the concerns raised in our 1988 paper. They also found significant effects for industry selection and for the omission of controls for entrant capabilities. Surprisingly, though, they did not find significant evidence for survivor bias. Overall, their results suggest that the tendency of researchers to detect first-mover advantages may be affected by methodology: for their sample of published studies, the likelihood of observing a positive relationship between pioneering and performance was only 8 percent when none of the four research methods were used, rising to 99 percent when all four of the methods were used.

A further meta-analysis study by Szymanski, Troy, and Bharadwaj (1995) found FMA interaction effects to be more important than the main effect. One interpretation is that first-mover advantages are moderated by differences in firms' resources and capabilities. Other recent studies in the marketing literature have pointed to such interaction effects (e.g., Bowman and Gatignon, 1996).

Historical analysis

Golder and Tellis (1993) have proposed the method of 'historical analysis' as both a critique

and an alternative to the loose methods commonly used to identify market pioneers. Nearly all first-mover studies have relied upon retrospective assessments of entry order, which tend to omit nonsurvivors. Further, in the case of the PIMS data, this order is based upon self-reports that the company was 'one of the market pioneers.' In an effort to overcome these problems, Golder and Tellis selected 36 product categories and performed detailed analysis of historical information in books and periodicals. They identified: (1) the *inventor* (first to develop patent or technologies), (2) the *product pioneer* (first to develop working model), and (3) the *market pioneer* (first to sell new product), where the latter corresponds to the standard definition of first-mover. Golder and Tellis found that market pioneers had a failure rate of 47 percent. Moreover, the average market share of market pioneers was only 10 percent, and their median period of market leadership was only 5 years. By comparison, firms that were early market leaders, but not necessarily pioneers, had low failure rates (8%) and large average market shares (28%). Based on these findings Golder and Tellis suggest that the first-mover advantages identified in many prior studies are likely to be spurious, given that early market leaders are often misidentified as pioneers.

Our examination of Golder and Tellis' data raises questions about how broadly new product categories should be defined. Products developed by 'inventors' and 'pioneers,' as identified in their study, are often substantially different from those of the early market leaders. For example, in the copier machine market they identify Xerox as a later entrant, relative to 3M Thermofax, which they designate as the product and market pioneer. (An alternative view would be that Xerox pioneered the plain paper copier market, whereas Thermofax pioneered the earlier generation of coated paper copiers.) While Golder and Tellis raise important points, we are not optimistic that historical analysis can successfully eliminate the subjective element that clouds much of the FMA literature.⁴

⁴ It would be interesting, nevertheless, to see more formal sensitivity analysis of how findings of first-mover advantage may be affected by changes in the definition and breadth of product categories.

Survival analysis

In recent years, the field of population ecology has employed powerful statistical tools for examining firm survival (Hannan and Freeman, 1989; Hannan and Carroll, 1992; Blossfeld and Rohwer, 1995). These tools have been used to assess characteristics that may promote the survival of organizational populations (rather than individual firms). Order of entry effects have been considered only indirectly in the ecology literature; for example, by testing measures such as population density (number of competitors) observed at the time of company founding.⁵

While this population-level perspective differs from the firm-level focus of strategy and marketing, the tools of hazard rate estimation are well suited for evaluating the impact of entry order on market survival. Indeed, we believe that greater use of such tools by strategy researchers would denote a healthy shift away from the excessive emphasis on market share in first-mover studies. A further opportunity exists for researchers in the field of organizational ecology to expand their perspective by more explicitly considering issues of entry order.

Experimental studies

Marketing scholars have increasingly turned to experimental studies to explore how entry order may affect the process of consumer preference formation (e.g., Kardes and Kalyanaram, 1992; Carpenter and Nakamoto, 1994; Zhang and Markman, 1998). Such work suggests that the order of product introduction may affect consumers' memory, perception of features, and formation of judgments about competing brands. Experimental studies offer a controlled setting for isolating and identifying these aspects of first-mover advantage.

Theoretical contributions

The 1980s were a period of great advance in the field of theoretical industrial organization economics as the insights of game theory were brought to bear; since then, progress has been

more incremental. Our 1988 survey gives numerous links to the theoretical economics literature applicable to first-mover advantages, but we note some important areas of continuing advance.

'Network externalities' and the establishment of product standards is one area where recent progress has been substantial. The survey article by Katz and Shapiro (1994) provides a guide to these developments. Related concepts of path dependence and increasing returns are articulated in Arthur (1989) and subsequent work.

Our 1988 paper stressed the endogeneity of entry timing and made a plea for theoretical modeling of factors that may influence entry order. Numerous studies of this sort have appeared in recent years, including Aron and Lazear (1990), Gabszewicz, Pepall, and Thisse (1992), Dutta, Lach, and Rustichini (1995), and Maggi (1996).

Increasingly, marketing scholars have constructed theoretical models relating to first-mover advantages (e.g., Fershtman, Mahajan, and Muller, 1990; Carpenter and Nakamoto, 1990). Recent theoretical studies have considered how FMAs may depend upon the pioneer's anticipation of, and reaction to, subsequent entry (Gatignon, Anderson, and Helsen, 1989; Shankar, 1997; Srinivasan and MacLaurin, 1998). This work leads to prescriptions regarding optimal strategic defense by the industry incumbent. Other theoretical models in the marketing field suggest that innovative late movers may be more profitable than pioneers (e.g., Shankar, Carpenter, and Krishnamurthi, 1998), a result that also arises in some of the economic models of endogenous entry timing. Such theoretical findings of 'late-mover advantage' have received growing empirical support (e.g., Schnaars, 1994; Berndt *et al.*, 1995; Zhang and Markman, 1998).

Empirical evidence

Numerous applied studies have been noted in the previous sections of this paper. Table 1 summarizes further evidence from recent empirical studies. We draw a number of general conclusions from this empirical work of the past decade:

1. Entry order effects exist, especially with respect to market share, but they are better specified as interactions than as direct effects.
2. The magnitude of first-mover advantages var-

⁵ One exception is Barnett and Freeman (1997), who include among their explanatory variables a count of the number of times that the organization was the pioneering entrant into one of 80 new product categories in the semiconductor industry.

Table 1. Summary of recent empirical papers on first-mover advantage

Author	Dependent variable	Independent variable(s)	Sample size	Model/analysis	Results
<i>Meta-analysis</i>					
Vanderwerf and Mahon (1997)	Sign and significance of tests for first-mover advantage	Use of research methods: market share, sample selection, survivor bias, limited variables	90 tests from 22 studies	Meta-analysis	Use of market share, sample selection, limited variables overstates first-mover advantage; survivor bias not significant
Szymanski, Troy, and Bharadwaj (1995)	Market share	Meta-analysis: omitted variables, sample characteristics, measurement factors Test of framework: interaction and main effects	Meta analysis of prior studies; 2746 SBU responses from the PIMS data base	Meta-analysis Test of framework: hierarchical regression analysis (HRA)	Order of entry exerts a significant, positive direct effect on market share, but order of entry may be best modeled as an interaction effect rather than a main effect
<i>Pioneer skills</i>					
Murthi, Srinivasan, and Kalyanaram (1996)	Market share	Order of entry, product variables, marketing instruments, efficiency/skills	236 business units for 3 years	Random intercepts model/maximum likelihood	Pioneering advantage is significant even when managerial skills are included
Robinson, Fornell, and Sullivan (1992)	Order of entry	Functional skills of entrant	171 companies	Multinomial logit/maximum likelihood	Market pioneers are different from later entrants but are not intrinsically stronger
Rao, Vakratsas, and Kalyanaram (1998)	Eq. 1: Relative positioning Eq. 2: Elapsed time since last entry Eq. 3: Relative market share	Eqs. 1 and 2: Order of entry, recency of the product category Eq. 3: Relative advertising, two entry variables: order of entry, entry time difference (elapsed time since last entry), relative positioning, recency of the product category	134 brands across 34 product categories extracted from the ASSESSOR data base	Three-equation system; the follower's strategy is represented by the first two equations. The third equation represents the market share penalty faced by a follower firm. The system of equations is estimated by nonlinear SUR	Followers are more likely to react by changing their entry timing than by changing both their entry timing and positioning. In recent categories followers enter more rapidly than in older product categories. However, the reduction in time of entry in recent product categories does not completely overcome the higher order-of-entry penalty in these categories

Table 1. Continued

<i>Marketing mix</i>					
Kalyanaram and Urban (1992)	Market share Trial penetration Repeat purchase	Order of entry, price, position, marketing mix	28 brands (average of 69 weekly observations/brand)	Exponential model/ non-linear least squares	Later entrants have lower asymptotic performance levels but approach them faster
Bowman and Gatignon (1996)	Market share	Marketing mix variables as a function of order of entry	5 product markets (2 durable, 3 nondurable), 55 brands, 3729 observations	Linear regression/ weighted least squares	Marketing mix responsiveness decreases with order of entry; main effect of order of entry not significant
Kalyanaram and Wittink (1994)	Relative market share	Marketing variables: price, distribution, and advertising and promotion expenditures (expressed as a ratio relative to the first entrant); entry variables: order of and entry, time difference between entrant <i>i</i> and entrant <i>i</i> -1	Five packaged goods categories with 3-5 brands each (19 brands total); 220 weeks of data aggregated across eight cities for each category	Log-linear regression/OLS	Confirming previous studies, share is negatively related to order of entry and time between successive entries. However, the magnitude of the entry effects must be assumed to be specific to the product category. In other words, there is heterogeneity in entry effects across categories.
Nehrt (1996)	Percentage growth in real net income	Timing and intensity of pollution-reducing investments, five control variables: timing of regulation, growth in real GDP, growth in wages, log of firm's initial net income, and growth in sales	50 chemical bleached pulp manufacturers in eight countries, including 19 companies from the U.S.	Multiple regression/OLS	Timing of pollution-reducing investments has a significant positive impact on performance. The effect of environmental regulations is nonsignificant, which conflicts with conventional wisdom that more highly regulated countries place their firms at a competitive disadvantage
<i>Time-in-market</i>					
Brown and Lattin (1994)	Market share	Order of entry, time in market, marketing activity	Sample 1: 129 brands Sample 2: 40 regional markets	Regression/OLS	Time in market is highly significant—order of entry advantage dissipates over time
Huff and Robinson (1994)	Market share	Order of entry, lead time, time of introduction (pre- or post-1960), years of competitive rivalry	95 observations in 34 frequently purchased consumer goods categories (Urban <i>et al.</i> , 1986 data)	Log-linear regression/OLS	Longer lead time increases the pioneer's advantage; pioneer's relative advantage declines over time with competition

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Table 1. Continued

Author	Dependent variable	Independent variable(s)	Sample size	Model/analysis	Results
Shankar, Carpenter, and Krishnamurthi (1998))	Brand sales	Cumulative sales (long-term asymptotic sales potential), cumulative sales of the closest competitor(s), own journal advertising expenditure, own detailing expenditure, total marketing mix expenditures of the closest competitor	Data set from a prescription drug market; each observation is subscribed by a brand i and month t ; 124 months, 8 brands	Exponential model/nonlinear least squares	An innovative late mover can create a sustainable advantage by: (1) enjoying a higher market potential and a higher repeat purchase rate than either the pioneer or non-innovative competitors, (2) growing faster than the pioneer, (3) slowing the pioneer's diffusion, and (4) reducing the pioneer's marketing mix effectiveness
Kerin, Kalyanaram, and Howard (1996)	Brand trial penetration	Marketing variables: price, distribution, advertising expenditure, promotion expenditures (ratio relative to the first entrant); Entry variables: order of entry, entry time difference from last entrant	Four packaged goods categories with 3–5 brands each: 120 observations (cereal), 100 observations (juice), 100 observations (ibuprofen), and 140 observations (toothpaste)	Log-linear regression/maximum likelihood	The order-of-entry effect is greatest for a new product class pioneered by a brand extension. Order of entry has the least effect on a new product form pioneered by an entirely new brand. Although order-of-entry effects are significant, the effects of marketing mix variables such as price and promotion are stronger
Patterson (1993))	H ₁ : Four performance measures: industry share, net profit share, return on sales, and return on equity H ₂ : Intercept of 'opportunity curve' H ₃ : Temporal strategic barrier height	H ₁ : Industry age at time of entry H ₂ : Perceived height of temporal strategic barriers H ₃ : Exponential decay coefficient of the opportunity curve function	151 firms drawn from six industries. The performance measures were taken from Standard & Poor's Industry Surveys (1988)	H ₁ : Exponential OLS specification linearized by log transformation H ₂ and H ₃ : Correlational analyses and pairwise tests	Statistically significant results of expected form for industry share and net profit share; return on sales and equity regressions not statistically significant. Evidence that temporal strategic barriers perform the function of preserving benefit for early entrants

Table 1. Continued

<i>New markets</i>					
Mascarenhas (1992a,b)	Market lag Order of entry Market share, entrant life	Market characteristics Firm characteristics Order of entry	8000 rig-year observations (international)	Survival data analysis/maximum likelihood regression/OLS	Pioneer market share advantage is larger than found in U.S. samples
Tufano (1989)	Securities underwriting spreads Market share of securities offerings	Pioneer vs. imitator	1944 publicly underwritten offerings based on 58 financial innovations	Linear regression/OLS Univariate analysis and comparison	Pioneers capture larger market share than imitators, but are not able to charge higher prices (spreads)
<i>Brand retrieval</i>					
Kardes <i>et al.</i> (1993)	Brand retrieval Brand consideration Brand choice	Pioneer, brand attributes, size of retrieval and consideration sets	18 brands 115 subjects	Sequential logit/maximum likelihood	Brand retrieval and consideration process contributes to the pioneering advantage
Alpert and Kamins (1995)	Brand retrieval, recall, attitude and purchase behavior	Pioneer vs. follower brands	366 consumer survey respondents	Univariate analysis and comparison	Pioneers generate positive attitudes and purchase intentions, but retrieval and recall were not as favorable

- ies greatly across product categories and geographic markets.
3. First-mover advantages dissipate over time but are enhanced by longer lead times before competitive entry.
 4. Entry order effects, although significant and robust, are weaker than 'marketing mix' effects related to price and advertising. Later entrants can utilize this result to catch up to and surpass pioneers.

Selected empirical studies on international and consumer behavior aspects of FMAs are discussed below.

International/global

The empirical evidence relating to first-mover advantages is drawn largely from the United States. We believe that more research is needed on the applicability of such first-mover results to other national environments. The few comparative studies performed to date suggest that international differences are substantial. Song and Di Benedetto (1996) found that managerial perceptions of first-mover advantages differ greatly across countries. Alpert *et al.* (1996) observed that more than half of the products offered by Japanese suppliers to supermarket retailers were pioneering brands, as compared with only 14 percent of the products offered by comparable U.S. suppliers. The latter findings suggest that the Japanese market is more innovation oriented, thereby rendering first-mover advantages more important.

Nakata and Sivakumar (1997) provide a theoretical analysis of how the characteristics of emerging national markets are likely to affect first-mover advantages. Mascarenhas (1992a,b), in an analysis of international markets for semi-submersible oil-drilling equipment, found an intermarket impact of pioneering that was greater than the intramarket effect. This suggests that in some industries it may be important to pioneer simultaneously in many national markets, rather than to pioneer within each market sequentially over time.

Consumer behavior

In their prize-winning article in the *Journal of Marketing Research*, Carpenter and Nakamoto (1989, 1994) suggest that consumer preferences

are partly based upon the outcome of competition (as a result of the evolution of consumer preferences with experience). They conclude that competition between pioneers and followers may be seen as a race to gain advantage by shaping the nature of consumer preferences.

Building on this insight, several researchers have sought to integrate psychological understanding of pioneering and choice within a cognitive economics approach. Kardes and Kalyanaram (1992) found for consumer packaged goods that consumers learn more about a pioneer than about later entrants, thereby giving rise to robust first-mover advantages, and that these advantages increased over time, especially when consumers were reminded of the pioneer product's features. Kardes *et al.* (1993) found that pioneering brands were more likely to be retrieved from memory, considered for choice, and actually chosen. Similarly, Alpert and Kamins (1995) found that consumers have a positive attitude toward pioneer brands. Muthukrishnan (1995) adds to these empirical results the notion that decision ambiguity creates an advantage for the incumbent brand, thereby enhancing first-mover advantages. These findings suggest that considerable first-mover advantages may result from consumer cognitive processes.

Case studies

Finally, several recent studies have focused on first-mover effects in specific industries or markets. These include financial products (Tufano, 1989), ethical drugs (Shankar, Carpenter, and Krishnamurthi, 1998), bleached pulp (Nehrt, 1996), and offshore oil rigs (Mascarenhas, 1992a,b).⁶ In addition there have been some descriptive case studies on the frozen food industry (Geroski and Vlassopoulos, 1991; Sutton, 1991) and the VCR industry (Rosenbloom and Cusumano, 1987; Cusumano, Mylonadis, and Rosenbloom, 1992). A recent assessment of dominant firms (Rosenbaum, 1998) found first-movers in four out of 10 industries. Many of these studies provide rich detail on entrant characteristics and market evolution.

⁶ Historical studies covering multiple product generations within an industry, as described earlier in this article, include Mitchell (1989), Henderson (1993), Christensen (1993), and Tripsas (1997).

CONCLUSIONS

What then are the research opportunities in the first-mover area as the new millennium approaches? In our view some of the important issues for future research are as follows:

1. We have suggested that the resource-based view (RBV) and first-mover advantage (FMA) are related conceptual frameworks that can benefit from closer linkage. The findings of FMA studies on resource accumulation by early entrants can help to overcome the empirical deficit of the RBV. Moreover, we believe that FMA research can be strengthened if positioned within the broad theoretical perspective of the RBV.
2. As we noted in our original paper, the endogeneity of entry order is an important issue to be investigated. The theoretical literature has moved forward in this regard, and there has been a small amount of empirical research. A continuing challenge is to understand the determinants of entry order and lead times across a diversity of market environments with heterogeneous firms.
3. We see little to be gained from more studies demonstrating first-mover advantages based on market share. Empirical tests should increasingly be related to profit performance. There is also an opportunity to apply statistical tools of survival analysis, as developed by population ecologists. We challenge the ecologists to 'have a go' at first-mover advantage research.
4. The focus of most FMA studies has been upon first-mover advantages. Only recently have first-mover disadvantages and follower advantages attracted significant attention. These should be more carefully explored; we suspect that the potential advantages accruing to followers may be as important as those going to pioneers.
5. Too high a fraction of our existing knowledge is based upon U.S. experience and data. International and cross-cultural studies are needed to determine if the drivers of first-mover success and failure differ across countries. Moreover, the antecedents and consequences of these differences should be identified and explored.
6. Finally, it is increasingly clear that no simple

managerial prescriptions apply with regard to FMAs and the optimal timing of entry. More research is needed on the strategic choices that pioneers and followers should make under different environmental conditions. Cross-fertilization between strategy and marketing should be particularly fruitful here.

We conclude with a call to researchers in both strategy and marketing to increasingly monitor the other's literature. In writing our 1988 paper we found that our different backgrounds strongly complemented each other. Our receipt of the SMJ best paper prize suggests that great benefits can arise from such interdisciplinary collaboration.

ACKNOWLEDGEMENT

The assistance of Dana MacLaurin, PhD candidate at the Stanford Graduate School of Business, is gratefully acknowledged.

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