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Following Successfully: Followership and Technology Adoption[1]

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ABSTRACT *Most firms in most countries find themselves taking up new technology in the wake of pioneers or first-movers. A central question is how (and whether) such firms can make a success of being followers—in the time-related sense of adopting subsequently. We take a novel approach to this question by drawing on the literature of leadership and followership within organisations. This literature employs characteristics in two dimensions to build a taxonomy of types of follower—in the hierarchical sense of working for and with an organisational superior. Using this approach, we generate hypotheses about the sorts of firms which are likely to prove more or less successful as early and later technology adopters. From the analysis, we are also able to identify ways in which the emerging followership literature requires strengthening.*

Keywords: technology, followership, leadership, innovation.

1. Introduction

This paper is motivated by the proposition that the potential benefits to firms of drawing on the experience of others in the technological domain remain under-appreciated. One contemporary commentator, for example, argues 'followership in technology has little value'.[2] Much of the pressure for technology policy focuses on stimulating R&D to generate new knowledge without due (or any) recognition of the important role played by R&D in assisting firms to recognise and absorb the ideas of others.[3] Given that most firms (and most countries and industries) stand to benefit greatly from the work of others, we believe insufficient effort has been devoted to understanding how potential adopters may effectively absorb new technology. Going a step further, we wish to investigate how firms can be successful followers, i.e. profit from following.

In this endeavour, we bring together two approaches with a view to generating new insights. The first approach relates to the process of technology adoption or diffusion throughout a group of user firms (which may or may not comprise a well-defined industry) and considers the drivers that explain leading and following and,

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more generally, order of adoption. The second approach relates to the notion of followership within an organisation, a concept which has been developed to complement a growing awareness of the importance of organisational leadership and recognises that qualitative variations in follower behaviour can be just as significant.

The most compelling elements of the literature of the economics of diffusion make it clear that heterogeneity and variety among firms matter when it comes to explaining the sequence of adoption of a new technology. For example, rank-type models of diffusion relate the order of adoption to the inter-firm distribution of expected returns on using a new technology—where returns are derived from the distribution of selected characteristics across firms.[4] In this approach, it is the selected characteristic which denotes the source of heterogeneity and in seminal analyses, the characteristic has been tied back to firms' resources: size of asset base underpinning firm size, and the age of existing capital equipment.[5] Empirical work has often (but not always) found a positive relation between size of firm and speed of adoption,[6] but the relationship between size and actual profitability for given adoption dates (the issue of interest to us) is less clear. The economic models presuppose that firms choose their adoption dates on the basis of known or confidently expected profit predictions. Since we are interested in *successful absorption*, we need to know which firms actually turned out to do well—which is a different matter (and harder to observe than date of entry).

To investigate that issue, we take an approach which complements the standard *resource-based* economic models. Adopting an organisational viewpoint drawn from the managerial literature on leader–follower relationships, we provide a classification of follower firms that: (a) defines a basis for variety; and (b) provides insights into both order of entry and the potential for success contingent on entry point. As we note later, this approach also complements economic work that has focused on inter-firm differences in *attitude to risk* and the implications of exogenously determined *market structure*. On the first of these, we believe the managerial followership literature points to the importance of a combination of attitudes and aptitudes which are qualitatively different from attitude to risk. On the second, we believe the internal structure of an industry, and its evolution, are to a significant extent *determined* by the sort of adoption decisions we are investigating. We are therefore analysing what causes the structure to be as it is rather than taking it as a datum.

The paper is organised as follows. Section 2 revisits and briefly reviews the strategic management and economic literature surrounding the relative merits of first-mover and later entrant strategies in connection with new technology. In view of continuing claims that later entrants are doomed to disappointment,[7] we seek to establish what the evidence shows on this point. Section 3 reviews the organisational followership model and extracts from it a taxonomy of follower types. Section 4 is the analytical core of the paper and generates a number of hypotheses based on predictions about the sorts of firms that are likely to make a success (or not) of earlier and later adoption. Section 5 foreshadows directions for further research.

2. Leading and Following with New Technology

Most firms, most of the time, are destined in a temporal sense to be followers when it comes to the introduction and adoption of new technology. In this section we ask first whether economic and business logic necessarily implies that first-to-market

(FM) firms have the best prospects and, by extension, whether a first-to-market strategy must always be superior. We then summarise the evidence on returns to pioneering and later use of a new technology. From this work we hope to draw inferences on: (a) whether following the lead of others and diffusing and absorbing rather than pioneering new technology is, in itself, a poor position to be in; and (b) what conditions and firm characteristics are most likely to enable a follower firm to be successful—relative to pioneers, other followers and the average. One way of modelling the diffusion of new technology is to impose a leader–follower *structure* on a group of potential adopters (perhaps an 'industry') and analyse variations in the adoption process accordingly as varying behavioural assumptions are made about the leader and followers. Our interest is more in what *determines* which firms will be leaders and which followers. If firms interested in success or survival *choose* not to lead and/or succeed *despite* not leading, there are potentially lessons to be learned from their experience about what it takes to be an effective follower and absorber. By the same token, we may be able to learn when following will be ineffective or should not even be contemplated.

In terms of the business strategy literature, our analysis might be placed within the framework defined by Ansoff and Stewart.[8] We follow them in distinguishing FM firms from subsequent adopters but where they talk of second-to-market and late-to-market firms, we will focus on 'early followers' (EF) and 'later-followers' (LF).

The benefits to be gained from FM relate to the temporary monopoly which pioneering entry bestows. Producer-based advantages here are associated with barriers to entry—which may be reinforced by the institutional support of IP rights such as a patent and exploited by either price skimming or price penetration. Prospective benefits include:

- learning-by-doing and scale economies facilitating lower production costs;
- pre-emption of scarce assets giving privileged or exclusive use;
- early exploration and exploitation of the next generation of technology;
- preferential access to distribution channels.

Consumer-related benefits include:

- reputation advantages deriving from pioneering success;
- brand loyalty stemming from asymmetric information about the quality of competing products and the presence of switching costs;
- dictating the terms of competition by setting industry standards;
- the opportunity to position a new product in ways that condemn rivals to be either pure copyists or producers of an inferior product.

Rather less has been said about the merits of EF versus LF but the general presumption is that late adoption only makes sense if the market is growing rapidly and significant scale economies are available for a late entrant.

While a case can be made that pioneering offers overwhelming benefits, it is not difficult to find reasons why it may be wise to wait. Most of the reasons centre on learning effects.

- On the production side, imitators do not usually have to spend as much time as innovators in the research blind alleys leading to innovation: they have the

benefit of the cues and heuristics bestowed by an existing product, process or solution.

- Followers can also observe how the market responds to a leader's innovation. Followers can set industry standards as much as leaders if the leaders turn out to have been unsuccessful in matching their product to the most receptive and populous parts of the market—which are then available to the perceptive follower.
- Followers may exploit learning on the part of users. Pioneers may have to educate users, expensively, about the value of an innovation while followers may benefit from potential users having already become aware and readied to purchase.
- Seeing the potential of a new product, followers may use existing assets they possess and distribution channels they have created to convert a niche or specialist market for an innovation into a growth or mass market.

If the case for pioneering entry were overwhelming, we should expect that to be reflected in empirical studies. In fact, the evidence is quite ambiguous on whether first or later entry yields the greater returns.[9] Further, studies which emphasise the benefits of pioneering are often blighted by 'survivor bias' in the sample of firms studied. They ignore the fact that many pioneers go out of business as the industry grows and 'are simply not around to study at a later date'.[10] This resonates well with other classic work on the changing membership of industries over time,[11] as well as the evolutionary literature—all of which records regular comings and goings in developing industries. Early exit by a pioneer need not, of course, signal failure or a low return: pioneers often sell out with major gains to followers. But the survivor bias problem warns us that empirical analysis of issues surrounding order of entry should include the experience of *all* firms that used the technology or were members of an industry, whenever they entered and whenever they exited.

We conclude this brief review on the following note. While there may be advantages to pioneering, there is no reason for a firm or country that finds itself following rather than leading necessarily to feel a sense of despair. Many second and later entrants have been successful both absolutely and relative to leaders. The more careful studies cited above work towards complex and multi-layered sets of conditions which might, in their view, determine the competitive advantage accruing to first-moving, but they also call for further research on later entrant advantages and strategies. The purpose of this paper is to make a contribution to that research. In so doing we propose that no commitment be made to statements attributing necessary advantage to leadership over followership in terms of return. By extension, we feel disinclined to argue that later followership is necessarily associated with lower returns than early followership—though, on average, it seems plausible that that might be the case. These we regard as essentially empirical matters.

3. Followership

The research literature on leadership in organisations relegates individuals in follower roles as subservient to leaders.[12] Indeed, organisational success is generally attributed to the behaviours or personality of leaders rather than their followers. While the influential position leaders have in organisations cannot be denied, they are only one component of an interactional framework which may be used to

understand leadership and its influence more generally.[13] This framework presents leadership as the intersection of three circles representing the leader, the followers, and the situation. Each circle encompasses a unique lens or view of leadership. Focusing only on the lens of the leader reduces our ability to understand events comprehensively because followers and the situational aspects are being ignored. The importance of followership within organisations has now been explored in the seminal work by Kelley.[14] As he points out, the power of followers within the organisational hierarchy is constantly under-estimated by organisational stakeholders.

This work highlights the importance of the follower lens and challenges the view of assessing organisational success only through the leader lens. It concludes that leaders contribute no more than 20% to the success of an organisation, while followers are critical to the remaining 80%. The importance of followers is slowly gaining recognition as demonstrated by a now widely accepted definition of leadership as 'an influence relationship among leaders and followers who intend real changes that reflect shared purposes'.[15] This definition highlights the importance of followers and the reciprocal relationship between leaders and followers.

Followership research challenges the view that leaders are actively shaping passive clay or that their followers should be viewed as a mindless mass. It generates a taxonomy of followership in two dimensions.[16] The first dimension deals with follower thinking and ranges from critical independent thinking to uncritical dependent thinking. Individuals may be located along a 'critical–uncritical' (C–U) axis in this dimension. The critical independent thinking dimension represents a style of autonomous thinking that includes constructive criticism, innovation, and creative thought. Critical independent thinking involves followers understanding the significance of their actions, the action of others, and the impact of decisions on the organisation's vision. In contrast, the uncritical, dependent thinking dimension represents a non-challenging style of behaviour and reflects a 'must-be-told-what-to-do' attitude. This uncritical style involves followers seeking only one course of action where alternative possibilities are not considered. These followers accept the ideas of leaders without thinking or commitment.

The second dimension of followership deals with the degree of follower engagement in their work and ranges from active to passive styles of involvement. Again, it is possible to locate individuals along an axis, this time labelled 'active–passive' (A–P). The active style represents full participation by followers and involves followers taking the initiative, assuming ownership, and being self-motivated. The passive style represents limited participation by followers, and involves followers being lazy and dodging responsibility. Followers adopting this passive style require constant supervision by their leaders.

The two-axis structure generates a taxonomy of followership yielding five general types of followership.[17]

1. the *alienated follower* is a passive yet independent critical thinker;
2. a *conformist follower* actively participates but does not utilise critical independent thinking;
3. a *passive follower* exhibits neither critical independent thinking nor active participation;
4. an *effective follower* is both a critical independent thinker and active in the organisation; and

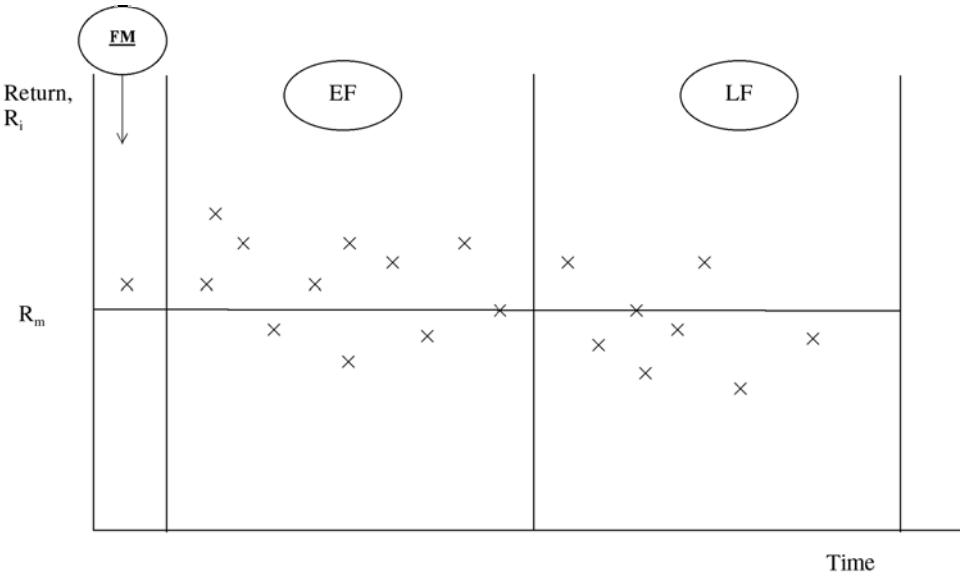

Figure 1. Hypothetical set of returns to entry: FM = first mover; EF = early followers; LF = later followers. R_m = mean rate of return.

5. a *pragmatic survivor* uses all other styles depending on which style fits the prevailing situation.

The above types help to define followership beyond the usual terms of conformity, weakness, and passivity[18] which tend to devalue the contribution followers make to organisational success. In particular, Kelley's effective follower type is characterised by both mindfulness and a willingness to act and recognises followers as active participants in achieving organisational success.[19] Consequently, followers need to possess desirable qualities usually associated with leaders, such as initiative, commitment, and courage.

Kelley's taxonomy of followership offers organisational stakeholders an alternative perspective to understand their organisations. Stakeholders who understand the engagement and thinking styles of followers access a rich source of information about who is contributing to organisational success.

4. Analysis

It is now time to draw together the strands of the analysis.

The extensive economic and managerial literatures on entry order suggest no systematic correlation between timing of entry on the one hand and market share and profitability on the other. Theoretical arguments may be invoked which imply conditions under which first mover advantages will be substantial and circumstances in which later entrants will do better than pioneers. But when interpreted carefully, the empirical evidence favours, as a general principle, neither a first-to-market nor later-entrant strategy relative to the other. Figure 1 is taken to characterise the scatter of likely returns over the life-cycle of a technology or some extended period of time long enough to allow long-term rates of return to be calculated.

If one is interested in the successful and effective diffusion of new technology, the best marker to seek is *above-average returns* over a reasonable time-frame. We start by triaging second- and later-entering firms into groups which made significantly above-average returns (where $R_i > R_m$ for the ith firm and R_m stands for the mean return), about-average returns ($R_i = R_m$), and significantly below-average returns ($R_i < R_m$). Successful and effective adopters fall into the first category; less or unsuccessful adopters into the latter categories. We also divide them, temporally, into early followers and later followers. Our purpose is to draw on the managerial followership literature to make predictions about the characteristics of firms in each group.

The followership literature sorts firms according to two dimensions of characteristics: the active–passive (A–P) dimension and the critical–uncritical (C–U). Although firms may operate at any level within each dimension, we identify just three possible levels for each one: 'high' (H), 'medium' (M) and 'low' (L). 'High' in the A–P dimension refers to the most active and 'low' to the most passive. 'High' in the C–U dimension refers to the most critically independent of firms and 'low' to the least critical. A particular interpretation of these dimensions in this context is as follows.

By construction, the analysis is about the process of change. In the same way as highly active followers within organisations are those most actively engaged in their work, highly active firms are those most actively engaged in understanding and attempting to anticipate changes in their business environment. Always alert to changes in their environment, they are constantly on the look-out for emerging opportunities. Opportunity may come from changes in the science base and/or technological knowledge, or from changes in the market. Within organisations, highly active followers are initiative-takers and self-starters. At the industry level, highly active firms are the ones that make themselves most aware of technological and market changes and are most sensitive to the need to position themselves for change. An anticipatory attitude is the key. The observation that they follow a pioneer into the market might reflect either a deliberate wait-and-see strategy in which the leader's pioneering entry had always been foreseen as the change to the environment which would trigger the follower's action. Or it could be the accidental outcome of independent entry strategies characterised by entry dates differing between one firm and another.

By contrast, passive followers within an organisation must always be prompted, shown the realities of already-occurring change and provided with supportive guidance before tardily coming on board. Analogously, firms low on the A–P scale, respond belatedly—and only then because they are prompted into awareness of the need to do so by significant changes to their business environment.

The A–P distinction is set essentially in the temporal dimension and has at its heart the degree of willingness and ability to anticipate emerging opportunity. Distinctions within the C–U spectrum reflect differences in the capacity of firms to analyse any situation independently, and think through how to prosper within it, given the initial conditions of their existing resource base. Followers within firms who score highly in this dimension are independent-minded and prepared to speak their mind. At the group level, firms that score well here have a high capacity and willingness to critically evaluate the fit between their capabilities and market opportunities and, dynamically, to identify the resource investments required to maintain or enhance the fit. Firms that score poorly fail to notice mismatches

between their capabilities and market requirements and, by extension, lack the will and ability to marry emerging technological opportunities to evolving market needs.

For the purposes of our analysis, we examine four groups: first-to-market (FM), early followers (EF), later followers (LF), and non-entrants (NE). We make the following assumptions. There is a positive correlation between level of 'activeness' and order of entry. On the A–P dimension, FM firms are assumed H since it is hard to imagine any firm achieving first entry without having been alert to the opportunities available to it—and, in many cases, having created such opportunities for itself. EF are assumed H or M, where H firms are those that have been active in positioning themselves (perhaps through a development programme paralleling that of FM). EF–M firms are those which keep a watching brief on developments but jump in quickly when they recognise the potential demonstrated by FM. LF are assumed M or L: M if they at least keep an eye on market developments and L if it takes the imminent threat of extinction to prod them into action. NE by definition are not active in this group of firms but may be anywhere on the A–P between highly alert to and totally unaware of opportunities in the group under analysis.

In terms of the C–U dimension, a greater degree of ambiguity is assumed. While FM firms might appear at first blush H, it is not impossible that blind enthusiasm could drive them to act as what we call 'uncritical plungers' registering L on the C–U scale. Firms like this may be greatly blessed with technological competence but only dimly aware of the importance of identifying market needs. EF firms, similarly, could well be H—market-alert as well as sufficiently technologically accomplished to get into the game early. On the other hand, they could be L: spurred into action by the activity of FM but poorly equipped with the critical judgment or faculty to identify the capabilities required to meet the market. LF firms could be H—exercising great caution in a highly uncertain market. Or they could be L—blindly following a me-too policy for want of more careful analysis. NE firms could be balanced on the cusp of entry, carefully weighing the pros and cons, or thrashing about in a careless orgy of diversification which might or might not take them into this area of activity.

Let us now try to make inferences about the characteristics of EF and LF firms according to whether their returns lie above, around or below the mean. To the extent that the followership framework allows such characteristics to be identified, they might then be used as predictors of what sorts of firm are most likely to benefit by entry at one stage rather than another. This could then form the basis for a test, comparing variations in returns on the one hand for firms in the EF and LF groups with differences in firms' A–P and C–U characteristics on the other.

In what follows, we distinguish five groups of firms. Headings indicate whether they are early or late followers and the returns they receive relative to the mean.

EF: $R_i > R_m$

Early entry, we argue, betokens firms that were always H or M on the A–P scale and above-average returns imply the firms concerned successfully adopted, absorbed and effectively used the new technology. Alert to opportunity, these firms also had the critical faculty to recognise the match required between resources and meeting market need: on average, they score a straight H on the C–U scale. Whether or not the match was perfect to start with, they correctly judged that they could quickly achieve effective alignment and synergy between market and technology. When

alertness reveals opportunity, early entry reflects a well-founded belief by firms like this that they can exploit it successfully without delay.

To turn this into a useful prediction, we need to ask whether firms H (or possibly M) on A–P and H on C–U will necessarily enter early and achieve higher-than-average returns. In fact, if we observed *at the outset* all potential adopters and tried to predict which would enter when and with what results, it is logically possible that some firms H on A–P and C–U *might not enter at all.* These firms might judge (correctly) that their resource base was ill-fitted to the emerging opportunities and that their capacity for required change was insufficient to allow them to become competitive in the changing environment. Such firms would judge that they would be best served to exit the industry, or that arm of it using the new technology, or wait until the next round of innovation (e.g. Hewlett-Packard vs TI). Such firms would never be counted in empirical analysis if we only observed actual adopters, i.e. the firms that had adopted and recorded some sort of return during the adoption period. But if they were potential adopters at all, they should be included. For even if, at the end of the adoption period, all EF with above-average returns were H in both dimensions, *the existence of such cases would show that H in both dimensions among the starter group was not a* ***sufficient*** *condition for (i.e. an infallible predictor of) successful early entry.*

We argue that firms H on C–U and alert to opportunity will not, however, enter late. They would either recognise their own existing and potential deficiencies and not adopt at all, or recognise (correctly) their own strengths, and enter early.

Could it be argued that it is not necessary to have been H on both dimensions to be a successful adopter? That is, might some firms in this group, for example, have been M to L (i.e. *not* H to M) on C–U and have prospered by good luck rather than good judgment, mounting the wave of innovation with little exercise of critical faculty? This seems a logical possibility for some firms. But even admitting that, it would not undermine the claim that, looking at *long-term* returns *on average*, firms in this category are nonetheless likely to have been H (or M to H) on the C–U scale. The reason is this. Most (if not all) firms engaged in the uptake of new technology have to make investments in modifying or even transforming their resource base. Firms may make these investments carefully (i.e. after careful, critical analysis) or uncritically (i.e. with little or no prior analysis, effectively randomly). In either case, the outcome could be good or bad. On average, uncritically (randomly) made decisions will not turn out to give returns above the mean. Indeed, we might anticipate that it is less likely that firms will get things right by mistake than make a lot of good decisions and be thwarted by a crucial error. Nonetheless, if decisions are made critically (are carefully considered), the mean return on such decisions should be higher than for randomly made decisions unless the environment is profoundly uncertain. *The key here is that the environment for followers is less uncertain than it was for the first entrant.* Firms best equipped to judge whether their resources match market need should be able to benefit from observations of the leader's experience and achieve a better outcome than if they acted randomly. On average, the exercise of critical faculty will lead to higher returns than uncritical choice, given an environment in which elements of uncertainty have been removed. In turn, this implies that the group of firms earning higher-than-average returns will, mostly, score H on the C–U scale.

It is important to have this argument in principle to hand since observation *at the end of the period* will always be potentially ambiguous as a guide to whether a firm

was H, M or L on C–U at the outset. The hypothetical returns we are observing relate to long-term experience. If a firm got lucky and randomly made appropriate investments at the outset, it could not *sustain* higher-than-average returns unless it learned well throughout the ensuing evolution of the industry. This would require it to *develop* so that, at the end of the adoption period, it would actually be scoring H on the C–U scale, even though it had not been an H firm to start with. The firm would have had to be a good learner, or its returns would have declined towards the mean, and perhaps fallen below it. But if we only observed the final state of the industry, this is something we could not know.

In summary, we argue that successful early followers will either have or quickly develop the characteristics of effective or exemplary followers within organisations, scoring H or close to it on both A–P and C–U. However, for individual firms, being H on both dimensions at the outset is neither a sufficient nor necessary condition for successful early following. Firms ill-equipped at the outset to adopt and absorb the new technology and acutely aware of their deficiencies (H on C–U) may exit or turn to other things: they may not follow at all. Firms alert to opportunity but unsure of how to capitalise on their resources (L on C–U) may adopt early and learn quickly—both about the new technology and how to manage it effectively. We argue it is impossible for a firm to belong to the high-return group in the long run by accident and unlikely, on average, that many firms L on C–U at the outset will learn enough to be above-average performers over the period.

Hypothesis 1a. *Early followers found at the end of the adoption period to have earned higher-than-average long run returns will have had for most of the period an active strategy to pursue market and technological opportunities and a demonstrated ability to match the two.*

Hypothesis 1b. *Potential adopters that exit or wait out the adoption period will have a high-level awareness of both opportunity and their deficiencies in the potential for exploiting it.*

Hypothesis 1c. *Firms unaware of their deficiencies in absorbing new technology only make above-average returns if they engage in demonstrable learning.*

EF: $R_i < R_m$

As with the first group, we argue, early entry implies H or M on the A–P scale but, we suggest, below-average returns imply a low score on the C–U scale. These firms are the analogues of Yes People within organisations: unthinking and uncritical, to some extent conditioned reflexes governed by knee-jerk reaction. They are alert to what the leader is doing and quick to respond to that but have little understanding of the opportunities the leader was attempting to exploit and of their own capacity to exploit the opportunities successfully themselves. On balance, their timing is *driven* by their A–P characteristic and unconstrained or uninformed by the exercise of careful judgment.

The best predictors of unsuccessful early entry are a strategy (explicit or implicit) aimed at acting on the leader's cue (though, in principle, early entry can also be an accident of timing), and a lack of critical faculty. Firms in this group are often ungrounded fad-followers: early into the game, but blind to the reality that they will be ineffective absorbers, users or implementers of new technology.

Is an L score on the C–U scale necessary for below-average performance among EF? No, because an alternative explanation for below-average returns among early followers is that firms like this were at least M on the C–U scale but made a single, perhaps forgiveable but unfortunately costly, error of judgment. We admit this as a possibility but argue that, *usually*, good analysis and judgment about capability are *less likely* to lead to below-average returns than at least average returns *over the long run*. A firm that starts out H on the C–U scale but makes a mistake has time to recoup, and if it remains H on C–U, is quite likely to achieve rising returns through time because of its superior capacity to learn from mistakes. On balance, firms that are H on C–U at the outset are more likely to recover and escape the below-average return region than firms that were L on C–U to start with. On average, therefore, we say that being L on C–U to start with is a better predictor of finishing up with below-average returns among EF than being H on C–U at the outset.

Is L on C–U sufficient for below-average performance among EF? As we noted in the previous section, the answer here is also no. Firms that start with a poor appreciation of their capacity to match capability to market opportunity have the opportunity, in principle, to learn and as they learn may also escape the below-average return region. We argue, however, that firms that start out L on C–U have less potential to become good learners than firms that start out H on C–U. For the same reason as there are unlikely to be many firms in the above-average range that started out as L on C–U, many firms that were L on C–U to start with are expected to finish up with below-average returns.

> **Hypothesis 2a.** *On average, firms that enter early but make below-average returns are firms characterised by a quick-response strategy but lacking tools and procedures for market and business analysis.*

> **Hypothsis 2b.** *Firms that display rising returns relative to the average over the adoption period will, on average, be those most aware of their capacity to match their capabilities to market opportunity.*

LF: $R_i > R_m$

In a sense, this is the most difficult group to characterise. Firms that are late followers, we argue, can only have been belatedly alert to opportunity or relatively reluctant to grasp it: at least during the earlier period they were M (or maybe even L) on the A–P scale. Firms that adopt late are most likely not to have noticed the potential of a new technology until early followers have shown that there is something to it. To have achieved above-average returns, however, they will also need to have scored H within the C–U dimension once they adopted. These firms are slow out of the blocks but ultimately make higher-than-average returns because they are high on C–U when they come to adopt: good at seeing how to turn their existing competencies to effective use in the new environment.

Firms H on C–U at an earlier stage but also H on A–P would either have been EF and, if they entered, successful on average, or would have recognised their inadequacies and not have entered at all (see earlier section on EF). Firms that enter correspond to the highly effective followers of the organisational followership literature. That literature, however, offers no well-defined characterisation of followers who are H on C–U and M on A–P. And in the context of the technology

diffusion literature it is also hard to imagine firms that are, *throughout the whole adoption period*, simultaneously excellent at judging the match between their resources and market opportunity, but sluggish at noticing that the market opportunity is there in the first place. This is an instance where the *temporal* nature of following in technology diffusion needs to be brought into play: we would argue that firms in this group were L on C–U at the outset but became H on C–U later. Such firms may well have undergone a management revolution as leaders and EF showed that opportunities existed.

It may not appear logically *necessary* for a successful individual LF firm to score H on C–U since it could be argued that some late-adopting firms might be L or M on C–U and achieve above-average returns by good luck. Given that the degree of uncertainty has been so much reduced by this stage, however, the scope for luck must in reality be very small indeed. At the level of the average, firms must necessarily be H on C–U, we would argue. It is not *sufficient* to be H on C–U at the later stage to achieve above-average returns since even firms with a good grasp of matching resources to market opportunity can still make mistakes, and some firms may be so analytical that they may suffer paralysis (see below). We would expect to see some firms that are H on C–U and adopted late making only average or below-average returns.

In summary, if we observed the positions of all firms *at the outset* on A–P and C–U scales, we would predict that firms below H on A–P will be LF. We argue below that H on C–U throughout combined with L on A–P implies 'analysis-paralysis' and below-average returns, so above-average returns would be predicted only for firms of much greater dynamism. Firms that start below H and become H on C–U portray precisely such dynamism and are what we might call *innovative imitators*. On the other hand, at the outset we cannot say which firms that start out below H will subsequently become H on C–U. It is a necessary condition to start out below H on C–U—but clearly not sufficient since many below-H firms on C–U will not make above-average returns.

The upshot of this discussion is that it is logically impossible to know at the outset which firms in the starter set will turn out to be successful late followers: successful late following will be closely related to *changes* to firms over time. The positive message here is important. Firms at the outset can have modest scores in terms of alertness and even low scores in terms of critical capacity—and still turn out successful in the long run if they change their spots. From the perspective of final outcomes, we can predict that history will turn out to have counted.

But there is a downside, too, to late following. We think it likely that the mean of high returns to LF will be lower than mean high returns to EF. While following early may have clear benefits compared with going first, it is harder to think of significant benefits as great for later following compared with earlier—however effective management might be. Later followers inhabit a world of relative certainty and starkly defined alternatives: adopt or die. That firms like this adopt the technology at all implies a determination to do well under unpromising circumstances—in turn suggesting that they have an eye on a longer-term future when a new wave of opportunities arrives.

Hypothesis 3. *Late follower firms that earn above-average returns are firms that have experienced significant managerial or cultural change since the start of the adoption period.*

LF: $R_i < R_m$

Firms in this group come late to the game for one of two reasons. (1) They wholly lack the insight to recognise the potential of the new technology and their capacity to adopt it: they are L on both A–P and C–U. (2) They are afflicted by 'analysis paralysis': L on A–P but H on C–U. The first group are classic 'sheep', unaware of change around them and when ultimately made aware, liable to persist unquestioningly in pre-existing routines, buying in the 'new' technology because nothing else is available. These firms may run old routines *alongside* 'new' technology, reducing productivity and raising costs through duplication. If they try to absorb the technology, they possess neither will nor ability to do so intelligently and, at best, attempt merely to mimic firms that have gone before but without any real understanding of the human and organisational adjustments that have to be made. They do not survive.

The second group is, in some ways, more interesting though, ultimately, no more successful. Firms of this kind are so preoccupied by the *analysis* of possibilities and inherent dangers that alertness to what is *actually happening* around them is dulled and drowned out, or seen only in terms of short-term gains to adopters. Like alienated followers within organisations, they can see all the downsides of the technology, and by the time the advantages have been demonstrated beyond doubt, it is too late for them to benefit.

Because of the dichotomised nature of this group, there are two sorts of candidate conditions for membership. Lack of alertness or awareness may be combined with either a very low or a very high degree of critical attitude. All firms which, at the outset, display L scores on A–P will enter late. Consider first those firms that also start out L on C–U. These firms will either remain L on C–U or change during the earlier adoption period. We argued above that firms must change if they are to earn above-average returns. Firms that do not change will earn below-average returns. For below-average returns, we argue it is thus a sufficient condition to have started and to remain L on both A–P and C–U, i.e. to take on the role of a sheep at all times. At the outset we cannot know which firms will change and which will not, but at the end of the period we could, in principle, identify those which had changed and those which had not. Armed with such data, we predict that some firms may have started out L on C–U and subsequently made the changes necessary to achieve above-average returns. Upgrading from L to H on C–U, however, is necessary for above-average returns but not sufficient: some upgraded firms will still fail. This implies that it is sufficient but not necessary to have been a sheep throughout to achieve below-average returns as a late follower.

We also argue that it is not necessary to be L on C–U at any stage to achieve below-average returns. Our second group of firms, those paralysed by their own analysis, will be H on C–U throughout. On the other hand, scoring at the outset H on C–U with L on A–P may not be sufficient to ensure below-average returns. Firms with such scores have time during the early adoption period to become more alert (i.e. to become M on A–P), and like firms that move to higher scores on the C–U scale, they could then face the possibility of achieving average or even above-average returns. In the language of the followership literature, these firms must change from being alienated followers to survivors.

Hypothesis 4a. *Late follower firms that make below-average returns will, at the outset of the adoption period, operate wait-and-see strategies.*

Hypothesis 4b. *Late follower firms that make below-average returns will be found to operate both old and new technology together in a larger proportion of cases than early followers.*

Hypothesis 4c. *Late follower firms that make below average returns will have greater variation of C–U scores than firms in other groups.*

EF, LF: $R_i = R_m$

Many of these firms, we argue, are what the followership literature would identify as 'survivors' or 'pragmatists' and, on average, M in both dimensions. In some cases, however, firms will score high enough on one dimension to compensate for being below-M on the other: being M in *both* dimensions is not a necessary condition in the case of all individual firms for average performance. With unusually good or bad luck, an M–M firm could also achieve above-average or below-average returns—though luck is increasingly unlikely to play a role the later adoption occurs. Being M in both dimensions is thus not a sufficient condition for average performance by an individual firm either.

On average, however, we would characterise firms achieving average returns as alert enough to see and understand what earlier entrants (relative to them) are about, but not pursuing independent and parallel lines of development. In the case of EF, their reaction is relatively fast but their response imperfectly thought through or their resources less-than-perfectly fitted to the opportunities they face. In the case of LF, they may have been initially distracted or poorly managed, but they later focus and thorough homework pays off just well enough to generate a normal return.

Hypothesis 5. *Firms that make average returns will be found, on average to have entered when most firms are entering and to have carried out no independent work on the new technology prior to the pioneering firm's adoption date.*

5. Discussion

We have used the managerial followership typology to form hypotheses about the characteristics and performance, on average, of later-entering firms in the adoption of a new technology. We are not aware that the followership literature has been used in this way before and offer it as one possible simplifying device to help understand the complex relationship between order of entry and return. Two sets of issues arise. First, what other basic ingredients should be included in the analysis to enhance its explanatory power most effectively? Second, what feedbacks might there be from the technology adoption literature to the managerial followership literature: i.e. what might we learn from applying followership literature in a new environment which could contribute to strengthening it in general terms?

On the first question, we found it helpful in the analysis to refer occasionally to the *existing resources* of potential adopters. In the managerial followership literature the emphasis is very much on the *attitudes* of the individual and much less on resource endowment: an active–critical person is deemed an effective follower without reference to their capacity to perform. This may or may not be seen as a shortcoming of the followership literature (see below) but for the purposes of prediction, it would appear useful to know something about the resources of firms

at the time the adoption process begins. This is recognised in rank-type models of diffusion in the economic literature in which order of adoption is generated by the distribution across firms of returns to the use of the new technology—in turn derived from the distribution of selected characteristics across firms.[20] Resource-related characteristics identified in this approach have included firm size (reflecting size of asset base) and the age of its existing capital equipment.[21] Our model selects a different type of characteristic and excludes resource-related markers, but we would make the point that if resource-related issues *were* introduced, consistency with our approach requires that it is the *type* of assets (in terms of suitability for emerging market opportunities) that should be considered rather than just their volume or their age. In itself, that seems to us an important insight.

There is another issue here too. Empirical work has often (but not always) found a positive relation between size of firm and speed of adoption.[22] The relationship between size and actual profitability for given adoption dates (the central issue of interest to us) is less clear. The economic models presuppose firms choose their adoption dates on the basis of known or confidently expected profit predictions. Since we are interested in *successful absorption*, we need to know which firms actually turned out to do well—which is a different matter (and harder to observe than date of entry).

Summing up on this point, we acknowledge that observations on firms' resources at the outset could be an important discriminator among firms which turn out to be successful long-term absorbers of new technology and those which do not. However, it is the type of resources, not merely their quantity or age, that needs to be identified, and to obtain insights into the success of adoption, it is necessary to have data on profit, not just date of adoption. In that context, it would be unhelpful to *start* from the proposition that order of entry *per se* or number of existing users in themselves *predetermine* the profitability of subsequent adoption (as assumed, respectively, by the order and stock effects models of diffusion). Persuasive empirical work supporting these assumptions remains to be done.

A second basic ingredient which we did not formally consider was *attitude to risk*. To an extent this may seem a matter of semantics: firms that enter early could be viewed either as unusually alert to opportunity or unusually willing to take risk. On the other hand, we believe the managerial followership literature points to the importance of a combination of attitudes and aptitudes which are qualitatively different from attitude to risk. To give two examples. EF firms high on C–U may perceive themselves to be taking great risks, but risks based on good analysis and judgment and necessary for survival. Other EF firms low on C–U may actually be taking risks that will turn out to lead to their demise but because of insufficient analysis and poor judgment may not perceive themselves to be taking great risks at all. From a risk perspective, the mere fact that firms enter early may be taken as implying a low level of risk aversion. Our approach emphasises the importance of the information firms have and what they do with it. Firms may in fact be quite risk averse and yet enter early because analysis and judgment lead them to conclude that failure to enter would carry with it a high probability of long term failure. In our view, it is a matter of judgment for the modeller whether foreknowledge of attitudes to risk would lead to better predictions about which firms will succeed and which fail. Our feeling is that high C–U firms are likely, on average, to do better than low C–U firms (despite the salutary possibility of analysis-paralysis in isolated instances), whether or not high C–U firms are risk-averse, risk-neutral or risk-

loving. If this were true, it would seem to place risk attitudes at a level of analytical significance below the attitudes and aptitudes we have discussed. It would be interesting to investigate, however, how the level of risk aversion correlated with the other dimensions of our analysis in determining both timing of entry and success.

A final ingredient that should be mentioned for completeness is *market structure*. The economics literature has a range of models implying that degrees of market power both within the adopting industry and in supplier and user industries have the potential to influence profitability and speed of adoption. We readily concede that we have not considered this as an element in this analysis and three points of clarification are needed as a result. First, we believe that the internal structure of an industry, and its evolution, are to a significant extent *determined* by the sort of adoption decisions we are investigating. We are therefore analysing what causes the structure to be as it is rather than taking it as a datum. This is in the tradition of modern evolutionary analysis rather than traditional structure–conduct–performance work. Second, the market structure framework has insights to offer about speed of adoption among potential adopters on the assumption that potential adopters can be characterised in a fixed way throughout the adoption period. It does not address the implications of learning among the yet-to-adopt sub-group as the process unfolds—which could well change the entry order and pace of adoption compared with the prediction at the outset. Third, we have not committed ourselves necessarily to a specified industry, rather the group of potential users. We should acknowledge that we would in the more general case need to consider the structures of the several or many industries involved. This remains an issue for further research.

On the second major question, the issue of feedbacks from the diffusion to the followership literature, it looks as if the organisational literature has omitted reference to the *capacity* of different individuals to be good followers. For a follower within an organisation to be effective would seem to require more than just high scores on the C–U and A–P scales: it would also appear to need skill and resourcefulness that can only come innately or with training. On the other hand, this may be less of a problem for the followership literature than it looks since one might assume mechanisms at work sorting and structuring an organisational workforce according to ability at the same time as the roles of leader and follower are assigned. Lowly-ranked followers working with low-level leaders and managers can simply be assumed to need less capacity to perform, at their level, than highly-ranked followers working with the organisation's executive.

Attitude to risk is another issue. It is not the way the followership literature describes individuals' behaviour, but we would want to argue that good followership often will involve risk-taking on a scale beyond that found for yes-people or sheep. Good followership requires individuals to make decisions, commit resources and act independently of their superiors' instructions (at least for temporary periods). This may, however, endanger their long-term prospects if the outcomes of their actions turn out to yield little observable return to the organisation. They will be particularly endangered if their superiors are themselves accountable (or feel accountable) for the actions of their subordinates and are unsympathetic to well-motivated efforts that just happened to turn out badly. This leads us to say that the followership literature needs to recognise with greater emphasis the risks inherent in exercising critical faculty: to model the interaction between leader and follower in a way which allows for risk to be related not just to the prospects of a given

decision but also the reaction of the leader to outcomes. The followership literature should concede, we believe, that effective followers should take risks. As a *predictive* matter, however, the extent to which even effective followers will take risks if they perceive the probability of career damage to be high needs to be dealt with more explicitly.

Lastly, on the matter of market structure, we would argue that the quality of followership may well be influenced by the extent to which individuals perceive themselves as having or not having an entrenched position or 'market power'. Clearly, however, this would need to be treated with care. In academic organisations, for example, the notion of permanent tenure has often been invoked to allow scholars to express their views without fear of recrimination or reprisal. Such views might include views about the running of the institution and, to the extent that they are reflected in constructive actions, imply that academic staff respond to their protected status by operating high on both C–U and A–P scales. On the other hand, permanent tenure is by no means a sufficient condition for effective followership and may lead to alienation reflected in cynical criticism. We would argue that the state of the labour market in which leaders and followers find themselves interacting is an important factor bearing on how followers behave. Such structural considerations offer a further avenue for research into followership which we believe could be fruitfully pursued.

6. Conclusion

There are large literatures on the diffusion of new technology, the technology strategies of firms and the relative merits of pioneering and later entry into new technology markets. This paper takes a starting point different from that found in those literatures and asks if insights can be generated by applying to the question the concept of followership which has emerged in the study of organisations. The propositions generated in this paper remain to be tested but we would argue that, irrespective of what we find, the larger issue with which we began should continue to form part of the ongoing research agenda of the study of innovation. As a matter of logic, only a minority of firms can ever be pioneers. For the large majority the question is how to be a good follower.

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Appendix: Testing the Hypotheses

This paper has taken an essentially theoretical approach and generated a range of hypotheses. The next step in the research programme is to test the hypotheses and in this appendix we reflect briefly on a range of issues that would need to be addressed at that point.

A first concern about some of the work in the area is *survivor bias*: the fact that pioneers that do not survive to be observed cannot have their performance measured. If studies are carried out only on surviving pioneers, they will necessarily be biased in the direction of predicting success for pioneering, both absolutely and relative to later entry. It is important, therefore, to take account of the experience of failed as well as surviving pioneers in work of this kind.

The same concern extends over EF and LF firms too. Biased results may arise if only the experience of survivors is taken into account. It is important to obtain data on all firms that ever attempted to adopt (or a representative sample of them) if we are to obtain unbiased results.

A second issue central to this study is to ensure that *successful* adoption is distinguished from unsuccessful adoption. We have defined success in economic rather than technological terms, i.e. a return relative to the mean. But, given the range of entry dates that might be relevant in this sort of work, that requires observing the mean return to participating firms over the life of the technology, or (if relevant) the life of the industry.

Third, there is a question of definition: who are the first users, who are EF and who are LF? Separating first users from subsequent adopters has caused difficulty in some studies but we would argue that whereas that might be a relatively clear line to draw, the line between EF and LF looks more arbitrary. Actually we feel it is not—as long as we know the set of all adopters and when they adopted. If we have those data, we may choose the median of $n-1$ followers as the critical point, or some other measure reflecting the point in time when half the adoption process is complete.

At least as challenging is the requirement to find data which would allow us to locate firms at some point on the C–U and A–P axes. If the relevant characteristics were observable in advance and would remain fixed throughout the adoption period, we could make predictions about which firms would enter at what times and whether they would be successful. This might be true, for example, if the relevant characteristic were firm size—though only if firms remained of similar size throughout or, at least, of the same relative sizes. In this case, we could make observations on the A–P axis in advance only if the relevant firms had had previous experience of technology adoption and we believed they would follow the same strategy in the future as in the past. Observations on the C–U axis would require us to make judgments about the quality and style of firms' managements.

The really profound logical difficulty, however, lies in identifying in advance the firms which are potential adopters. If we were to observe the world before the adoption process began, we would first have to make predictions about which firms were potential adopters before we could identify their characteristics and try predictions about the timing and success of adoption. In most cases, some potential adopters will not even exist before the process begins, or may exist only in embryonic form as parts of larger organisations.

This implies, as already noted, that the only way to proceed is to look at completed processes of adoption. In so doing, we would not be making predictions about the sorts of firm that will adopt, successfully or otherwise, before the adoption process begins. Rather, we would be testing whether the characteristics identified as important in the followership literature have transferred to the technology adoption context in a way that helps us understand what is more or less likely to enable firms to adopt successfully.

With a historical perspective, it is possible to say, for example, that early entry implies a high score on the A–P scale while late entry implies a low score in the early phase. As far as the C–U scale is concerned, it would be necessary to have fairly detailed information, derived from questionnaire surveys and interviews, on the sense-making and analytical efforts of firms when confronting emerging opportunities.

In summary, we believe it will usually be impossible to label, *before the adoption process begins*, those firms that will enter early, enter later, enter successfully or unsuccessfully, or not enter at all. Evidence of the relevant set of firms is only likely to be available after the event, and evidence of the A–P score will be supplied by the revealed decision about entry timing. That said, our concern was not actually to predict whether and when entry will occur but rather to say when later entry will be successful. Having adopted the followership approach, we have identified a characteristic (score on the C–U scale) which, when combined with the timing of entry, we can use to test hypotheses about when later adoption will, on average, be successful.