

Leveraging the advantage of early entry: proprietary technologies versus cost leadership

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Abstract

This research develops the relationships between the “early mover advantage” and a firm’s market share. It tests hypotheses relating a firm’s strategic choices and order of entry to market share on a cross-sectional data set of 1042 French manufacturing companies. The results support the persistence of an advantage for early movers. Furthermore, the development of proprietary technologies, considered as a capability to protect in-house knowledge from competition, has a leverage effect on the advantage of early moving. Finally, if cost leadership is a relevant strategy to gain market share, it is mostly beneficial for late entrants.

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1. Introduction

A company’s market share is positively influenced by both early entry (Lieberman and Montgomery, 1988; Utterback, 1994) and cost leadership strategy (Porter, 1980). These two strategic decisions, however, are generally considered separately and rarely studied jointly, as if they were disconnected topics (Tellis et al., 2001). In this paper, we study the interactions of early entry with (1) proprietary technology and (2) cost leadership strategy. We firstly argue, in line with the First Mover Advantage literature (Lieberman and Montgomery, 1988), that early entry favors market share. Secondly, we assume that developing core proprietary technologies impacts positively market share. We hypothesize that the combination of entering early into a market with a proprietary technology has a leverage effect on market share. Early entrants into a business earn the highest benefits in terms of market share when they manage to support their early mover advantage with proprietary technologies that competitors cannot imitate. Finally, we study the interaction of early entry with a cost leadership strategy. A cost leadership strategy has a positive impact on market share in general (Porter, 1980), but we find that late followers

benefit more from cost leadership strategy than early entrants. Evidence is given on a sample of 1042 French manufacturing companies.

2. Theoretical background and hypotheses

2.1. Early entry and market share

Competitive models based on neo-classical microeconomics have shown that rivalry leads to the erosion of economic rents temporarily monopolized by first movers. High returns attract new entrants in growing industries, and rivals’ pressure in perfect competition squeezes corporate profits until the whole industry falls to a zero-profit level (Besanko et al., 2000). This model has strongly influenced the description of business evolution. From the Strategy–Conduct–Performance paradigm (Bain, 1951) to the analytical Porterian framework (Porter, 1980), rivalry analysis implies a four-phase evolutionary pattern. ‘First to market’ companies initiate the business. Then, ‘follow the leader’ firms enter into the business to compete against the few incumbents. A third wave of new entrants appears that consists of ‘application engineering companies’. They increase the competitive pressure and force the weakest competitors to exit the business. Finally, late entrants producing ‘me too’ products move into the market (Ansoff and Stewart, 1967; Robinson et al., 1992).

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The capability of pioneers to stay ahead of rivals in the business despite successive and competitive entries is an important issue (Tellis and Golder, 1996). According to Lieberman and Montgomery (1988, 1998), a first mover advantage helps protect pioneers from competition. According to their view, a pioneer is able to sustain its advantage over competition by erecting resource barriers (Wernerfelt, 1984) and accumulating economies of time (Dierickx and Cool, 1989). Resource barriers concern reputation, brand name, particular relationships with suppliers and experience. Each factor enables the first mover to build a resource barrier and prevents competitors from effectively imitating or substituting the pioneer's bundle of resources. Economies of time are the time savings provided by experience and expertise. Followers are deprived of these experience and expertise and must build them before evening first movers' efficiency (Makadok, 1998).

The idea of first mover advantage has been successfully investigated at several levels. Managers usually consider that pioneering leads to market share advantages (Song et al., 1999). Academic studies have also provided empirical evidence of a relationship between the order of entry and the market share: the market share of the i th entrant divided by the first mover's market share equals 1 divided by the square root of i (Kalyanaram et al., 1995). Thus, the fourth entrant's market share roughly equals 1 divided by the square root of 4, that is, half the pioneer's share. Therefore, according to previous studies, we suggest the first hypothesis linking early entry and market share.

Hypothesis 1: The earlier a firm enters a market, the greater a firm's market share.

2.2. Early entry and technological resources

Entry decision coincides with the possibility for a firm to protect its sources of rents (Teece, 1986; Mitchell, 1991). For a firm, maintaining high resource barriers and high economies of time derives from effective investments in exploration and accessible profits from exploitation of its technological assets (Levinthal and March, 1993; Roberts, 1999). Keeping an early mover's advantage depends on the firm's capability to develop and protect its technical resources (Barney, 1991). In industries with high risks of information leakage, a follower may succeed in appropriating the economic value of innovations. In general, the more proprietary the technology (i.e., the less diffused), the higher the appropriability of the benefits from the use of this technology (Teece, 1986; Mitchell, 1991).

Hypothesis 2: Owning proprietary technology has a positive effect on market share.

By definition, early movers, as innovators, create a business and provide the rules of the game in the new competitive field. As long as they keep undisclosed the sources of their innovation, they are protected from entries by imitators. In

this way, keeping proprietary a technology is one of the means to build up a resource barrier. We thus assume that combining early entry with proprietary technology provides early movers with an additional market share benefit.

Hypothesis 3: The positive effect of early entry on market share is enhanced by owning proprietary technologies.

2.3. Early entry and cost leadership

From a strategy perspective, many research works, following Porter's (1985) arguments, have studied the impact of strategic orientations on market share (Buzzel and Gale, 1987). Concerning cost leadership strategy, the basic idea popularized in most handbooks is that a firm that manages to sustain a competitive advantage in cost structure can offer the lowest prices to customers. Such a firm is likely to benefit from a virtuous circle: Based on its cost advantage, the firm produces and sells higher volumes than competitors. Therefore, the firm achieves higher economies of scale than competitors—which increases its cost leadership (e.g., Grant, 1998; Hitt et al., 2001). We conclude that cost leadership impacts favorably market share.

Hypothesis 4: Cost leadership strategy has a positive impact on market share.

The cost leadership advantage is claimed to be rooted in both scale economies and the experience curve (Makadok, 1999). This cost leadership advantage might combine its effects with the pioneering advantage. Pioneers are likely to be the best positioned to achieve scale economies and to outperform future competitors. However, as suggested above, the balance resides between exploration and exploitation costs. Pioneers bear specific costs and risks associated with their innovative strategy. In case of quick and easy imitation, followers can benefit from the pioneers' incurred costs and enter more efficiently. Moreover, as they can learn from pioneers' possible mistakes in new markets without being committed to make comparable investments, followers are also likely to become rapidly cost efficient (Zahra and Covin, 1993; Tegarden et al., 1999). Thus, pioneers involved in a cost leadership strategy might allow followers to understand the key determinant factors of competition. Followers are more likely to catch up pioneers when competition is engaged on costs than they are if pioneers base their entry strategy on technological and marketing innovation (Porter, 1996; Durand and Coeurderoy, 2001). Consequently, we believe that early entry associated with a cost leadership strategy does not impact favorably market share because followers can benefit more from a cost strategy than early movers do.

Hypothesis 5: A cost leadership strategy is less advantageous for pioneers and early followers than for late entrants.

3. Methods

3.1. Database

The Bank of France, the French central bank, generated the database used in this research in 1996. This information is gathered annually since 1993 in order to advance the corporate research carried out by the Bank of France on French companies. The data is collected in face-to-face interviews with CEOs. For this kind of survey, the top manager is considered as the person with the most comprehensive knowledge about the firm and its strategy (Hambrick, 1981; Miller and Friesen, 1984). The questionnaire, largely inspired by the PIMS database, deals chiefly with the following topics: the business environment, the firm's strategy in each of its businesses, the firm's internal organization and management features.

Bank of France agents specially trained on survey techniques conducted these interviews. A user guide has been developed and implemented to foster homogeneity among the agents managing the questionnaire. Like in the PIMS database, CEOs define their business environment (Buzzel and Gale, 1987). Nevertheless, businesses are classified according to the European equivalent of the SIC classification (the NACE). Some criticisms may thus be addressed to such databases, pointing out their cross-sectional nature, the risks of misunderstandings or problems with the measurement of variables (Manu and Sriram, 1996). However, the importance of PIMS for research in strategy and management is also widely accepted among academics and practitioners (Venkatraman and Ramanujam, 1987; Scherer and Ross, 1990). Despite its limitations, the qualitative database of the Bank of France has begun to be exploited by academics (Amburgey and Dacin, 1997; Cool and Henderson, 1998).

3.2. Sample

In 1996, the Bank of France surveyed a sample of 2011 firms belonging to manufacturing businesses. The Bank of France database contains mostly small and medium-sized firms (from 30 to 2000 employees), but it is representative of the industries studied (Cool and Henderson, 1998). Responses with one or more missing observations were deleted. Surveyors are asked to record a blank rather than an uncertain answer during the face-to-face interviews. This method is prone to increase the number of missing responses, but existing responses are more reliable. Out of 2011 respondents, 509 did not answer the question on Market Share (which represents roughly one fourth of the cases).

In addition, we decided to remove the firms which indicated that they had less than four competitors, which concerns 29 companies (i.e., 1.4% of the sample). Two main reasons explain our choice. Firstly, as we deal with medium-sized companies (the 1993–1995 average size of the firms

in our final sample is 181 employees), it seemed unlikely that these firms eliminated almost all their competitors. Hence, questions on competitive positioning are likely to be biased for such companies (indeed, for instance, how can one assess a pioneer effect when there is not any competitor?). Secondly, in the French industrial structure, these firms with few competitors are likely to be very specific business cases such as local subsidiaries, subcontractors or outsourced companies. For both reasons, we selected out these respondents, which present high risk of being outliers. Such process of selection is in line with other studies deleting firms operating in sectors with very few cases (Cool and Henderson, 1998).

After these operations, and due to missing data, the final sample comprises 1042 firms. We compare the new sample with the original to check whether we introduced any selection bias. Results show that there are no significant effects in terms of industry structure, corporate size or product life cycle. Table 1 provides details on the breakdown of our sample by industry. Several manufacturing industries are represented. Around one third of the total operates in the food industry, a particularly developed activity in France. Both car manufacturing and pharmaceutical industries provide a small number of cases, as they are very concentrated and dominated by large enterprises. Each other sector stands for more or less 15% of the sample. This diversified sample provides the opportunity to study the entry strategies throughout a wide span of businesses.

3.3. Measures

3.3.1. Market share

The dependent variable is the market share of the firm in its business, measured as a percentage of total sales. The survey made by the Bank of France chose the same methodology as the PIMS database (Buzzel and Gale, 1987): The CEO, in collaboration with the surveyor, describes the business in which the firm is operating. On the basis of this description, he provides the market share of his firm in the business. Indeed, computations based upon official classifications (like SIC in the USA or NACE in Europe) often poorly fit the real business of firms, especially the smaller ones. For instance, the market can be “cross-section” and/or “cross-border”. The definition made by the

Table 1
Sample structure by industry

Industries	Number of cases	Percentage (%)
Food industry	364	35
Textile and fabric industry	136	13
Clothing	137	13
Printing industry	122	12
Pharmaceutical industry	39	4
Housing equipment	182	17
Motor vehicle parts and accessories	62	6
Total	1042	100

CEO is likely to be the most relevant, as she knows her real business; but the evaluation can also be biased towards overestimation. However, such a risk is controlled by the interviewers, as they are trained to double-check with the CEO the Market Share figure. In addition, as commonly done to normalize the distribution of the variable (Tegarden et al., 1999; Makadok, 1999), we use in the models the logarithm of market share.

3.3.2. Order of entry

In the database, there is a question about the order of entry of a firm in its main business since the last major technological change. The scale of the variable consists of five items: first; second; third–fifth; sixth–tenth; beyond tenth. Generally, CEOs know accurately when their firm entered the business, but they are less likely to exactly remember their entry rank. In particular, innovators who did not manage to survive are often overlooked in the rankings. For these reasons, we prefer to gather the five items into three categories: pioneers or early movers (first; second); early followers (third–fifth; sixth–tenth); and late entrants (beyond tenth). Therefore, this codification is less detailed but more robust than the original variable. In the regression models, we use the late entrants as the group of reference. The models present the coefficients for both other categories. These coefficients have thus to be compared to the reference group.

3.3.3. Proprietary technologies

In the database, a question concerns the number of competitors with the same core technologies as the respondent. The scale of the variable consists of five items: none; one competitor; two–five; six–ten; more than ten. In this case, too, there is an asymmetry of information: CEOs know accurately whether their firm competes using proprietary technologies or not, but they are unlikely to accurately number how many competitors share a technology. In particular, foreign competitors or newcomers are often overlooked since their presence in the market may be transitory or recent. For these reasons, we preferred once more to classify the five items into three categories: specific technologies (none or one competitor owning a comparable technology); concentrated technologies (three to ten competitors having the same technology); and diffused technologies (more than ten competitors). Again, such a codification is less detailed but more robust than the original variable. In the regression models, we use the diffused technologies as the group of reference.

3.3.4. Cost leadership

Strategic behavior is seldom directly observable. Strategic variables are thus measured by multiple scales whose internal reliability is controlled by the Cronbach alpha (Nunally, 1978). Two items assessing the position of the firm in terms of cost and price vis-à-vis its main competitors measure cost leadership. In the first question, the CEO

indicates whether the firm sells products at very low, low, similar, high or very high prices in comparison with the main competitors. In the second question, the CEO indicates whether the firm's production costs are very low, low, similar, high or very high in comparison with the main competitors. The Cronbach alpha reliability between the two variables for the cost leadership construct is .68, which indicates a fair level of reliability.

3.3.5. Other variables

Four other variables were included in the models as controls. Firstly, since firm size is likely to be related to a firm's market share, we had to control for its effect. Firm size is measured by the logarithm of the 1993–1995 average number of employees in the firm (Size). Secondly, at the business level, the growth of the market served by a firm might contribute to the firm's market share. We therefore introduce a market growth variable, expressed by the percentage of real growth of turnover (i.e., inflation being corrected) in the main business segment targeted by each firm in 1995–1996 (Growth). This variable is built up as an ordinal scale with four categories. The first category is for shrinking businesses (negative growth); the second class for no growth (0%); the third for moderate growth (less than 5%); and the fourth for growing business (more than 5%). The Growth variable provides information about the dynamism of the business in the short term. Thirdly, we also add a variable to control for the long-term effect of business life cycle. A qualitative variable (Business Life Cycle) is used to differentiate businesses according to their stage of development: The CEO indicates whether her main business is emerging (Emerging Business), growing (Growing Business) or mature (Mature Business). Note that potential cases of declining businesses were encapsulated into this last category in order to reduce possible biases in CEOs' responses (this last category is not introduced in the regression models but used as a reference). Finally, to control for industry specificities, we also introduced the industrial classification through a set of dummies based upon the official European classification. Such dummies enable us to control for the concentration differentials among industrial sectors, and, consequently, differentials among average market shares.

4. Results

4.1. Descriptive analysis of the sample

Tables 2 and 3 provide interesting insights about the structure of our sample. In the sample, 22% of the firms entered their business as pioneers and 34% as early followers. One may suspect a bias of selection overrepresenting the innovators, supposedly more open to surveys than followers. However, opposite arguments can be raised arguing that innovators are likely to be more secretive than

Table 2
Main descriptive statistics (categorical variables)

Variables	Number of cases	Percentage (%)
<i>Entry order</i>		
Pioneers	217	22
Early followers	350	34
Late entrants	475	46
<i>Proprietary technology</i>		
Specific technologies	138	13
Concentrated technologies	344	33
Diffused technologies	560	54
<i>Business life cycle</i>		
Emerging business	214	21
Growing business	638	61
Mature business	190	18

others because they are more exposed to information leakage. Besides, the sample selection is random. Consequently, a selection bias in favor of early entrants is possible but certainly not obvious. The distribution of firms according to the level of proprietary knowledge is not surprising: Only 13% own specific technologies, 33% have concentrated technologies and the rest have diffused technologies. This balanced distribution concurs with an absence of a selection bias. Most of the firms are involved in growing businesses, which means for a CEO a business with perspectives of development. Evaluated on a five-point scale, the cost leadership measure exhibits an average value of 2.95. With the median being at 3.00 (indicating a balanced position with competitors), it follows that the sample is rather homogeneously distributed across companies both with and without a cost advantage. Lastly, concerning market share, the cases vary on a broad span, from 1% to 80%. On average, the firms have around 12% in their business, but the median is at 6%. The mean may be inflated by the extreme cases with the highest values. For these reasons, as previously mentioned, we choose to run the models with the logarithms of market shares to normalize the distribution of the variable (Table 3, last row).

4.2. Models

As the sample is cross-sectional and gathers firms with various sizes, we decided to correct risks of heteroscedasticity by using a weighted least square estimation (WLS). We used the number of employees as weight. Considering the number of categorical variables in the model, we opted for generalized linear models. Such models are particularly well designed to cope with interaction effects among categories.

Table 4 presents five WLS models. Model 1 includes the control variables only. Model 2 presents all the variables together but without any interaction. Model 3 assesses the coimpact of proprietary technology and order of entry on market share (test of Hypothesis 3). Model 4 tests the interaction between entry order and cost leadership strategy

(test of Hypothesis 5). Model 5 exhibits a complete regression with all the variables and interactions.

Model 1 shows that our control variables alone explain 11% of logged market share variance. All of them are significant except the two proxies standing for the stage of development of the business. In this model, the life cycle of the business does not seem to have direct impact on a firm's market share. Furthermore, complementary tests were also run with the age of the firm. This variable did not change the results. In our sample, the individual market share is not directly related to any time dimension, at both business and firm levels. However, we must keep in mind that the sample is cross-sectional, and not a panel. Consequently, the time dimension is weakly addressed in such a sample. By contrast, the relation between corporate size and market share is logically positive. Finally, all industry dummies are significant, the industry taken as reference being the car industry.

Model 2 shows that each of the three strategic variables—entry order, proprietary technologies and cost leadership strategy—has an impact on market share with the expected positive sign. Moreover, concerning the first two, the coefficients by category are decreasing (.26 for Pioneer vs. .17 for Early Follower; .37 for Specific Technologies vs. .26 for Concentrated Technologies). This gives evidence on the ordered structure of these two categorical variables exhibiting a substantial but diminishing effect on market share. By contrast, measured on a five-item scale, the impact of the cost leadership measure, with a maximum value of 0.15 (i.e., 5×0.03), appears comparatively less influential. Overall, Hypotheses 1, 2 and 4 receive strong support.

Models 3 and 4 test separately the two interactions (Hypothesis 3 and 5). Model 3 explores the interaction between a firm's order of entry and its proprietary technologies. A leverage effect appears: The direct impact of pioneering decreases (coefficient .14) and early followers (coefficient .28) seem to benefit more from their entry rank than pioneers do. However, the interaction effect shows that pioneers can enhance their market share by profiting from proprietary technologies. By contrast, the benefit of entry is significantly reduced for early followers, especially when they do not exploit specific technologies. The coefficient of the interaction between early followers and concentrated technologies is negative and significant. Given that the late followers stand for the reference category, these results suggest that pioneers really enjoy a pioneering advantage on market share when they manage to protect their core technologies from imitation. Hypothesis 3 is thus supported.

Table 3
Main descriptive statistics (numeric variables)

Variables	Mean	Median	Minimum	Maximum
Cost leadership	2.95	3.00	1	5
Size	181	87	17	5362
Growth	2.22	2.00	1	4
Market share (%)	12	6	0	80

Table 4
WLS models for market share (log) ($n=1042$)

	(1)	(2)	(3)	(4)	(5)
Constant	0.79*** (0.10)	0.58*** (0.10)	0.62*** (0.09)	0.46*** (0.12)	0.42*** (0.11)
<i>Entry order</i>					
Pioneer (relative to Late entrant)	–	0.26*** (0.03)	0.14*** (0.04)	0.44*** (0.12)	0.26* (0.12)
Early follower (relative to Late entrant)	–	0.17*** (0.03)	0.28*** (0.04)	0.64*** (0.12)	0.58*** (0.12)
<i>Proprietary technology</i>					
Specific technologies (relative to diffused technologies)	–	0.37*** (0.04)	0.33*** (0.07)	–	0.30*** (0.07)
Concentrated technologies (relative to diffused technologies)	–	0.26*** (0.03)	0.31*** (0.05)	–	0.30*** (0.05)
<i>Entry order × Proprietary technology</i>					
Pioneer × Specific technologies	–	–	0.23* (0.09)	–	0.24** (0.10)
Pioneer × Concentrated technologies	–	–	0.13* (0.07)	–	0.14* (0.07)
Early follower × Specific technologies	–	–	–0.13 (0.09)	–	–0.09 (0.09)
Early follower × Concentrated technologies	–	–	–0.23*** (0.06)	–	–0.21*** (0.06)
Cost leadership	–	0.03* (0.01)	–	0.10*** (0.03)	0.07** (0.02)
<i>Entry order × Cost leadership</i>					
Pioneer × Cost leadership	–	–	–	–0.04**03 (0.0204)	–0.04 (0.04)
Early follower × Cost leadership	–	–	–	–0.13** (0.04)	–0.10** (0.03)
Size (log)	0.06*** (0.01)	0.03* (0.01)	0.03** (0.01)	0.02* (0.01)	0.03** (0.01)
Growth	0.01 (0.01)	0.03* (0.01)	0.04** (0.01)	0.02 (0.01)	0.04** (0.01)
<i>Business life cycle</i>					
Emerging business (relative to mature business)	0.12* (0.05)	0.04 (0.05)	0.05 (0.05)	0.09 (0.05)	0.04 (0.05)
Growing business (relative to mature business)	0.03 (0.04)	–0.03 (0.04)	–0.02 (0.04)	0.01 (0.04)	–0.02 (0.04)
<i>Sector</i>					
Food industry	–0.19*** (0.05)	–0.18*** (0.04)	–0.20*** (0.04)	–0.14** (0.04)	–0.20*** (0.04)
Textile and fabric industry	–0.23*** (0.06)	–0.21*** (0.05)	–0.21*** (0.05)	–0.21*** (0.06)	–0.21*** (0.05)
Clothing industry	–0.34*** (0.06)	–0.24*** (0.05)	–0.27*** (0.05)	–0.27*** (0.06)	–0.25*** (0.05)
Printing industry	–0.32* (0.07)	–0.25** (0.06)	–0.26** (0.06)	–0.26*** (0.07)	–0.27*** (0.06)
Pharmaceutical industry	–0.34*** (0.06)	–0.30*** (0.06)	–0.34*** (0.06)	–0.31*** (0.06)	–0.33*** (0.06)
Housing equipment	–0.29*** (0.05)	–0.28*** (0.05)	–0.29*** (0.05)	–0.26*** (0.05)	–0.28*** (0.05)
R ² (%)	11.5	30.0	32.3	21.4	33.0
Adjusted R ² (%)	10.6	29.0	31.1	20.3	31.6

Car industry is the reference for other industries.

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

Model 4 tests the interaction between the order of entry and the cost leadership strategy. By comparison with Model 3, the explained variance is limited (20% vs. 31%). As in Model 3, introducing the interaction terms reduces the pioneers' advantage (coefficient is .44 for pioneers vs. .64 for early followers). Furthermore, in the interaction, the pioneers' coefficient is negative, as expected, but not significant. In addition, the interaction term is negative and significant for early followers. These findings indicate that both early followers' market share is hurt relative to late entrants when they get involved in cost leadership strategy. This gives strong support to Hypothesis 5.

Model 5 provides the complete model. Results confirm the conclusions drawn from previous findings. Moreover,

we tested successfully that the complete model improved significantly the explanatory power (a 3% change in R^2 significant at a 1% threshold by comparison with Model 2 without interactions). It appears that pioneers actually benefit from an advantage of early entry on market share as long as they are able to protect efficiently their core technologies. The early followers seem to have the best timing to increase market share (.58 coefficient, higher than .26 for pioneers). They also benefit more from using specific rather than concentrated technologies. Concerning late entrants, as the reference category, the interaction of entry order and cost leadership strategy has a positive coefficient, indicating that they appear to benefit more from this strategy than earlier movers do.

5. Discussion

5.1. Contributions

The results of this cross-sectional study not only support arguments for the early entry advantage (applied to market share) but also bring new insights on the competitive moves following entry. It appears that entry order plays a durable influence on market share. While pioneers seem to obtain higher market shares in Model 2, introducing interactions with proprietary technology and cost leadership strategy modifies the perspective on the results. With interactions, early followers seem to bypass pioneers, as the impact of early entry is lower than that of early followers in Models 3–5. However, a pioneering advantage is likely to last longer when firms can impede technology diffusion within the industry. In case of proprietary technologies, pioneers are apt to gain a larger market share in the business. One of the main advantages of pioneers is that they “create” the market more than they enter it.

The cost leadership strategy has often been presented as the best solution to gain market share. The results of this research mitigate the positive influence of cost leadership on market share relatively to entry order. In particular, it appears that pioneers and early followers—relative to late followers—do not leverage the advantage of early entry when they sustain a cost leadership strategy. By contrast, late entrants mainly earn the benefits of this strategy. As pursuing cost leadership implies product and process standardization, late entrants face lower barriers to enter and gain market share. Especially, late movers have the possibility to select their investments and resources to pursue the objective of cost minimization. They can economize on the costs of learning how to enter a new business, while pioneers have to include them exclusively.

These results lead to two further strategic implications. First, entry decision in itself is a critical decision, at both organizational and industry levels. Indeed, it is influential on subsequent strategic decisions made by competitors. From our findings, pioneers are able to leverage their early mover advantage through efficient protection of the key technologies that enabled them to initiate the business. Their followers do not really benefit from the positive association of entry order and proprietary technologies. Therefore, early movers should decide whether or not to diffuse their technology. They face the risks of losing the benefits of their risk-taking strategy if they do not protect their technological resources. However, in some industries with network effects, keeping for too long its technology proprietary may have counterproductive effects (Garud and Kumaraswamy, 1993).

Secondly, the benefits of cost leadership have to be reevaluated. This strategy is often illustrated by examples drawn on a small number of very large companies. Because of their size and the key economic role in industries like car manufacturing, telecommunications or energy, these exam-

ples should not be overlooked. However, compared with the real corporate populations, they can be considered as “outliers” (for instance, in Europe, 0.2% of companies are classified as large enterprises—more than 250 employees, according to Eurostat, 1999). It is risky to infer general precepts on cost leadership from some special cases. Our results show, on a representative sample of small to medium-sized firms that (1) the order of entry in an industry impacts substantially a firm’s market share and (2) the interaction between cost leadership strategy and early move influences negatively market share.

5.2. Limitations

The first limitation of our study concerns the use of secondary data. This is undoubtedly a constraint, in comparison with ad hoc surveys. However, our study benefits from the high quality of the Bank of France’s studies inspired by the PIMS’ legacy, the pluri-annual plan of survey initiated by the Bank of France, as well as a broader scope in terms of targeted firms than we could have gathered by ourselves.

Another limitation is that we observe individual firms only at two periods: the time of entry into the business and the current situation. Consequently, we may have overlooked possibilities of strategic change through time. Such a limitation is inherent to the available data. Nevertheless, numerous research works on strategic groups (Caves and Porter, 1977; Cool and Schendel, 1988) and path-dependent phenomena (Dosi, 1988; Tripsas and Gavetti, 2000) give evidence on strong inertia of strategic positioning across firms. Therefore, we are confident in our results, even if we must keep in mind this underlying assumption of time continuity and relative strategic inertia.

A third limitation could be a self-selection bias in the sample selection. This is a problem in the PIMS data (Scherer and Ross, 1990, p. 419). Nevertheless, studies on sample representativeness undertaken by the Bank of France have not revealed the existence of the same problem. We must point out, however, that the largest companies are not in the database as it is mainly dedicated to the study of SMEs. This might explain the mitigated impact of cost leadership, since the most cost-efficient firms are supposedly the largest.

Finally, we have to question our study for the presence of a survivor selection bias. Because we do not have data for a longitudinal study (including entries and exits), only survivors are present in our sample. Had we had a longitudinal data set, we could have controlled this time-dependent bias. Although this survivor bias is critical for survival analysis, it is, however, notably less important for a cross-sectional study as the present research.

5.3. Research agenda

The study entails several possible future research avenues. Firstly, it would be worthwhile to refine the notion of proprietary technology. Turning a proprietary technology

into a competitive advantage is a critical challenge for pioneers, and it should be defined thoroughly and related to the chosen strategic orientation. In particular, we have enlightened here that pioneers should move carefully towards cost leadership strategies, even if they could see it at first glance as the best way of dominating the business. A second stream of research would determine the consequences of both order of entry and proprietary technologies on a firm's overall performance. Pioneer effect has always been related to market share. However, its long-term effect on performance is still controversial (Durand and Coeurderoy, 2001). Thirdly, more longitudinal studies like Garud and Kumaraswamy (1993) or Tellis and Golder (1996) on specific industries would provide further knowledge on how firms modify their behaviors so as to change the selective pressures represented by late movers pressure and technology diffusion (Durand, 2001). Finally, it would be worthwhile to study other possible strategic moves (for instance, innovative or marketing differentiation) enabling followers to cancel out pioneers' advantage of early entry. At the industry level, an event analysis carefully investigating a firm's moves and competitors' reactions would help determine when and how to compete successfully.

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