Pioneering Strategies and Small Firms, an Australia–UK Comparison

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ABSTRACT *An important aspect of strategic choice is whether to be a pioneer or a follower. This issue is especially important for small and medium sized enterprises (SMEs), potentially disadvantaged by scale in design, production and marketing. However, empirical evidence suggests that, in spite of their size, SMEs may benefit from being pioneers or 'first movers'. Indeed, in some markets being first may be the only way SMEs can compete against larger firms, whose advantages in exploitation may be more scale intensive than in earlier stages of the innovation process.*

The UK and Australian economies present an interesting context for a comparison of SME pioneering strategies. The UK market is larger and its relative competitiveness is increased by smaller geographical distance and the ability of the market to support a greater number of firms, both large and small. Such differences in the potential competitiveness of markets might substantially influence the nature of SME strategies and the role of pioneering advantage.

The study reported in this paper examines the strategies of a matched sample of 478 firms in Australia and the UK. Timing of entry models are developed and tested. The different economic contexts, however, provide contrasting explanations of pioneering strategies. Technological turbulence and size of firm appear to be important determinants of strategy in both countries, but are most statistically significant for UK firms. Perceived competitive advantage provides the bulk of explanation of strategic behaviour for Australian firms. The overall UK models perform better statistically, suggesting that there may be more convergence towards some 'norm' for these firms. Overall statistical fit suggests a robust model construction and successful operationalisation of important strategy variables.

Keywords: small firms, innovation, strategy, Australia, UK.

Introduction

Whether to be a pioneer or a follower is an important issue and has been formalised within the framework of first and second mover advantage. With rapid technological change and shortening product life cycles, timing of entry has become an increasingly important factor determining market share and profitability.[1] For all firms these are important strategic issues, but for small and medium sized firms (SMEs), where precipitous decline is often the penalty for poor strategy, they are especially important. The competitive environment is an important driver of the strategic impact of timing of entry. This paper evaluates some of the issues in the context of the UK and Australian economies, which represent two different environments for SMEs. In the UK, with relatively small geographic distances, markets are more competitive than in Australia, where even small SMEs may achieve dominant regional positions.

Size of firm has implicitly been an important consideration in the innovation and

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timing of entry literature.[2] Innovation research is replete with examples of small firms being more successful than large in the invention and innovation process, but it also contains many examples of small firms unable to capture the benefits from their pioneering advantage. In spite of its potential, the role of timing of entry in small firm strategy has attracted little attention. Partly this is because innovation research has focused more on radical than incremental change, and partly because the unit of analysis has tended to be the innovation rather than the firms and industry group.

This paper reports on research that is part of a broader study of small firm strategic planning. The unit of analysis is the firm rather than a specific innovation and the strategy data are based on the perceptions of organisations of their strategy. This is a departure from the objective measures that many other studies have used,[3] but in the field of strategy the focus on the perceived environment has considerable support and in the context of a two-country study facilitates an easier comparison.[4] Data were collected over the period 1990–1993 from two parallel surveys of small firm strategy in the UK and Australia. These focused on the pioneering status of small firms and the extent to which strategy was determined by their organisational characteristics and the competitive environment. The study included manufacturing and service sector firms so that pioneering and later mover strategies refer to both technical and non-technical areas.

The paper is organised as follows. Sources of first mover and pioneering advantage are examined and their specific role in SME strategy is assessed. From this, several explanatory variables are identified which might help explain timing of entry. The survey methodology is discussed and a two-stage modelling process is undertaken. Conclusions concerning the determinants of strategy are then assessed for both the UK and Australia.

Sources of First Mover Advantage

First mover refers to being the first (or among the first) to embark upon a particular action. Such moves confer certain first mover advantage (FMA), which may lead to better performance. The FMA literature defines pioneering to include a spectrum of first moves in product and process innovation, brand positioning and organisational innovation. The term makes no distinction between intent and action, as first mover is both a form of strategic intent and behavioural fact.

There are several sources of FMA. The most common are those arising from pioneering in technological areas, resulting in new products or new processes. Technological pioneering can result in patents, proprietary learning or experience curve effects and these are major sources of FMA for technology leaders.[5] Robinson, using the PIMS database, found pioneer firms benefited (in terms of market share and profit) from patents to a significantly greater extent than late entrants.[6] However, Mansfield *et al.* found that even patent-based FMA may not be enduring as, within a relatively short time, imitators can duplicate patented innovations for about two-thirds of the innovator's cost.[7] The extent of advantage from proprietary knowledge clearly depends on how rapidly ideas leak out, how good is the intellectual property protection, and whether innovators have an asset base which enables them to move efficiently from design to production.[8]

FMA also stems from an early experience which enables firms to move more quickly down the learning curve. However, FMA from learning effects can be diminished by diffusion of technology.[9] This process of diffusion can take place in many ways: reverse engineering, publication of research findings and mobility of trained employees being some of the major routes. Any technological discontinuity will also reduce the import-

ance of earlier pioneering advantage and the experience curve may overstate the benefits of learning.[10]

A further major potential source of FMA is via pre-empting competitors in the acquisition of input factors (e.g. natural resources, location, and plant equipment). However, Glazer's study of local newspaper markets found no differences in survival rates between first and second movers.[11] Lillien and Yoon found evidence that early entry was justified when returns were high, but could be confounded if the market was evolving rapidly and before a dominant design emerged.[12] In a theoretical paper, Schmalensee suggested that pre-emptive investment, even when accompanied by scale economies, may provide only minor entry barriers to new entrants.[13] FMA may also arise from pre-emption of product space, niches and brand loyalty. Switching costs may also provide a pioneer with FMA as buyers incur the extra cost of product and ancillary investments, training, and opportunity costs. Software is a classic example.

Being a first mover may not confer only advantages: the first mover may also suffer disadvantages, which are effectively the advantages for being a second or late mover. These late mover advantages (LMA) include resolution of uncertainty by the pioneers, as in the emergence of dominant design.[14] Other benefits or free rides from pioneers' investments in pre-emptive R&D include buyer education and infrastructure development,[15] and changes in technology or customer needs which are not appreciated by pioneers. Finally, a first move may well generate potential advantage, but further investment may be required to reap full benefit.

Pioneering by Small Firms

Size has been identified as an important determinant of success in R&D.[16] In the pharmaceutical industry, economies of scale in experimentation, testing and achieving regulatory approval are factors which virtually guaranteed the dominance of large firms until the advent of genetic engineering. In other sectors, however, small size has not proved a barrier to successful innovation (e.g. electronic and computing equipment, process control instruments and scientific instruments). The stage of the industry life cycle has also been influential in determining the success of smaller firms.

The size impact of FMA needs to be identified and it is necessary to consider both the factors which are important in *generating* invention and discovery (e.g. research effort required, tests, procedures, etc.) as well as factors which assist in *exploitation* and development of innovation (marketing, channels, manufacturing skills, etc.). In those situations where large size conveys an advantage in both generating and exploiting invention, the most appropriate strategy for a small firm will normally be that of a late mover, possibly associated with a niching strategy.[17] Conversely, if large size gives no significant advantage in either generating or exploiting invention, a first mover strategy may be best for smaller firms. Where a small firm has no comparative disadvantage in invention, but does have a comparative disadvantage in exploitation, it may adopt a first mover strategy in research but may contract out or license its invention, or alternatively be a late mover in exploitation.

Early empirical studies focused on factors determining the ability of small firms to handle successfully the complexities of the invention process, but the success small firms have in protecting and exploiting their ideas may also be crucial. This might be done individually, or through collaboration and alliances with larger firms to capture the rents arising from their skills and ideas. Teece identifies the main determinants of the exploitation strategy a firm adopts as the protection it has for its ideas and the upstream and downstream assets of manufacturing, logistics and marketing it can use in commer-

cial exploitation.[18] A combination of poor complementary assets and low intellectual property protection will inhibit a first move by a small firm, while the reverse might encourage pioneering strategies. The sources of a firm's competitive advantage—location, costs, customer service, reputation—are all moderating factors which will also influence the extent to which pioneering strategies will be successful. These assets and competencies, when combined with available marketing channels and productive resources, are crucial in the successful exploitation of new ideas.

However, the nature of the external environment, in the form of prevailing business conditions and the rapidity and stage of technological change, can also be expected to influence the pioneering strategies of small firms. Porter suggests that where there is new technology in an emerging industry, small firms have the greatest chances of success with early moving strategies.[19] Based on the development of a generic strategies model, Bradburd and Ross found some support for the proposition that successful small firm strategy required an appropriate niche position when competing against large firms.[20] Such a policy might be particularly important when trying to capture commercial gain from a pioneering advantage.

The strategic and the organisational capability of the firm (often identified as its ability to monitor competitors, forecast demand and plan ahead) is also potentially a factor determining performance. This strategic orientation may be difficult to measure, but could be an important complementary factor when assessing the role of pioneering strategies for small firms. Whilst FMA models are sometimes indeterminate, it does seem that an explanation of pioneering needs to consider complementary assets and capabilities (and included here is size), the external business and technological environment, and the strategic position of firms as key factors associated with the decision of the small firm to be a first mover or follower. The rest of the paper deals with the construction of a model with these components and the operationalisation of the constructs.

The UK and Australian Study

Methodology

In order to examine the determinants of first and late mover strategies, a questionnaire was sent to small firms (all with fewer than 100 employees) in both the UK and Australia. With minor modifications the questionnaire and sampling frame were the same.[21] The Australian survey was conducted in 1989 and the UK survey in 1992. The research was part of a larger survey concerned with the planning and strategy-making of firms in certain industry sectors. The sample was taken from the Dun and Bradstreet database, which, despite some acknowledged weaknesses, does provide a good coverage of firms in both countries. The firms chosen were those which had already replied to an earlier and very short questionnaire about levels of budgeting and planning activity. In the UK, 264 usable replies were received (27% response rate), 121 in services and 143 in manufacturing. In Australia there were 214 usable replies (32% response rate), with 102 in services and 112 in manufacturing.

Because non-response can frequently distort survey evidence, particularly when a size dimension is involved (small firms being less likely to reply than larger firms), the respondents and non-respondents were compared by number of employees and turnover to assess the extent of sample selection problems. Differences between responders and non-responders were examined using the t test for differences between means. There was, however, no significant difference between responders and non-responders in terms of the size of firm. The questionnaire collected data on the planning processes of the firm,

their extent, the information used in planning and strategy, and elements of strategic positioning at corporate and competitive levels. The Dun and Bradstreet data covered basic financial data, size and standard industrial classifications (SICs).

Following Sexton and Van Auken, strategy and planning processes were measured by examining the extent and nature of plans and budgets used by the firm.[22] The more extensive these were, the greater the strategic sophistication implied. The specific measures included whether sales forecasts, market share comparisons and profit planning were undertaken. The outcome of this audit yielded a planning score in the range 0–3, with 0 referring to the lowest and 3 the highest level. Strategy was defined as the position of the firm in its markets and the perspective it took regarding the longer term. These dimensions were assessed using Likert scale measures of respondents' perception strategy.

The extent and nature of pioneering by firms were measured by a series of statements (e.g. "We aim to be first to offer new products or services that are different") followed by a seven point Likert scale with 'strongly agree' and 'strongly disagree' as the anchor statements to identify the views of a firm's position. Such an approach captures the importance of the perceived rather than the objective environment, which in the context of strategy studies is potentially an advantage. In the context of this paper, this approach was also used to examine the firm's perceived relative capability in marketing, manufacturing and research, its perceived strategy in the contexts of Porter's generic strategies, and its view of the external environment in terms of technology change and turbulence.

The basic model includes a dependent variable describing timing of entry (first mover, second mover, reactors and maintainers of position). Explanatory variables were grouped into the following four categories, which broadly cover those aspects of the external and internal environment identified in the survey of earlier research, and which might influence timing of entry strategies:

- *Internal skills and capabilities*
  Number of employees, turnover, age of firm, management experience.
- *Processes of strategy formation and planning*
  Planning scores, using the Sexton and Van Auken typology, and strategic positions with respect to Porter's generic strategies (cost, differentiation, focus).
- *External conditions*
  View of business conditions, technical change/turbulence and sectoral differences (in particular, service *versus* manufacturing).
- *Sources of competitive advantage*
  Perception of differences from competitors in terms of skill, customer service, costs, reputation, location.

Following preliminary analysis of the data, the methodology used was to compare those who clearly identified themselves in a particular position (e.g. those who strongly agreed with the first mover metaphor), with those who strongly disagreed with the metaphor. This involved the creation of a dichotomous dependent variable which resulted from summing of all scores (1–4 inclusive) as firms which strongly agreed with the relevant metaphor describing strategic action, and then comparing these with scores 5–7 inclusive, identified as the firms strongly disagreeing. The alternative to this would have been to treat the scaled replies as a continuous variable. However, the perceptive nature of this measure can lead to wide variation of interpretation and the creation of a dichotomous independent variable seemed more appropriate. Initial analysis suggested that the various categories of leader, follower, reactor and maintainer were not mutually exclusive and reflected the mixed nature of strategies over time. Hence, our sample consisted of firms

which we were able to categorise into their perceived strategic positions across the range of options.

Data Analysis

Our empirical analysis proceeded in two stages. We first compared mean scores of the explanatory variables, identified for those firms strongly agreeing or disagreeing with the metaphors of first mover, second mover, reactor and maintainer as descriptors of their pioneering strategies. However, such an approach does not provide the basis for building a causal model which can examine the impact of changes in the strategic environment on timing strategies. Hence, the second stage involved modelling strategy using multivariate techniques. The compared *t* tests on the explanatory variables for specific pioneering strategies are given in Table 1. They suggest that very different factors drive entry strategies in the two countries. In the UK, the size of firm by employees (EMP), age of firm (AGE), and sophistication of planning in terms of planning score (PLAN), were important, but not in Australia. Business conditions (CONDS), turbulence in the supply chain (TURB), and perceived sources of competitive advantage (COMPAD) were important in both countries, but sometimes in the context of different strategies. In the Australian sample of firms, pioneering was best explained by the existence of perceived competitive advantage (COMPAD). This factor was also important for UK firms, but was secondary in importance to changes in business conditions (CONDS) and turbulence in supply chains (TURB).

The evidence seems to suggest that Australian firms might be pushed into early moving by their perceived market position and competitive advantage, whereas UK firms were pulled by threats to stability in their business environment and turbulence in technology. Since either size or age of firm were contributory explanatory factors for firms in either country, the evidence does not support the *a priori* expectations from the literature. For second movers and followers, size of firm was important in the UK, with larger firms being more likely to adopt this strategy. In Australia it was an absence of competitive advantage which was the major determinant of second moving.

Neither country study was able to throw light on the reactor category and future researchers might need to measure this variable in a different way. However, maintainer strategies were well explained in both studies. In the UK, age of firm and sophistication of planning processes were important, whilst in the Australian study, business conditions, turbulence and an absence of competitive advantage, seemed to drive this strategy. Overall the preliminary results provide contrasting pictures. Different explanations of strategy are identified, but these clearly work very differently in the two economies. A modelling approach that can examine causality as well as association was required.

Modelling Entry Strategies

Although the initial analysis using *t* tests provided valuable insights into the relationships between mover strategy and contextual variables, any explanation of mover strategy can be tested only by using a statistical model of the behaviour. Logit analysis appeared the most suitable approach for constructing and testing models of mover strategy as the dependent variable is binary, and so could be used to model whether the firm was pursuing a particular strategy.

The survey data showed that respondents did not view the four mover strategies as mutually exclusive and so a separate logit model was developed for each of the four strategies. However, since the four models were examined simultaneously and were to

Table 1. Comparison of 'means' by pioneer category

	Australian Firms				UK Firms			
Independent Variables	**FM**	**SM**	**R**	**M**	**FM**	**SM**	**R**	**M**
Employees (EMP)						** (+)		
Turnover (TURN)		** (−)						
Age of firm (AGE)								*** (+)
Planning score (PLAN)		* (−)			** (+)			*** (−)
Involvement (INVOLV)					** (+)			
Business conditions (CONDS)				** (+)				** (−)
Technology change (TECH)								
Turbulence (TURB)		* (+)			*** (+)	*** (+)		
Competitive advantage (COMPAD)	* (+)	** (−)		*** (−)	*** (+)			

Key

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
**** Significant at 0.1% level

\+ or − refers to whether score was significantly greater than or less than that for the rest of the sample

FM signifies 'First Mover' strategy
SM signifies 'Second Mover' strategy
R signifies 'Reactor' strategy
M signfies 'Maintainer' strategy

have the same set of independent variables, the estimated coefficients of each model should make sense in relation to those of the other models. For instance, as we move from early to late moving strategies, we should expect to see some pattern emerging in terms of the size and signs of the coefficients or the independent variables.

A comparison between the models for the UK and Australia is given in Table 2. As with the earlier *t* tests, the Australian model showed less statistical support for any of the specific mover strategies. In both country studies, the concept of reactor strategies was poorly explained by the available data. In the Australian study, only the second mover and maintainer strategies were significant in terms of their model χ^2, with the maintainer model being particularly impressive with a model χ^2 probability of 1.2%. In the UK study, the first and second mover models were most impressive with probabilities of 0.01% and 1.1% respectively.

Because we need to consider the individual models as part of a larger model which focuses on timing of entry across a series of separate but linked dependent variables, consistency of pattern across strategies is also important. Hence, if we view the four strategies as points on a mover continuum, the UK model is good. The estimated coefficients of the explanatory variable, TURB, decline ordinally, while those for EMP,

Table 2. Logit models (pioneering strategy model)

	UK Firms				Australian Firms			
Model	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Dependent variable	**FM (n = 151)**	**SM (n = 101)**	**R (n = 63)**	**M (n = 176)**	**FM (n = 122)**	**SM (n = 85)**	**R (n = 82)**	**M (n = 161)**
Estimated coefficients								
TURB	0.1003	0.0759	0.0323	− 0.0285	0.2894	− 0.7732	− 0.2384	0.3639
	(0.0001)	(0.003)	(0.234)	(0.294)	(0.1043)	(0.115)	(0.62)	(0.0464)
EMP	− 0.0178	− 0.0014	0.0030	0.0067	− 0.0014	0.0108	0.0305	0.0026
	(0.019)	(0.847)	(0.694)	(0.427)	(0.9153)	(0.7120)	(0.19)	(0.8472)
CONDS	− 0.1698	0.3712	− 0.3630	− 0.7700	− 0.4208	1?2824	0.146	− 0.9341
	(0.533)	(0.176)	(0.234)	(0.009)	(0.2525)	(0.1404)	(0.84)	(0.0262)
Constant	− 0.2553	− 1.3147	− 1.2979	1.5635	1.2450	− 6.4747	− 4.2017	2.3179
	(0.477)	(0.0003)	(0.0008)	(0.0001)	(0.3434)	(0.0479)	(0.1450)	(0.1076)
Model χ^2	19.019	11.429	3.517	8.234	3.885	6.913	1.597	9.582
	(0.0003)	(0.010)	(0.319)	(0.041)	(0.2741)	(0.0747)	(0.66)	(0.0225)
% of correct predictions	61%	62%	73%	73%	59%	95%	97%	64%
Impact on χ^2 by the addition of competitive advantage	n/a	n/a	n/a	n/a	4.435	7.244	4.557	19.039
					(0.3503)	(0.1235)	(0.3358)	(0.0008)

Figures in parentheses are probability levels.

Key

FM signifies 'First Mover' Strategy SM signifies 'Second Mover' strategy

R signifies 'Reactor' Strategy M signifies 'Maintainer' strategy

increase ordinally. Although the χ^2 for the UK models (with the exception of the third model—'Reactor') are significant at 5% level or above, following Table 1, it was unlikely that the Australian models would work as well. Table 2 bears this out. The Australian models are of poorer fit and do not have the consistency of UK models across mover categories. However, a comparison of first mover strategies with reactor and maintainer, shows the same signs for both countries, pioneering being inversely associated with size of firm. We should also not be too surprised that the results do not closely match; the economies in the two countries are very different. Indeed, it is interesting that the explanatory variables in both country studies contribute as much as they do to the individual models. We turn later to the similarities and differences between the two economies that might explain the overall differences.

A Further Look at the Australian Data

Taking the Australian data on its own provides more useful insights into pioneering strategies in as much as it highlights why firms hold back and do not pioneer or first move. Generally the models in Table 2 suggest that these later mover firms (maintainers in our study) in Australia are larger than average, operate with supply chains where there has been substantial change, but overall perceive stable demand conditions in the future. The maintainer model is significant at the 98% confidence level with TURB and CONDS both having highly significant coefficients. Apart from the SM model, the rest perform poorly. Nevertheless, given our methodology and in the context of a comparison with UK data, the results are interesting. In addition, the earlier statistical tests in Table 1 suggested that in Australia, perceived competitive advantage was important. We added this to our models in order to examine its influence on the whole picture and for our best model (maintainers) we were able to raise overall model probability from 2.25% to 0.08%, the coefficient of competitive advantage being significant at the 99.5% confidence level. The use of this variable also increased the explanatory power of the reactor model but the model χ^2 was still poor. The use of competitive advantage in the logit models was not as helpful as Table 1 suggested might be the case, multicolinearity being the most likely cause.

Table 2 presented some contrasting results. In particular, the drivers of pioneering appeared to differ between the UK and Australia, and model fit, given by the χ^2 values, was generally poorer for the Australian data. However, Table 1 had identified alternative explanations of pioneering between firms in the two countries and rather than undertake a straight comparison between Australia and the UK it was decided to use a statistical modelling approach for Australian data. A statistical modelling approach takes all the explanatory variables identified in Table 1 and then uses a backward step routine to examine their impact, dropping those variables unable to contribute to the significant explanation of the variability in the dependent variable. Data and model results are given in Table 3. When this is done, we see the same variables that were important in the UK model playing a more significant role in the Australian study. TURB becomes a powerful variable in explaining both first and second mover strategies, while the behaviour of the slower and more conservative firms who wear the reactor and maintainer mantle, is best explained by EMP and COMPAD. Since both of these have positive signs, there may be some support for Abernathy and Utterback's proposition that firms become less concerned with product innovation as they mature and grow.[23]

How, though, do we explain the still considerable differences between the two studies? Undoubtedly we should expect some differences because the two economies are so different. First, the UK economy is four times the size of the Australian without its

Table 3. Logit models (Australia—statistical model)

Model	**1**	**2**	**3**	**4**
Dependent variable	**FM**	**SM**	**R**	**M**
Estimated coefficients				
CONDS	–	–	–	−0.8666 (0.0330)
TURB	0.2742 (0.0794)	−0.8836 (0.0794)	–	–
EMP	–	–	0.0288 (0.2016)	–
COMPAD	–	–	–	0.0980 (0.0028)
Model χ^2 probability	0.1145	0.0476	0.252	0.002

Key
FM signifies 'First Mover' strategy
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geographic dispersion and isolation. Secondly, the small firm sector in Australia operates in often very concentrated but restricted sub-strategic markets. For example, geographic distance between the main capital cities separates many competitors. Under these conditions, the Australian market in which small firms operate may be less competitive and the process of Darwinian selection less abrasive. In addition, SMEs in Australia may hold beliefs about effective strategy that are not tested in a truly competitive marketplace. Finally, perceived competitive advantage was an insignificant determinant of pioneering in the UK study, but much more important in Australia. It is possible that Australian firms were better able to assess this than a larger set of more complex competitive conditions.

Conclusion

The concept of timing of entry has long been recognised as an important area of strategic decision making. This is particularly the case for smaller firms. Their ability to control the environment forces them to assess the alternatives of early and late moving. The problem with the concept is that, while it is important theoretically, it presents problems of measurement. In particular, there are issues of intent and action. From a strategy perspective, this should not be an issue as strategy is as much about patterns of events and actions as it is about planned intentions.

In the context of this study, timing of entry was measured by recourse to a firm's perception of its position. This proved a useful and robust measure in our study of pioneering in two countries. Across a wide range of firms in both service and manufacturing sectors in the UK and Australia, we were able to identify the major determinants of pioneering or follower strategies. The *a priori* explanatory variables were able to explain much of the variance in strategy, especially in the UK context. The specific determinants of entry strategies were different in the two studies, the impact of the different types of economy and the competitiveness of their markets being possible explanations. Governments in both countries have pursued 'supply side' macro policies and the indication from this study is that, at the level of the smaller firm, the long term

competitive environment significantly influences strategies and how firms perceive the role of innovation in these. Further research is probably required on the operationalisation of constructs and development of theory. Most work in this field has been undertaken using published data (usually PIMS), in the context of large firms. A greater focus on the strategy process, and on the detail of what pioneering means in the different stages of innovation would be valuable.

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