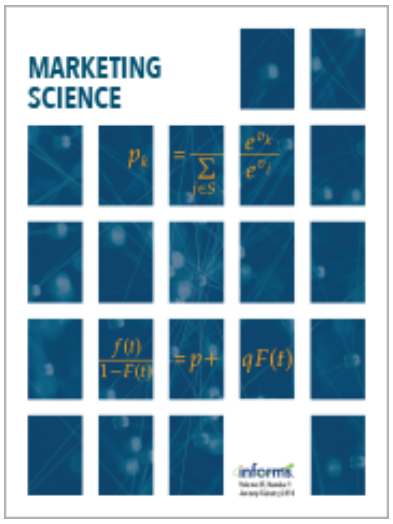

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Research Issues at the Boundary of Competitive Dynamics and Market Evolution

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Building on the observation that competitive dynamics and market evolution are inextricably linked and underresearched, we propose a road map to guide and stimulate future research in the area. A number of rationales have been proposed to explain why there is relatively little research directed toward understanding the links between competitive dynamics and market evolution; these include the predominance of different research paradigms in each area, a lack of data appropriate for analyzing the two areas together, and the difficulty of obtaining robust and significant results with analysis that is by definition complex (it must consider factors and outcomes both across firms and over time). Using this last rationale as a starting point, we develop a series of research propositions related to key relationships where (a) insignificant or contradictory results have been obtained (in extant research) or (b) researchers have yet to delve. The propositions are designed to deepen our understanding of the relationship between the areas. Throughout the analysis, the key to developing the propositions is to recognize the importance of moderating factors, mediating factors, and covariates. In addition, where the approach to empirically test a proposition is new, we propose categories, measures, and comparisons that can be used.

Key words: competition; market growth; market potential; competitive response; market structure
History: This paper was received September 11, 2001, and was with authors 6 months for 4 revisions; processed by Gary Lilien.

1. Introduction

Casual observation and a number of studies provide strong evidence that interfirm competition is strongly related to how markets evolve. For example, in new markets, firms constantly innovate and try to improve on competitive products; this is less true in mature markets. In mature markets, firms respond both immediately and aggressively to price reductions by competitors and this is less likely in new markets. While some links between competitive behaviour and market evolution are known and integrated into the fabric of managerial wisdom, it is surprising that little academic research has focussed on understanding these links. As noted in Lambkin and Day (1989) and more recently by Gatignon and Soberman (2002), competitive dynamics and market evolution have received significant individual attention in the past, but interactions between the two are underresearched. Therein lies the purpose of this article. Our objective is to stimulate and guide future research designed to improve our understanding of the interactions between competitive dynamics and market evolution.

We build on Gatignon and Soberman (2002), which surveys the major elements of competitive dynamics and market evolution, respectively, and discusses the small but extant literature that considers interactions between the two. While this chapter is comprehensive, it leaves us with a fundamental conundrum: "Why has so little work been done to understand links between two areas that seem inseparable?" The authors propose several explanations, including (1) the ease of focussing effort in one subject area, (2) a paucity of data that covers both the evolution of a market (from infancy to maturity) and competitive reactions over the period, (3) two research areas that have their origins in different disciplines (this difference seems to have created an artificial barrier to looking at both areas simultaneously),[1] and (4) studies that focus on the links tend to generate either insignificant or contradictory results. While all of these are plausible, the survey lends strong support to the fourth explanation. Researchers have often oversimplified the relationships between competitive dynamics and market evolution. This seems to be an important cause of contradictory or insignificant results because the links between competitive dynamics and market evolution appear to be quite complex.

We take as given that market evolution and competitive dynamics have strong links. It is our belief that if future studies recognize the complexity of the links between the two areas, they should have no more

[1] The study of market evolution has its origins in sociology (and the study of diffusion). The study of competitive reaction has its origins in economics and game theory.

than average difficulty in obtaining clear results. Frequently, factors of market evolution do not have direct effects on competitive dynamics, but affect competitive dynamics through intermediate factors. In other words, the relationship of key factors of market evolution to key factors of competitive dynamics is frequently mediated by unobserved factors. Another aspect of the complexity is the prevalence and role of moderating factors. In addition, this type of research exists in a context of evolving markets where many things change, not just the variables of interest (an ignored but important covariate can be responsible for generating insignificant results when its effect is opposite to the variable of interest).

From this starting point, the paper proposes a research road map. We propose the framework of Figure 1 adapted from Gatignon and Soberman (2002) as a basis for developing research propositions.

This figure emphasizes *links* between competitive dynamics and market evolution and distinguishes between links based on the direction in which they act. However, within the framework of Figure 1, it is possible to conceive of scores of possible links between the two areas. Accordingly, we focus our discussion on links that have high potential to stimulate interesting research. We do this by examining those links where existing research has yielded inconclusive or contradictory findings. Second, we highlight a number of links that are intuitively important, but are, at present, unexplored. To develop logically consistent propositions, we use the literature in economics, psychology, and sociology to deduce possible moderating factors, mediating factors, and critical covariates. A key objective is to develop propositions that can be subjected to rigorous empirical testing. Where the approach to empirically test a proposition is new, we propose categories, measures, and comparisons that can be used.

In the following section, we present the research propositions for links where factors of competitive dynamics affect market evolution. In the third section, we move to links that act in the opposite direction. In the final section, we consider propositions that deal with how external factors might affect the links between competitive dynamics and market evolution.

2. The Effects of Competitive Dynamics on Market Evolution

The research that discusses how competitive dynamics affect market evolution falls into two groups. The first involves research that focusses on the nature of competition between firms. Here, authors have attempted to explain their findings based on the evolutionary state and/or the structure of the market. The second group is research that seeks to understand market evolution from a perspective of population ecology (Rogers 1983). Here, researchers have identified competitive behavior (especially the entry and

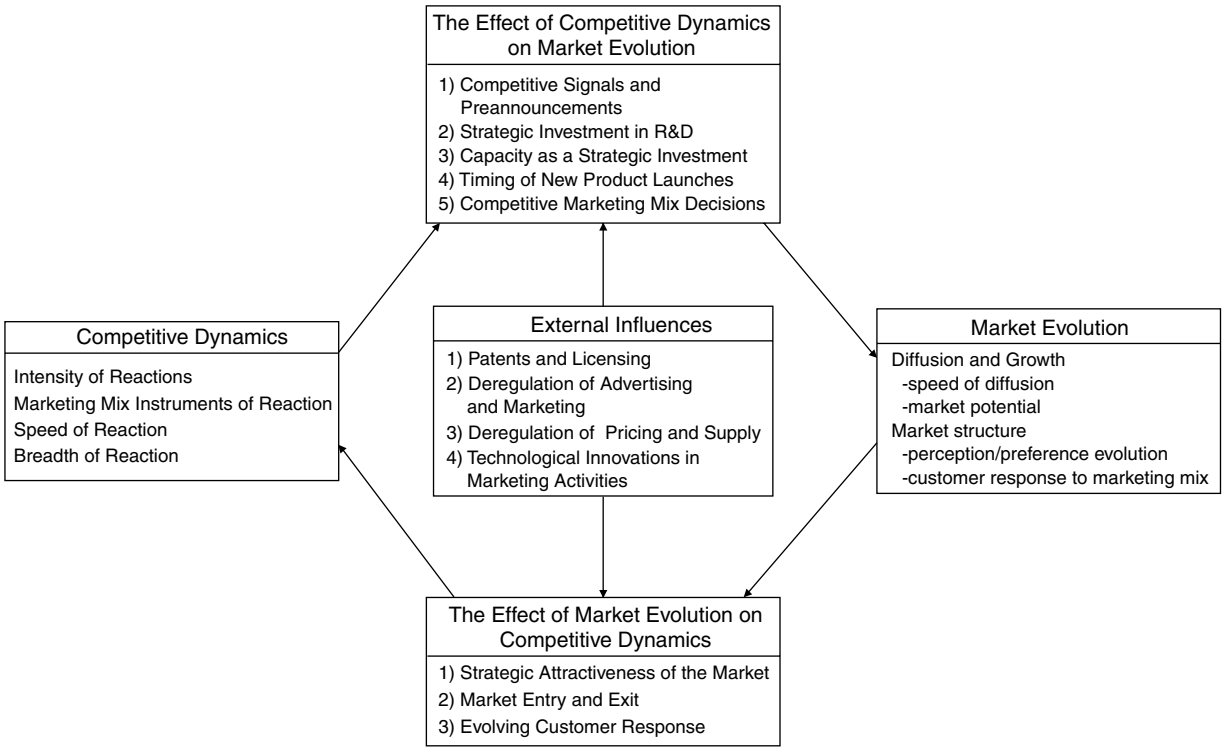

Figure 1 A Framework for Understanding the Interactions Between Market Evolution and Competitive Dynamics

exit of firms) as having an important effect on the speed with which a market develops (Lambkin and Day 1989). Because the second group has restricted its examination of competitive behavior to entry and exit, we base this section on how the key factors of competitive response identified in the first group affect market evolution. Our focus is on links where there has been significant controversy or where, intuitively, a hypothesized link should be important. We group the links under five headings: preannouncements, strategic investment in R&D, capacity as a strategic investment, timing of new product introductions, and competitive marketing-mix decisions; and propose at least one testable proposition for each.

2.1. Preannouncements

In general, preannouncements are costless declarations that firms make to either competitors or customers (Robertson et al. 1995). When firms target preannouncements to competitors, the usual objective is preemption, and sometimes to give competitors a basis for not entering the market. The use of preannouncements for pricing is also important (Heil and Langvardt 1994). Researchers have shown that managers can reduce the likelihood of price competition when they are able to send coded messages to each other (Moore 1992). Accordingly, much of the interest in preannouncements has been antitrust because limiting price competition is generally not in the public interest. When preannouncements are used in this way, they act as impediments to market growth and development.

When the target of preannouncements is consumers, their primary role is to reduce information asymmetry and improve the matching of buyers with sellers. In many markets, consumers often lack complete information about the products that are available, and this limits their willingness to buy. Preannouncements increase the information that consumers have and facilitate greater alignment by allowing groups of consumers to find or interact with sellers that better suit their preferences (Gibbons 1992). This role can extend to communicating a firm's intentions to employees, channel members, and other related parties (Calantone and Schatzel 2000). Here, preannouncements allow a market to function more effectively. When used in this way, preannouncements should foster higher growth and a larger market for a given product.

These two roles for preannouncements have opposite effects on market growth, and this may in large part explain why there is mixed evidence regarding the impact of preannouncements.

A definitional issue also contributes to confusion about the impact of preannouncements. While preannouncements are defined as costless declarations of information, the literature refers to situations where preannouncements are not costless. Certain types of announcements entail legal obligations (making them irreversible) or stake a firm's reputation to the announcement. In fact, Eliashberg and Robertson (1988) conceive preannouncements as a form of signaling where costs can be incurred. However, this conception of preannouncements creates confusion. The primary feature that distinguishes preannouncements from signals is that preannouncements do not impose a cost on the party making the preannouncement (signals do). As a result, simple announcements that focus on the quality of future products have less impact because they do not impose a significant cost on a party making a false claim. In contrast, signals (like warranty length) are informative about quality because they impose a cost on a firm making a false claim (Spence 1974). In other words, this difference between preannouncements and signals is what determines the type of information that is most common in consumer-directed preannouncements (information that improves matching as opposed to information that makes claims of superior performance).

To avoid confusion, we assume that preannouncements do not impose a cost on a firm making a misleading claim. Even with this clarification, we face the dilemma posed by the counteracting effects noted previously. The economics literature suggests that the number of firms might play an important role in moderating the impact of preannouncements (Jacquemin and Slade 1989). The first effect (improved matching of buyers and sellers) is stronger when there are many competitors because when many firms must coordinate their actions, the ability of preannouncements to facilitate coordination is reduced. In contrast, when there are few competitors, the coordination effect is likely to be stronger, and this leads to Propositions 1 and 2.

Proposition 1 (P1). *Preannouncements tend to increase the growth and size of a market when there are many competitors due to better matching of supply and demand.*

Proposition 2 (P2). *When there are few competitors, preannouncements tend to reduce the likelihood of price wars, which result in lower rates of market growth.*

2.2. Strategic Investment in R&D

Competing firms devote considerable time, effort, and resources to the creation of technological progress (Arrow 1962). R&D is primarily an issue for incumbent firms because they are familiar with the category and have the expertise and resources within their organizations to innovate (Gilbert and Newbery 1982, Adams and Encaoua 1994).[2]

[2] Of course, because of arrogance or inertia, an incumbent might choose not to capitalize on this advantage.

The primary classification for technological progress (or innovation) is whether a new technology is a product or a process innovation. Product innovations are those that are perceived directly by consumers, whereas process innovations are those that allow firms to produce the same good at a lower cost (Abernathy and Utterback 1978, Athey and Schmultzer 1995). The most common form of product innovation is an improvement in quality, where the performance of the new product clearly dominates the performance of the old product. An improvement in quality generally means that (a) existing customers will be willing to pay more for the product and (b) more consumers will come into the market. As a result, the literature posits that product innovations are more likely to lead to market expansion than process innovations. However, the research on this point is inconclusive.

One possible explanation for the inconclusive results lies in the standard used to classify innovations. The process/product classification may be restrictive because product innovation is a richer concept than simple improvements in quality (Gatignon and Soberman 2002). There is a rich literature about how differentiation can be used as a competitive strategy (Bain 1949, 1956; Lane 1980). Differentiation can be thought of as a strategy that entails introducing products that possess benefits or features that are unavailable from existing products.

Building on this idea, economists have defined vertical product innovations as those that provide a higher benefit for existing customers (holding prices equal). In contrast, horizontal product innovations entail a new product that is more highly valued by consumers who place a lower value on the existing product; i.e., horizontal innovations lead to products with different characteristics that are preferred by consumers with different tastes (Eswaran and Gallini 1996). In the first case, leapfrogging is important because a highly priced vertical innovation has the capability to fully replace the existing product without expanding the market significantly. In contrast, horizontal innovations bring new segments into the market and may elicit limited reaction from existing competitors (in terms of price or marketing). These observations lead to Propositions 3 and 4.

Proposition 3 (P3). *Vertical innovations will lead to market expansion if and only if firms react to the innovation by reducing price.*

Proposition 4 (P4). *Horizontal innovations lead to market expansion independent of the price response of incumbent firms.*

These propositions could be tested in categories like pharmaceuticals, where there is culture of frequent innovation, substantial data (due to the patenting and licensing process), and the nature of an innovation (vertical versus horizontal) can be classified with less ambiguity. For example, innovation is frequent in drug classes such as corticosteroids, antiulcer drugs and antidiabetic drugs. Some of the new drugs are simply superior to the existing treatment (vertical innovations), and others have extended the therapeutic application of the category to different ailments (horizontal innovation).[3] The propositions suggest that vertical innovations increase the size of the category mainly when the competitors reduce price in reaction to the innovation. In contrast, horizontal innovations should increase the size of the category regardless of how the incumbents react.

2.3. Capacity as a Strategic Investment

Incumbents can build *excess* production capacity as a barrier to entry (Spence 1977, Dixit 1979, Demsetz 1982). While some entry barriers form naturally due to regular business activity (Bain 1956), an incumbent can build capacity with the express intent of not using it. The idea is that an incumbent can make a conscious decision to build excess capacity in order to reduce the cost of responding to a potential entrant. This literature focuses on manufacturing capacity; however, the logic of this work applies to any fixed investment that may reduce the cost of responding to a new entrant (for example, distribution and after-sales service capacity). As a result, in the growth stage incumbents may have excess capacity beyond what might be expected due to forecasting error.

Of course, with the incentives described above, it is possible that more than one incumbent will invest in excess capacity.[4] In addition, changes in technology (e.g., globalization of communication channels) or regulation (government rules allow greater competition between two previously isolated markets)[5] can lead to two or more firms with excess capacity. If several firms have excess capacity and the market price exceeds the marginal cost of production (as is often the case in growing markets), the motivation to

[3] We are concerned here with new benefits within a product category, although sometimes an innovation may open an entirely new category or compete in other existing categories.

[4] In the early 1990s, many Asian developers invested heavily in building capacity in the golf industry. However, the Asian crisis of 1997 resulted in rapid decreases in pricing. As a result, there has been unprecedented growth in the popularity of golf amongst the local population (see "Sub-par Performance of Clubs of Asia Has Golfers Tee-d off," *Wall Street Journal Europe*, March 9, 2001).

[5] For example, in 1999 changes in Canadian regulations for foreign publications have allowed U.S. publications with overcapacity to enter Canada with very competitive pricing (see "Butting Heads Over Split-Run Magazines . . .," *CBC Newsworld*, Feb 03, 1999, http://cbc.ca/cgi-bin/newsworld).

increase production is strong. Consequently, a market may suddenly be faced with high inventories, and this can lead to significant price reductions. As noted earlier, such declines in market prices can lead to demand expansion and an acceleration of the diffusion process. It is through this mechanism that excess capacity plays a role in accelerating the rate of diffusion. Interestingly, even monopolists may attempt to accelerate the rate of diffusion through penetration pricing when network or experience curve effects are strong (Robinson and Lakhani 1975).

Proposition 5 (P5). *The greater the number of firms with excess capacity in the growth phase, the higher the likelihood that unexpected reductions in pricing will lead to an acceleration in market growth.*

2.4. Timing of New Product Launches

The timing of product launches is a key dimension of competitive dynamics (Kuester et al. 2000) and an important determinant of ultimate market structure (the degree to which a category is dominated by one firm). The so-called "first-mover" advantage is supported by numerous empirical studies and is based on the role that pioneers play in "setting" consumer expectations. These advantages can lead to situations where inferior pioneers retain leadership even when the new entrants are superior (Carpenter and Nakomoto 1989, Kardes and Kalyanaram 1992). Of course, when a pioneer launches a product that is close to the true preferences of consumers, the first-mover advantage is amplified. Empirically, me-too products are observed to perform poorly when they provide similar attributes and are priced somewhat lower (Bond and Lean 1977).[6] Nevertheless, the success of generic drug manufacturers and Japanese automobile manufacturers shows that being a follower can be successful.[7]

Interestingly, the first-mover literature has focused primarily on the alignment of the new product with the preferences of the early customers in the market. Although this contributes to our understanding of market evolution, it ignores two additional aspects that affect the sustainability of the first-mover advantage. First, for first-movers, potential consumers are completely uninformed about the category. The first-mover needs to make significant marketing investments to educate the market about the category and its benefits. In contrast, the marketing expenditures of late entrants can be focused on building a brand image or emphasizing the benefits of the follower product (e.g., better price, better performance, easier to acquire) to a greater extent. Because the category is already well understood, the late entrants benefit from the category-creation expenditures of the first-movers.

Second, it is easier for a late entrant to adopt preferred levels of certain attributes. For late entrants, there is less guesswork in designing a product, because they have the benefit of observing consumer response to the first-mover (in a sense, the first-mover is a test market for companies that enter the category late). In fact, second-movers perform better when they offer levels on certain attributes that are significantly different from those offered by the first-mover (Carpenter and Nakomoto 1989). Moreover, if the first-mover's product is significantly different on key attributes from what consumers want, and is difficult to modify because of supply- or demandside constraints, the late entrants may be in a better position to launch preferred versions of the product.

We summarize the expected impact of launch timing on market structure in the following proposition.

Proposition 6 (P6). *The degree to which a market will be dominated by a first-mover is inversely related to* (a) *the need to create awareness for a new category and* (b) *the degree to which the first-mover's product is aligned with the preferences of consumers who enter the market late.*

2.5. Competitive Marketing-Mix Decisions

In most categories, firms use a number of marketing levers, including advertising, sponsorship, promotion, distribution, sampling, merchandising activity, pricing, and endorsements. Firms allocate their resources (marketing budget) across these elements, and this leads to the question of whether the way in which firms allocate their resources affects market evolution. There are models that incorporate marketing activity into the diffusion process, and they are complicated because the effects of many marketing activities are lagged and not instantaneous (Erickson and Montgomery 1980, Gatignon and Robertson 1991, Franses 1994). In addition, there is evidence the marketing mix is endogenously determined by a firm's market position and the maturity of the category (Bronnenberg et al. 2000).

However, these studies do not provide sharp conclusions about how breadth of competition affects market growth or market potential. There is evidence that high levels of activity on one element can affect the responsiveness for another (Gatignon 1984). For example, high levels of competitive advertising may accelerate the category growth by increasing awareness, and this can make consumers more

[6] The most likely situation for the launch of me-too products is clearly when the pioneer has launched a product without any weaknesses.

[7] Many of the key innovations in automobiles such as transverse-mounted engines, front-wheel drive, independent suspension, and fuel injection were introduced by European and American manufacturers, but were successfully commercialized by Japanese manufacturers.

responsive to other marketing instruments (Bowman and Gatignon 2000). Studies such as these lead to general conclusions about the general impact of "competitive activity" on market growth. However, little attention has been given (even by "competitive dynamics" researchers) to how market outcomes are affected by the breadth of competition between firms, i.e., the extent to which competitors concentrate their competitive reactions on one marketing-mix variable versus using a full spectrum of marketing tools.

Frequently, different segments are more (or less) responsive to different marketing activities. Here, the size of the market will be positively related to the breadth of competition. In addition, the use of multiple marketing instruments will lead to heterogeneity in the way that the market responds to various marketing-mix elements.

On another note, a broad response from a single dominant firm may be a strategy to make it (a) more difficult for a potential competitor to generate awareness and, consequently, trial for its product, or (b) more difficult for a potential competitor to differentiate itself from the incumbent. This entry deterrence strategy may contribute to short-term development of the market (through lower prices and greater communication efforts), but it can lead to a lower level of penetration in the longer term due to reduced competition.

We summarize the observations relating to the impact of the breadth of competition on market growth and potential in Propositions 7, 8, and 9.

Proposition 7 (P7). *The greater the breadth of marketing-mix reactions, the greater the number of segments reached and the more heterogeneous the nature of demand.*

Proposition 8 (P8). *When the number of competitors is high, the greater the breadth of marketing-mix reactions, the higher the rate of market growth and long-term penetration of the market.*

Proposition 9 (P9). *When the number of competitors is small, the greater the breadth of the marketing mix employed, the greater is the likelihood of entry deterrence and, consequently, the lower the long-term penetration of the market.*

A key challenge in testing Proposition 7 is the definition of segments and measuring the heterogeneity of demand. For most consumer categories, segments are defined on a demographic basis. However, other metrics might be applied (such as lifestyle, need-based or occasion-based segments). Across similar categories, one would test to see if there is greater variance in consumer characteristics when competitors respond to each other across a wide, versus a narrow, array of marketing instruments.

3. The Impact of Market Evolution on Competitive Dynamics

Gatignon and Soberman (2002) identify three broad explanations for why market evolution affects the way competitors respond to each other. The first is the strategic attractiveness of the market over time (in terms of its expected size, the ease of meeting customer needs, and the ability to generate long-term profits), the second is the number of competitors over time (which changes due to the entry and exit of firms), and finally, there is the evolution of customer response.

3.1. Strategic Attractiveness of the Market

The literature examining the nature of competition in markets characterized by different levels of market growth provides ambiguous conclusions. Most empirical work suggests that competitive reactions are stronger and faster in growing markets (Ramaswamy et al. 1994, Robinson 1988, Bowman and Gatignon 1995). However, Gatignon and Soberman (2002) note that the opposite might be observed in markets that are highly uncertain or characterized by complex structures.

Overall category growth might be the result of competing firms bringing distinctly different groups of customers into the market. This leads to a complex market structure where the cross-price elasticities of competing firms might be relatively low. If one assumes that competitive reactions are stronger when the responses of consumers are higher (i.e., cross elasticities are high), less competitive response would be expected in a mature market. Another condition for weaker competitive reaction in growing markets is a high level of uncertainty. In an uncertain environment, firms might be reluctant to respond strongly and might delay before reacting.

In Propositions 10a and 10b, we incorporate these factors into the general observation that competitive reactions are strong and rapid in growing markets.

Proposition 10a (P10a). *Competitive responses are generally stronger in higher-growth markets.*

Proposition 10b (P10b). *Competitive responses are weaker in highly uncertain markets and in markets characterized by complex structures.*

The lack of systematic empirical investigation of moderating factors is probably due to the difference in the unit of analysis for work on competitive reactions and work on market evolution. The brands within an industry are the unit of analysis for analyzing competitive reactions, and overall market size is the standard unit of analysis for work on market evolution. To our knowledge, nobody has collected data that are comparable at the brand or firm level across a

large sample of industries. This is the type of data that could be used to test Proposition 10. A large sample of industries would provide sufficient variance for the two conditions stated in the proposition. One potential source is disaggregate consumer panel data, although these data are generally limited to frequently purchased goods (Leeflang and Wittink 1992). Alternatively, it is also possible to develop measures of competitive reactions without complete data on all the competitors. For example, the PIMS data provide a variety of environments that could be exploited to expand the prior work on competitive reactions (Robinson 1988, Ramaswamy et al. 1994). Survey data have also been used to study competitive reactions (Gatignon et al. 1997), but data across several categories would need to be collected. Regardless of the nature of the data, the proposition could then be tested with moderator regression models or, more efficiently from a statistical standpoint, using advances in varying parameter models.

Environmental Stability. A key exogenous factor that affects the evolution of the markets is stability of the environment in terms of the customer base, the distribution system, the production system, and the technology. In addition, rapid changes in the price or availability of commodities can have a significant impact on the development of a market. During the Second World War, the inability of the allies to procure a steady and reliable supply of natural rubber led to accelerated development of the synthetic rubber industry (MacDougall 1997).

From the perspective of consumers, most categories are distinct. Nevertheless, a technology can be common to many categories in terms of the product or its production (for example, microprocessors are an integral element of many unrelated categories). As a result, products are affected by category-specific R&D, but also by technological advances in other categories. This is a significant source of uncertainty, especially in products with a significant technological content (Mansfield 1961). Key determinants of a firm's propensity to respond to a competitive initiative (like a new product) are its culture and systems. Similar to the population ecology research, organizations born in periods of technological change tend to be well adapted to changing and reacting quickly. Thus, firms are observed to respond quickly to new product entries in industries that are characterized by a high rate of technological change (Bowman and Gatignon 1995). This is summarized in Proposition 11.

Proposition 11 (P11). *In growing markets, competitive responses are more likely the more unstable is the environment.*

3.2. The Number of Competitors Over Time

In general, as a market matures, there is a process of consolidation (the number of active firms declines). In addition, after a firm has been active in a category for some time, it has often made significant category-specific investments (production facilities, a salesforce or a distribution channel). New initiatives thus, pose a significant threat so active firms generally devote significant attention to monitoring competitive activity and react quickly (and intensely) when a threat is identified. Of course, monitoring competitors is easier when the number of competitors is lower. Therefore, as a category matures, reaction to new initiatives should become faster and stronger. However, a secondary effect of concentration (when the number of important firms diminishes to five or less) is that coordination and "limiting" competition becomes easier. While explicit collusion is forbidden by anti-trust law, firms do learn how to compete *profitably*. For example, a firm will learn to concentrate its efforts on the marketing mix elements where it believes it has an advantage. As a result, a firm may not react to a competitive initiative unless its backyard is threatened.

Because these two effects act in opposite directions, most studies find that market concentration is not significant for explaining the extent or the speed of competitive reactions.

To summarize, early in the life of a market, there are usually many atomised competitors who do not respond to (or even know about) each other. As a market evolves, concentration decreases, but there are still numerous competitors. Here, the main effect of higher concentration is easier monitoring. This should lead to broader, more intense, and faster reaction to competitive initiatives. At some point, however, the concentration becomes low enough that coordination and "limiting" competition should become stronger. Interestingly, in a study of categories, relatively advanced in the life cycle, Kuester et al. (1999) find a strong but negative impact of concentration on the speed, breadth, and intensity of competitive reactions. Longitudinal analysis should show that the speed, intensity, and strength of competitive reactions follow an inverted U over the market life cycle, and we summarize this in Proposition 12.

Proposition 12 (P12). *After the introductory stage, the number of competitors declines and incumbent reactions increase in intensity, speed, and breadth. In a mature market, as the number of competitors declines further, competitive reactions decrease in intensity, speed, and breadth.*

3.3. Evolving Customer Response

As markets mature, two things happen, regardless of how market structure changes over time. The first is that the type of consumers who are involved in the market change. In the introductory stage,

the buyers are innovators who are less price sensitive and are willing to experiment. In contrast, as a market matures, it will be dominated by followers who are more risk averse and price sensitive. Thus, there is a natural tendency for markets to become more price sensitive over time. Second, as a market matures, there is a significant increase in the general level of knowledge about the category. This change should manifest itself as a reduction in the sensitivity of consumers to advertising or marketing activity (consumers are informed and know what they want, so should be less influenced by marketing activity). Not surprisingly, these changes should affect competitive responses.

There is support for the role of market elasticities as predictors of competitive response. Gatignon et al. (1989), Shankar (1997, 1999), and Kuester et al. (1999) all find that the higher the marketing elasticity is (relative to the competitors), the stronger the reactions are. We synthesize this relationship based on the expected evolution of market elasticities in Propositions 13 and 14.

Proposition 13 (P13). *As a market matures, price elasticity will increase and, as a result, competitive reactions to pricing initiatives will be stronger and more likely.*

Proposition 14 (P14). *As a market matures, spending (i.e., advertising, promotion, and salesforce) elasticities decrease and, as a result, competitive reactions to spending initiatives will be weaker.*

There have been a number of empirical studies that examine the evolution of marketing-mix elasticities over the product life cycle. However, no consistent pattern either for price elasticity or marketing elasticity is observed. One potential explanation for this is that interaction between firms and customers can change significantly as markets evolve. For example, Bergemann and Välimäki (1996) analyze the impact of "customer learning through experimentation" on competing firms. Trial is assumed to be the route through which consumers can learn about products. As a result, the firms choose low introductory prices to sustain experimentation (this assumption fits many new food products). Prices rise after the introductory period, as the merits of competing products become known. To test Propositions 13 and 14, it is critical to correct for actions like "low introductory prices to stimulate trial" (which may be important depending on the category). Such actions lead to an increase in market pricing as the market evolves and may lead to the erroneous conclusion that the market is becoming less price sensitive over time.

4. The Impact of External Influences on the Relationship Between Competitive Dynamics and Market Evolution

This section is focused on how external influences impact the interactions between competitive dynamics and market evolution.[8] We find that the external influences that have the most potential to affect the interactions between competitive dynamics and market evolution are patents, licensing, and technological innovations in marketing support activities.

4.1. Patents and Licensing

The objective of patents is to provide firms with an incentive to invest in R&D by providing innovating firms with a legal monopoly for a fixed number of years. Recent trends are to strengthen patent protection because R&D spending is a key ingredient for innovation and economic progress.[9]

Our interest is the effects that such regulatory changes might have on interactions between competitive dynamics and market evolution. On the one hand, increased patent protection creates a stimulus for higher levels of R&D investment due to the monopoly it provides to the innovating firm. On the other hand, increased patent protection is also a legal impediment to responses by other firms in the industry.

The tension between these two effects would appear to be offsetting; however, given the critical role that competitive interactions play across markets in terms of stimulating development, it would appear the impediment to market development created by the patent will be stronger.

Proposition 15 (P15). *The effect of patent protection will reduce market growth because of the lack of competitive interaction more than the protection of patent protection will stimulate the development of innovations.*

This proposition will be moderated to the degree that the patent holder licenses her innovation within the same market (a patent holder generally has the option of licensing). When firms have the option to license patented innovations, the attractiveness of investing in speculative R&D will be increased.

[8] External influences have direct effects on competitive response or market evolution individually. For example, advertising deregulation means that firms will respond to advertising initiatives by competitors, whereas before deregulation, this would not have been possible. These are not the types of effects we discuss here.

[9] Increased patent protection tends to accelerate private investment in R&D. In 1992, the Canadian government increased the patent protection for pharmaceutical products, and R&D spending as a percent of sales doubled soon after the new legislation (see http://cbc.ca/consumers/market/files/health/drugpric.html).

However, licensing has the effect of introducing competition into a market that would otherwise be a monopoly. This leads to Proposition 16.

Proposition 16 (P16). *Competitive reactions will have greater effect on market evolution when innovators are engaged in substantial licensing activity.*

4.2. Technological Innovations in Marketing Support Activities

There has been a significant increase in the availability and use of electronic channels to market to consumers. In particular, the Internet provides a simple medium through which consumers can obtain product information cheaply and quickly. When a product class is well known, the most common information obtained on the Internet is pricing. This can exacerbate price competition between firms who operate in the Internet space (Lal and Sarvary 1999, Balasubramanian et al. 1997). In addition, search engines and shopping agents have further accelerated price-driven shopping for products that are easy to compare. Ten years ago, these tools were unknown, yet the combination of inexpensive two-way communication with consumers (the Internet) and increases in computing power allow Web-based engines to process and use the enormous amounts of publicly available information (Iyer and Pazgal 2003).

The discussion in §2 highlights the influence of competitive reactions on market growth. The previous paragraph highlights an effect the Internet can have on this relationship. Because the Internet allows firms to communicate almost instantaneously with certain customers (those who use the Internet for pricing and product information), the overall response to a competitive reaction will be faster. As a result, the level of Internet use in a category should moderate the relationship between competitive reactions and market growth. We summarize this in Proposition 17.

Proposition 17 (P17). *The impact of competitive reactions* (*like pricing*) *on market growth rate will be positively affected by the level of Internet use amongst potential consumers in the category.*

5. Conclusion

The objective of this paper was to develop research propositions for better understanding the interactions between competitive dynamics and market evolution. It is also possible to investigate the propositions by considering the structure and behavior within markets across countries. In some countries like the United States, most markets are highly competitive. In contrast, European markets have been more heavily regulated. For example, the market structure of the broadcast/cable TV market in the USA is significantly different from that of Europe. These differences are primarily due to the competitive efforts of U.S. broadcasters since the birth of TV in the 1950s. More recently, the deregulation of the railway in Britain has led to a completely different structure than the structure observed in the rest of Europe. Changes in competitive regulations pushed by the European Union also provide opportunities for longitudinal studies.

We believe that our analysis brings together two bodies of research that need to be understood, analyzed, and researched together. This paper should clear the path for better understanding the links between the two areas, with important managerial and economic policy implications.

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References

Abernathy, W., J. M. Utterback. 1978. Patterns of industrial innovation. *Tech. Rev.* **80** 41–47.

Adams, William, David Encaoua. 1994. Distorting the direction of technological change. *Eur. Econom. Rev.* **38** 663–673.

Arrow, Kenneth J. 1962. Economic welfare and the allocation of resources for invention. R. Nelson, ed. *The Rate and Direction of Inventive Activity*. Princeton University Press, Princeton, NJ, 609–626.

Athey, S., A. Schmultzer. 1995. Product and process flexibility in an innovative environment. *RAND J. Econom.* **26** 557–574.

Bain, Joseph. 1949. A note on pricing in monopoly and oligopoly. *Amer. Econom. Rev.* **39** 448–464.

Bain, Joseph. 1956. *Barriers to Competition*. Harvard University Press, Cambridge, MA.

Balasubramanian, Sridhar, Robert A. Peterson, Bart J. Bronnenberg. 1997. Exploring the implications of the Internet for consumer marketing. *J. Acad. Marketing Sci.* **25**(4) 329–346.

Bergemann, Dirk, Juuso Välimäki. 1996. Learning and strategic pricing. *Econometrica* **64**(5) 1125–1149.

Bond, Ronald S., David F. Lean. 1977. Sales, promotion, and product differentiation in two prescription drug markets. *Economic Report*. Federal Trade Commission, Washington, D.C.

Bowman, Douglas, Hubert Gatignon. 1995. Determinants of competitor response time to a new product introduction. *J. Marketing Res.* **32**(1) 42–53.

Bowman, Douglas, Hubert Gatignon. 2000. The impact of competitive context on the allocation of marketing mix resources. Working paper, INSEAD, Fontainebleau, France.

Bronnenberg, Bart J., Vijay Mahajan, Wilfried R. Vanhonacker. 2000. The emergence of market structure in new repeat-purchase categories: The interplay of market-share and retailer distribution. *J. Marketing Res.* **37**(1) 16–31.

Calantone, Roger J., Kim E. Schatzel. 2000. Strategic foretelling: Communication-based antecedents of a firm's propensity to preannounce. *J. Marketing* **64**(1) 17–30.

Carpenter, Gregory S., Ken Nakomoto. 1989. Consumer preference formation and pioneering advantage. *J. Marketing Res.* **26**(3) 285–298.

Demsetz, Harold. 1982. Barriers to entry. *Amer. Econom. Rev.* **72**(1) 47–57.

Dixit, A. 1979. A model of duopoly suggesting a theory of entry barriers. *Bell J. Econom.* **10** 20–32.

Dougherty, Joseph J. 1977. Wort production. Harold M. Broderick, ed. *The Practical Brewer*. Master Brewers Association of Americas, Madison, WI, 62–98.

Eliashberg, Jehoshua, Thomas S. Robertson. 1988. New product preannouncing behavior: A market signaling study. *J. Marketing Res.* **25**(August) 282–292.

Erickson, Gary M., David B. Montgomery. 1980. Measuring the time-varying response to market communications instruments. David B. Montgomery, Dick Wittink, eds. *Proc. First Marketing Sci. Conf.*, Marketing Science Institute, Cambridge, MA.

Eswaran, Mukesh, Nancy Gallini. 1996. Patent policy and the direction of technological change. *RAND J. Econom.* **27**(4) 722–746.

Franses, P. H. 1994. Modeling new product sales: An application of cointegration analysis. *Internat. J. Res. Marketing* **11**(Nov–Dec) 491–502.

Gatignon, Hubert. 1984. Competition as a moderator of the effect of advertising on sales. *J. Marketing Res.* **21**(4) 387–398.

Gatignon, Hubert, Thomas S. Robertson. 1991. Innovative decision processes. Harold Kassarjian, Thomas S. Robertson, eds. *Handbook of Consumer Behavior Theory and Research*. Prentice-Hall, Englewood Cliffs, NJ.

Gatignon, Hubert, David Soberman. 2002. Competitive response and market evolution. Barton Weitz, Robin Wensley, eds. *Handbook of Marketing*. Sage Publications, London, U.K., 126–147.

Gatignon, Hubert, Erin Anderson, Kristiaan Helsen. 1989. Competitive reactions to market entry: Explaining interfirm differences. *J. Marketing Res.* **26**(1) 44–55.

Gatignon, Hubert, Thomas S. Robertson, Adam Fein. 1997. Incumbent defence strategies against innovative entry. *Internat. J. Res. Marketing* **14**(2) 163–176.

Gibbons, Robert. 1992. *Game Theory for Applied Economists*. Princeton University Press, Princeton, NJ, 210–218.

Gilbert, Richard, David Newbery. 1982. Preemptive patenting and the persistence of monopoly. *Amer. Econom. Rev.* **72**(June) 514–526.

Heil, Oliver P., Arlen W. Langvardt. 1994. The interface between competitive market signaling and antitrust law. *J. Marketing* **58**(July) 81–96.

Iyer, G., A. Pazgal. 2003. Internet shopping agents: Virtual colocation and competition. *Marketing Sci.* **22**(1) 85–106.

Jacquemin, Alexis, Margaret E. Slade. 1989. Cartels, collusion, and horizontal merger. Richard Schmalensee, Robert Willig, eds. *Handbook of Industrial Organization*. North-Holland, Amsterdam, The Netherlands, 416–473.

Kardes, Frank R., Gurumurthy Kalyanaram. 1992. Order-of-entry effects on consumer memory and judgment: An information integration perspective. *J. Marketing Res.* **29**(3) 343–357.

Kuester, Sabine, Hubert Gatignon, Thomas S. Robertson. 2000. Firm strategy and speed of diffusion. Vijay Mahajan, Eitan Muller, Yoram Wind, eds. *New-Product Diffusion Models*. Kluwer Academic Publishers, Boston, MA.

Kuester, Sabine, Christian Homburg, Thomas S. Robertson. 1999. Retaliatory behavior to new product entry. *J. Marketing* **63**(4) 90–106.

Lal, Rajiv, Miklos Sarvary. 1999. When and how is the Internet likely to decrease price competition? *Marketing Sci.* **18**(4) 485–503.

Lambkin, Mary, George S. Day. 1989. Evolutionary processes in competitive markets: Beyond the product life cycle. *J. Marketing* **53**(3) 4–20.

Lane, W. J. 1980. Product differentiation in market with sequential entry. *Bell J. Econom.* **11** 237–259.

Leeflang, Peter S. H., Dick R. Wittink. 1992. Diagnosing competitive reactions using (aggregated) scanner data. *Internat. J. Res. Marketing* **9** 39–57.

MacDougall, A. J. 1997. Rubber products industry. *The 1998 Canadian Encyclopedia*. McClelland & Stewart, Toronto, Ontario, Canada.

Mansfield, Edwin. 1961. Technical change and the rate of imitation. *Econometrica* **29**(4) 741–765.

Moore, M. 1992. Signals and choices in competitive interactions: The role of moves and messages. *Management Sci.* **38**(4) 483–500.

Ramaswamy, Venkatram, Hubert Gatignon, David J. Reibstein. 1994. Competitive marketing behavior in industrial markets. *J. Marketing* **58**(April) 45–55.

Robertson, Thomas S., J. Eliashberg, T. Rymon. 1995. New product announcement signals and incumbent reactions. *J. Marketing* **59**(1) 1–15.

Robinson, Bruce, Chet Lakhani. 1975. Dynamic models for new-product planning. *Management Sci.* **21**(10) 1113–1122.

Robinson, William T. 1988. Marketing mix reactions to entry. *Marketing Sci.* **7**(4) 368–392.

Rogers, E. M. 1983. *Diffusion of Innovations*, 3rd ed. The Free Press, New York.

Shankar, Venkatesh. 1997. Pioneers' marketing mix reactions to entry in different competitive game structures: Theoretical analysis and empirical illustration. *Marketing Sci.* **16**(3) 271–293.

Shankar, Venkatesh. 1999. New product introduction and incumbent response strategies: Their interrelationship and the role of multimarket contact. *J. Marketing Res.* **36**(3) 327–344.

Spence, Michael. 1974. *Market Signaling*. Harvard University Press, Cambridge, MA.

Spence, Michael. 1977. Entry, capacity, investment and oligopolistic pricing. *Bell J. Econom.* **8** 534–544.