# Entrepreneurial Characteristics, Strategic Choice and Small Business Performance

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ABSTRACT. Notions of entrepreneurship are central to accepted explanations of small business performance. The majority of studies exploring the growth implications of different entrepreneurial characteristics tend, however, to be partial or lack any formal structural framework. This leads to uncertainty concerning the mechanisms by which different entrepreneurial characteristics influence firm performance and the size of any effect.

This paper develops a structural model of the relationships between entrepreneurial characteristics, firms' strategic choices and performance. The determinants of firms' strategic choices are then subjected to extensive empirical analysis. The results suggest a marked difference between the determinants of strategic initiatives related to management and control and those related to products, markets or managerial systems. Firms' propensity to make management and control initiatives depends almost exclusively on the characteristics of the entrepreneur. Firms' propensity to undertake initiatives related to new products, markets or management systems depends partially on the background of the entrepreneur but also reflects the firm's strategic targets, its market position and the likely operating environment.

> *. . . innovation is the specific function of entrepreneurship . . . [it] is the means by which the entrepreneur either creates new wealth producing resources or endows existing resources with enhanced potential for creating wealth* (Drucker, 1985, p. 67).

## 1. Introduction

Notions of innovation and entrepreneurship are central to the accepted conceptualisation of the determinants of small business performance (O'Farrell and Hitchens, 1988). In this view, the entrepreneur – usually envisaged as a dynamic, risk-taking individual – is the dominant factor determining whether any business venture will succeed or fail. Empirical analyses within this paradigm have emphasised the relationship between the motivation, personal characteristics, situation and heredity of the entrepreneur and the performance of his or her business (see, for example, the studies reviewed in Storey, 1994). The best of these studies use case-study, control groups, multivariate or matched-plant methodologies to isolate and describe the mechanisms by which individual characteristics influence performance (e.g. Storey et al., 1989; Barkham et al., 1996, Hewitt-Dundas, 1996).[1] In multivariate studies, however, there is a tendency to estimate reduced-form rather than structural models. This, in combination with a failure to explicitly specify the underlying structural relationships, leads to uncertainty over the relative importance of the various entrepreneurial characteristics. It can also obscure the mechanisms (or business processes) through which these characteristics influence business performance.

The aim of this paper is to develop a detailed structural explanation of the relationships between small business performance on the one hand and entrepreneurial characteristics, firms' operating environment, *and* their strategic and organisational choices on the other. The argument identifies two separate relationships relating firstly to the determinants of firms' strategic choices, and secondly to the link between firms' strategic choices and subsequent business performance. The framework used to explain firms' strategic choices is similar to that used in previous analyses of technological innovation (e.g. Geroski, 1990; Harris and Trainor, 1995; Love et al., 1996). These models are extended, however, to allow for the potential catalytic role of the entrepreneur. Firms' strategic choices in any period are therefore related to the

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market position of the business at the start of the period, the characteristics of the entrepreneur, the aspirations of the company and the anticipated operating environment.

The second element of the model is the link between firms' strategic choices and business performance. The formulation adopted follows relatively closely the argument developed in a number of studies associated with the PIMS (i.e. Profit Impact of Market Strategy) project (e.g. Carroll, 1985; Buzzell and Gale, 1987). In the context of larger business units, this suggests that firm performance can be explained in terms of firms' current market position – thought of as representing the outcome of past strategy – and their current strategic choices. In the PIMS models, however, firm performance is measured purely in terms of return on sales and return on investment. A much broader conception of 'performance' is implicit in the framework outlined here embodying both growth and profitability measures along with other indicators of firms' market position.

The remainder of the paper is organised as follows. Section 2 outlines the main conceptual framework and discusses problems associated with estimation. Section 3 describes the data, drawn from the Competitive Analysis Model Project (CAM) database, which is used for the empirical analysis. Sections 4 and 5 present the main empirical analysis focusing specifically on the determinants of firms' strategic choices (for an analysis of the business performance-strategic choice relationship see Roper, 1996). Section 6 concludes.

## 2. Model specification

The model of the link between entrepreneurial characteristics, strategic choices and small business performance developed in this section provides the basis for the subsequent estimation. It also provides a framework within which to encompass and interpret the findings of a number of recent studies of small firm performance (e.g. Barkham et al., 1996). As a starting point, consider the factors that determine a small firm's strategic choices, which are assumed to be made at the start of each period. Four groups of determinants may be identified. First, the firm's strategic legacy or market position at the *end* of the previous period (Buzzell and Gale, 1987). This would include any target variables the firm might have relating to profit etc and other indicators of the initial market position of the firm (e.g. above average product quality or market share). To indicate the partition between target variables and other aspects of the firm's market position, consider a vector $S_t = (\Pi_t \; L_t)$. Where $S_t$ represents all aspects of the market position of the firm at the end of period $t$; $\Pi_t$ is a vector of performance indicators relating to growth, profitability, asset efficiency etc measured at the end of period $t$; and $L_t$ is a vector of other market position indicators.

The second group of factors determining the firm's strategic choices might be said to be the characteristics, resources, motivation and attitudes of the entrepreneur at the start of period $t$, denoted $E_t$. Thirdly, the firm's strategic choices will depend on the business targets of the entrepreneur over the period $t$. These are assumed to be specified at the start of the period and (either implicitly or explicitly) to relate to each element of the market position vector $S_t$. These targets can therefore be written: $S_t^* = (\Pi_t^* \; L_t^*)$, where $\Pi_t^*$ is a vector of performance targets and $L_t^*$ are (explicit or implicit) targets relating to other aspects of the firm's market position (e.g. market share targets). The final group of influences on the firm's strategic choices will be the anticipated operating environment ($O_t^e$). This will include the anticipated reaction of competitors to any strategic initiatives but would also embrace all other aspects of business conditions such as capital requirements or the possibility of new entrants. As such these factors may either act to constrain firms' strategic activity or create new market opportunities.

Combining these four elements suggests that the set of strategic choices made by the firm at the start of period $t$, $I_t$, may be written:[2]

$$I_t = k(S_{t-1}, E_t, S_t^*, O_t^e) \qquad (1)$$

The other main link in the model relates to the firm's market position at end of the period, i.e. $S_t$ (or equivalently the determinants of the firm's strategic legacy at the start of period $t + 1$) Three groups of factors may be distinguished. First, the firm's strategic legacy from the previous period, i.e. $S_{t-1}$ (Buzzell and Gale, 1987). Secondly, the strategic choices or innovations made by the firm (at the start of ) period $t$, i.e. $I_t$. Thirdly, the actual

operating environment which emerges during the course of period $t$, i.e. $O_t$. Taken together this suggests:

$$S_t = g(S_{t-1}, I_t, O_t) \quad (2)$$

The basic structural model linking entrepreneurial characteristics, the firm's strategic choices and business performance is then given by equations (1) and (2).

Substituting (1) into (2) gives a reduced-form equation for business performance:

$$S_t = f(S_{t-1}, E_t, S_t^*, O_t^e, O_t) \quad (3)$$

In this form, however, the equation is not operational because of the inclusion of the unobserved term relating to the firm's expected operating environment. Assuming that expectations are subject only to random errors, $O_t^e = O_t + \varepsilon_t$, where $\varepsilon_t$ is random.[3] Using this assumption, equation (3) may be rewritten as:

$$S_t = l(S_{t-1}, E_t, S_t^*, O_t) + \varepsilon_t \quad (3a)$$

In empirical terms this reduced-form equation has the advantage that all of the explanatory variables are either predetermined or exogenous to the firm. Ordinary Least Squares estimation techniques are therefore appropriate. A less attractive feature of the model, however, is that the ability to recover the underlying structural parameters (i.e. equations (1) and (2)) depends on the assumed functional form.[4] A preferable approach is therefore direct estimation of the two structural relationships. Equation (1), however, like the reduced-form models includes the unobserved expectational term relating to the firm's future operating environment. Assuming, as before, that firms' expectations are subject only to random errors, equation (1) can be rewritten as:

$$I_t = k(S_{t-1}, E_t, S_t^*, O_t) + \eta_t \quad (1a)$$

That is, the firm's set of strategic choices ($I_t$) can be explained in terms of its strategic legacy ($S_{t-1}$), the characteristics etc of the entrepreneur ($E_t$), any targets the firm may have ($S_t^*$) and its operating environment ($O_t$).

For a single strategic choice this equation is structurally similar to those found in the literature on technological innovation. Typically these explain firms' probability of making a technological innovation (here $I_t$) in terms of the anticipated returns from innovating (here $S_t^*$), the degree of market power of the firm (here $S_{t-1}$) and corporate structure variables (here $E_t$) (e.g. Geroski, 1990; Harris and Trainor, 1995; Love, Ashcroft and Dunlop, 1996). In these models, and in the current context, the probability of the firm making a particular strategic choice or innovation (i.e. $I_t$) is unobservable. Instead a dichotomous variable is observed which takes value one if the firm innovates or makes some strategic choice and zero otherwise. Logit estimation techniques can then be applied.[5]

## 3. The Competitive Analysis Model (CAM) database

The empirical analysis is based on data from the CAM database. This was derived from an interview survey with small firms in Ireland conducted between April and September 1995. The target population for the survey was manufacturing companies with 10 to 100 employees which had been trading for at least four years. The intention of the survey was to collect data from a sample of firms considered to have significant growth potential. To this end samples were constructed with the assistance of the appropriate development agencies in Northern Ireland (LEDU – the Local Enterprise Development Unit – and the IDB – Industrial Development Board) and Forbairt in the Republic of Ireland. The final sample consisted of 1853 small companies, of which 785 were in Northern Ireland.

Prior to the main survey a pilot survey of forty face-to-face interviews was undertaken with companies in Northern Ireland. This was used to validate questionnaire design and ensure common response patterns. Subsequent interviews with sample companies were conducted either face-to-face or by telephone. An overall response rate of 37.9 per cent was achieved giving a usable sample of 703 companies (McFerran et al., 1996). Response rates differed significantly, however, between Northern Ireland (51.4 per cent) and the Republic of Ireland (27.8 per cent) contributing to a sample biased towards Northern Ireland companies.[6]

As part of the survey, information was sought on twelve strategic initiatives which might have been undertaken by firms during the 1991–94

period (Table I). These are divided into three groups reflecting both external (products and markets) and internal (systems, management and control) aspects of firms' strategic activity:

(a) *Products and markets* – three strategic initiatives were considered relating to the introduction of new and improved products, the introduction of a new group of products (differentiated by technology, product type or market), and entry into any new export market (Table I). The most common of these initiatives, taken by 50 per cent of the sample firms, was the introduction of new/improved products (Table I). Smaller proportions of firms had introduced new product groups over the 1991–94 period (27 per cent) or entered new export markets (39 per cent).

(b) *Systems initiatives* – three systems initiatives were considered: the achievement of ISO 9000 certification, and the introduction of management information and management accounting systems. Over a third of firms had introduced information and/or accounting systems during the 1991 to 1994 period, with around a third achieving ISO 9000 quality certification.

(c) *Management and control* – two strategic indicators were included relating to whether the owner-manager or entrepreneur had taken steps to increase his or her ownership and control over the enterprise. Within the sample there was a clear tendency towards more centralised control and ownership over the 1991 to 1994 period (Table I). Four further indicators were included relating to changes in managerial techniques. Around half of the sample firms indicated that from 1991–94 they had moved towards more non-hierarchic managerial approaches, increasing the importance of reasoning, feedback and agreement. The remainder of the sample firms indicated a move towards more structured managerial techniques involving increased direction, standardised work practices and recruitment.[7]

TABLE I
Percentage of firms taking each strategic initiative during 1991 to 1994 period

| | Percentage of firms undertaking activity ($n$ = 651) |
|---|---|
| *Products and markets* | |
| Introduced new group of products | 26.6 |
| Introduced new/improved products | 49.9 |
| Entered new export markets | 39.2 |
| *Systems* | |
| New ISO 9000 quality certification | 31.3 |
| New management information system | 37.6 |
| New management accounting system | 38.9 |
| *Management and control* | |
| Centralised control | 32.4 |
| Centralised ownership | 16.9 |
| Increased importance of reasoning, feedback and agreement | 49.2 |
| Increased importance of direct instruction | 39.6 |
| Increased importance of standardised working practices | 48.5 |
| Increased importance of selective recruitment | 47.6 |

*Notes*
1. In the definition of the products and markets initiatives, product groups were differentiated by production technology, product type or market. Five geographical market areas were considered: Northern Ireland, the Republic of Ireland, Great Britain, the rest of the EU and non-EU areas.
2. Management information systems were included only if they were computerised and were regularly used for decision making. MAS systems were included if they were capable of comparing performance to budget and generating variances.

*Source*: Competitive Analysis Model Database.

## 4. Exploratory analysis

Previous studies have suggested the importance of a wide range of factors in explaining small business performance (e.g. Storey, 1994; Cambridge Small Business Research Centre, 1992). Less evidence is available on the determinants of small firms' strategic choices (although see Barkham et al., 1996). It was therefore decided that the first stage of the empirical analysis should consider a relatively large number of explanatory variables and aim to identify the sub-set of variables which had most significance *across a range of strategic choices*. This exploratory analysis was based on a series of 'partial' Logit models in which each of the four sets of explanatory variables defined in equation (1a) (i.e. initial market

position, the entrepreneur, strategic targets and operating environment) were regressed separately on the twelve strategic choice variables.[8]

The significance of the individual factors included in the partial Logit models varied widely with one variable (the educational background of the entrepreneur) statistically significant at the 10 per cent level in two-thirds of the partial models. At the other extreme, nine variables were insignificant at the 10 per cent level in *all* of the partial models estimated. It was therefore necessary to develop a decision rule to identify those variables which had some general significance. A simple rule based on the Binomial distribution was appropriate in which each partial Logit model was regarded as an independent trial. Then the probability of an explanatory variable being significant (at the 10 per cent level) in at least 4 out of the twelve trials was 0.0256, and the probability of being significant in three or more trials was 0.1108. Taking the former alternative suggested a set of sixteen explanatory variables which were significant in four or more partial Logits (Table II).[9]

TABLE II
Explanatory variables included in the strategic choice models

| Description | Definition | Mean |
|---|---|---|
| 1. *Market position* | | |
| Strong product focus | Percentage of sales in largest single product group. | 79.1 |
| Strong market focus | Percentage of sales in largest geographical market. | 78.9 |
| Quality above average | A 0/1 dummy variable; 1 if the firm stated its product quality was above that of its closest competitors in 1991, zero otherwise. | 0.34 |
| 2. *Entrepreneurial Characteristics* | | |
| Entrepreneur is owner | A 0/1 dummy variable; 1 if the entrepreneur owns more than 20 per cent of the equity of the firm, zero otherwise. | 0.64 |
| Entrepreneur's education | Years of education and vocational training of the entrepreneur. | 13.1 |
| Entrepreneur shares power | A 0/1 dummy variable; 1 if the entrepreneur was willing to share power to achieve an expansion of the business, zero otherwise. | 0.57 |
| Entrepreneur's age | Entrepreneur's age in years. | 39.8 |
| Entrepreneur had large firm experience | A 0/1 dummy variable; 1 if the entrepreneur had previous experience in firms with 500 or more employees, zero otherwise. | 0.29 |
| Entrepreneur's years in industry | The entrepreneur's number of years in the current industry. | 19.2 |
| Employment growth aim | A 0/1 dummy variable; 1 if employment growth was an 'important' or very important' business objective, zero otherwise. | |
| 3. *Targets* | | |
| Specified sales growth target | A 0/1 dummy variable; 1 if the firm had a formal turnover target specified in its strategic plan, zero otherwise. | 0.45 |
| Sales target intensity | An intensity index ranging from 0 if the firm aimed to reduce turnover through to 100 if its target was for rapid sales growth (i.e. more than 20 per cent pa). | 61.2 |
| 4. *Market conditions* | | |
| Customer power | An intensity index ranging from 0 if customer power was 'unimportant' to 100 if customer power was 'very important'. | 85.0 |
| Shortages of labour | An intensity index ranging from 0 if labour shortages were 'unimportant' to 100 if they were 'very important'. | 63.6 |
| High capital requirement | An intensity index ranging from 0 if capital requirements were minimal to 100 if they were in excess of £10m. | 21.8 |

*Source*: Competitive Analysis Model Database.

*Market position variables*

Market postion indicators included in the exploratory analysis covered company profitability, asset utilisation and firms' product market position in 1991. Turnover growth from 1991–93 was also included. The profitability and asset utilisation variables had little significance in the partial Logit models and were therefore excluded from the subsequent analysis. Other variables describing the market position of the firm in 1991 (e.g. relative price, quality certification, export market focus and the legal status of the company) were also excluded on statistical grounds. This left a group of three market position indicators: whether the firm had a strong concentration of sales in individual product groups and geographical markets in 1991, and whether the firm had above average product quality in 1991 (Table II).

Above average product quality and/or a strong product or market focus are likely to equate to a strong market position (Buzzell and Gale, 1987). In this situation, firms' may have less need to take further strategic initiatives. Arguably, however, to maintain any market advantage it is necessary for firms to be continually innovating especially as product life-cycles decline and international competition intensifies (Best, 1991). If the latter influence were dominant a positive relationship would be observed between above average product quality, product or market focus and firms' propensity to take strategic initiatives.

*The characteristics, motivation and attitudes of the entrepreneur*

In the exploratory analysis the most consistently significant variable was the years of education of the entrepreneur. This reflects earlier studies reviewed in Storey (1994) where entrepreneurial education is one of the few factors unambiguously and positively associated with small business growth. Barkham et al. (1996) also indicate in their univariate analysis that graduate entrepreneurs were much more likely to make strategic decisions to use market research and/or introduce new products than others.[10] On this basis the variable representing the entrepreneur's years of education is expected to have a positive sign in the strategic choice models (Table II).

Other variables relating to the background of the entrepreneur were also included in the exploratory analysis: whether his/her family had owned or run a firm, his/her age, whether the entrepreneur had prior experience in large, medium or small firms, whether they had any other business interests and their number of years experience in the current industry. Each of these variables had proved important in previous studies relating to small firm growth, although as Storey (1994) points out their effects were uniform in neither sign or significance.[11] Only three of these variables, relating to the entrepreneur's age, prior industry experience and experience of working in a large firm, had any general significance in the exploratory analysis conducted here. Entrepreneurial age is generally found to have a negative association with innovative activity, although industry experience might be expected a priori to have a positive effect. Less certainty attaches to the likely impact of prior large firm experience. In the context of inward investment, for example, it has been suggested that large firms do provide high quality managerial training (Harris, 1991), but it is also evident that large firms tend pro rata to be less innovative than small firms (Acs and Audretsch, 1988 and 1993 and Audretsch, 1995).

The final group of entrepreneurial characteristics included in the exploratory analysis related to the entrepreneur's position within the firm, whether he or she had a significant equity stake in the business and whether they were willing to share power and ownership. Possession of a significant equity stake in the business is likely to have a positive effect on a firms' willingness or ability to take strategic initiatives. In the context of technological innovation, for example, it has been suggested that the involvement of the owner within a firm may increase its willingness to take risk and may, if control remains centralised, allow a rapid response to market opportunities (Rothwell and Zegveld, 1982). This suggests a positive expected sign. The only other significant factor in the exploratory analysis relating to the position of the entrepreneur was his/her willingness to share power. This factor, which is linked to the willingness to share ownership, has been shown to be strongly and positively associated with small business growth (see Solem and Steiner, 1989;

Storey et al., 1989; Cambridge Small Business Research Centre, 1992; Kinsella et al., 1993; Barkham et al., 1996). It may also be indicative of the managerial ethos within the company suggesting a willingness to move towards more dispersed responsibility. Such managerial approaches are typically associated with positive innovation effects (see, for example, the discussion in Fairtlough, 1994).

*Strategic targets*

Previous studies have suggested that strategic planning can have a significant positive effect on small business growth (Woo et al., 1989; Kinsella et al., 1993, Barkham et al., 1996). Wider evidence also exists of the positive profitability effects of a formalised strategic approach (Buzzell and Gale, 1987; IBM Consultants, 1993). In the exploratory analysis conducted here three strategy variables – relating to whether or not the firm had employment growth as a business objective, whether the firm had a formal sales target and the ambitiousness of that target – had some general significance (Table II). Reflecting the findings of earlier studies a positive coefficient is anticipated on each of these three target variables. This reflects the effect of the positive stimulus provided by firms' growth aspirations on their propensity to take strategic initiatives.

*Market conditions*

The final group of explanatory variables related to firms' perceptions of the nature of competition in their marketplace, resource constraints and capital requirements. Of these only three – relating to the level of customer power, shortages of labour and the minimum capital requirement in the industry – proved generally significant in the exploratory analysis (Table II). Shortages of skilled labour are likely to have a constraining or negative effect on firms' strategic activity. High levels of customer power may also reduce the returns from innovation in firms' current market, but may also act as a stimulus to innovations which would allow the firm to take advantage of more profitable market opportunities elsewhere. Likewise high capital requirements in an industry may represent a barrier to innovation, particularly for small firms (Rothwell and Dodgson, 1994), or may act as a stimulus to innovation as firms try to maximise the returns from previous capital investments.[12] A priori both the level of customer power and capital requirements therefore have indeterminate sign expectations in the strategic choice models.

## 5. Explaining firms' strategic choices

The exploratory analysis identified a group of sixteen firm and entrepreneurial characteristics which had some general significance across the range of strategic choices. Table III gives the results of Logit regressions of each strategic choice indicator on the set of firm and entrepreneurial characteristics after the elimination of coefficients with very little statistical significance. Each of the strategic choice models was significant at the 1 per cent level using a Chi-square test, and the signs and significance of individual variables proved robust to changes in specification. Looking at the percentage of correct predictions, however, suggests marked differences in the power of the individual models to discriminate between those firms taking and not taking the various strategic initiatives. In seven cases the equations evidenced a reasonable ability to predict correctly. In four other cases, however (new product groups, new quality certificates, centralisation of ownership and control), the models identified less than a third of those firms taking each strategic initiative. In these cases it is clear that the set of explanatory variables considered here is insufficient to discriminate between those taking and not taking the various initiatives. Two possibilities are evident. First, there may be some common 'missing factor' from each of these regressions which would be reflect in correlated equation errors. Secondly, there may be other factors, particular to each strategic initiative which may be missing. In this latter case no significant correlation would be expected between equation errors.

From the equations in Table III it is clear that the propensity to make strategic initiatives related to products or markets was greatest in diversified, young firms with average or below average product quality. The same type of company was also more likely to introduce new quality and/or information systems. Other strategic initiatives relating to changing patterns of control, ownership

TABLE III
Strategic choice logit models

| | Products and markets | | | Systems | | | Management and control | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | New product groups | Product changes | New export markets | New quality certific. | New MAS | New MIS | Centralised control | Centralised ownership | Increased RFA | Increased direction | Increased SWP | Increased SRT |
| Constant | –1.124 | 3.016** | 2.215 | –0.023 | 0.472 | –0.377 | 0.357 | –0.794 | –0.891 | –1.850 | –1.402** | –0.860 |
| *Market position* | | | | | | | | | | | | |
| Strong product focus | –0.022** | –0.028** | | –0.008** | –0.648** | –0.013** | –0.005 | –0.007 | 0.004 | 0.004 | 0.006 | |
| Strong market focus | | –0.005 | –0.013* | | | –0.016** | | | | 0.011 | | |
| Quality above average | –0.742** | | –0.517 | –0.058 | | | | | –0.361* | | –0.319* | |
| *Entrepreneurial characteristics* | | | | | | | | | | | | |
| Enterpreneur is owner | | | | –0.377* | 0.621** | | | 1.634** | | | | |
| Education (years) | 0.048 | | 0.031 | 0.042* | | 0.093** | 0.029 | 0.036 | 0.053** | | 0.065** | 0.045 |
| Entrepreneur shares power | –0.202 | | –0.120 | –0.170 | –0.376 | | 0.278 | 0.368 | 0.246 | | 0.259 | |
| Entrepreneur age (years) | 0.028* | –0.003 | | | | | –0.031** | –0.026** | –0.021** | –0.042** | –0.022** | –0.022 |
| Entrep large firm experience | | –0.442 | | 0.325 | –0.530* | | 0.285 | 0.397 | 0.381* | | 0.195 | 0.104 |
| Years in industry | | –0.033** | –0.022 | | –0.029** | –0.031** | | | | 0.020 | 0.005 | |
| *Targets* | | | | | | | | | | | | |
| Employment growth aim | –0.016** | | | –0.006 | 0.009 | 0.012* | | | 0.006 | 0.011 | 0.008* | |
| Sales target indicator | 0.712 | | –1.720** | 0.884** | –1.711** | –1.722* | | | | | | |
| Sales target intensity | 0.019** | 0.005 | 0.023** | | 0.021** | 0.017** | | | | 0.006 | | 0.006 |
| *Market conditions* | | | | | | | | | | | | |
| Customer power | | | –0.021** | | | 0.013 | | | | | | 0.006 |
| Shortages of labour | | | 0.013** | –0.006* | | | | | | | | 0.008* |
| High capital requirements | | | –0.005 | | –0.007 | –0.010* | | –0.007 | 0.006 | –0.005 | | |
| Number of firms | 293 | 266 | 247 | 623 | 253 | 251 | 634 | 543 | 546 | 252 | 631 | 294 |
| Log likelihood | –161.2 | –161.4 | –152 | –351.1 | –159.6 | –152.9 | –375.9 | –231 | –364.3 | –163.2 | –421.5 | –194.4 |
| Chi-square | 43.7 | 40.47 | 33.3 | 73.8 | 31.3 | 40.7 | 46.1 | 53.7 | 28.3 | 22.9 | 31.6 | 10.2 |
| *Percentages correct predictions* | | | | | | | | | | | | |
| Overall (%) | 68.9 | 68.8 | 65.2 | 72.4 | 63.2 | 65.3 | 68.3 | 82.5 | 57.7 | 65.9 | 61.5 | 59.9 |
| Non-adopters (%) | 89.5 | 59.6 | 74.8 | 92.0 | 66.2 | 72.6 | 94.9 | 98.6 | 52.4 | 64.8 | 59.7 | 20.5 |
| Adopters (%) | 24.7 | 75.7 | 52.8 | 29.6 | 60.2 | 56.9 | 12.7 | 10.1 | 62.9 | 66.9 | 63.3 | 87.8 |

*Note*: 1. In addition to the core variables included in the table a number of other variables were significant in only one equation: an investment target indicator in New Product Groups (coefficient = –0.706); group membership and parntership indicators in the New Quality Certification equation (coefficients 0.738 and –1.028 respectively); a market share growth aim in the Centralised Ownership equation (coefficient –0.018) and a market share target indicator in the Increased Direction equation (coefficient, 1.044); whether the entrepreneur was the sole founder of the firm in the new MIS equation; (coefficient, –0.806); whether the entrepreneur was also the founder in the new MIS equation (coefficient 0.600) and in centralised ownership equation (coefficient, –0.917); and shortages of finance were significant in the new product groups (coefficient, 0.012) and product changes (coefficient, 0.010) equations.
2. Significance at the 5 per cent level is denoted **; significance at 10 per cent is denoted *.
*Source*: Competitive Analysis Model Project Database.

or managerial technique were less clearly linked to the firms' market position. Product focus, which *a priori* had an uncertain expected sign, had a particularly strong and significantly negative effect on firms' propensity to introduce new or improved products and/or product groups. Elsewhere product focus also had a predominantly negative effect. Similar negative effects were also evident from a strong market focus. Above average quality also had a consistently negative effect on firms' propensity to take strategic initiatives reinforcing the impression that innovative activity was less likely among small firms with an established market position.

In terms of the impact of entrepreneurial characteristics on firms' strategic choices, the most consistent result related to the positive impact of entrepreneurs' educational background. By contrast, entrepreneurs' willingness to share power had a negative, albeit insignificant, effect on firms' propensity to take product, market and systems initiatives. The age of the entrepreneur had little effect on this type of initiative but had the expected negative effect on firms' propensity to undertake managerial changes. Large firm experience and prior experience in the industry had the opposite effect, i.e. they tended to reduce firms' propensity to take product, market or systems initiatives but to increase firms propensity to undertake managerial or organisational changes.

The effect of the entrepreneurial variables can be summarised as suggesting first that firms run by better educated or trained entrepreneurs are more likely to take strategic initiatives. Secondly, marked differences existed between the effect of entrepreneurial characteristics on product, market and systems initiatives on the one hand, and those relating to management and control on the other: a willingness to share power, large firm experience and prior industry experience reduced the propensity to make product, market or systems initiatives but increased the propensity to undertake managerial or organisational changes; entrepreneurial age had little effect on product, market or systems initiatives but a strong negative effect on firms' propensity to undertake managerial or organisational changes.

Firms' targets had little discernible impact on their propensity to take strategic initiatives relating to management or control. Stronger links were evident between firms' targets and their product, markets and systems choices. Unexpectedly, the effect of having employment growth as a business objective and having a formal turnover target varied in sign. The intensity of firms' turnover growth target, however, had a consistently positive effect. This latter result is consistent with the findings of other studies which have linked strategic planning to improved business performance (Woo et al., 1989; Kinsella et al., 1993; Barkham et al., 1996).

The final group of explanatory variables related to the market conditions firms were facing in 1991. These variables were generally insignificant with customer power and labour shortages also having variable signs. High capital requirements had, as expected, a generally negative effect on firms' propensity to innovate (Table III).

The inclusion of market position indicators along with variables relating to firm and entrepreneurial characteristics and targets was intended to ensure a comprehensive explanation of the factors explaining firms' strategic choices. To test the validity of the final models two further tests were undertaken. First, variables excluded in the exploratory analysis were introduced back into the final Logit models to test their significance and hence the decision to exclude them. While individual variables did prove significant in some of the strategic choice models, none of the excluded variables achieved *as general significanc*e as those included in Table III. This provided some confirmation of the choice of the final set of explanatory variables.

The second issue, emphasised by the failure of some of the strategic choice models to correctly identify those taking each strategic initiative, related to the possibility of there being important missing variables. For example, in the analysis no allowance was made for the gender of the entrepreneur which some studies have suggested may be an important factor in determining small business growth (Jones, 1991). If this variable, or other similar omitted or unobserved factors, were affecting firms' strategic choices, this would not be reflected in the equation coefficients but would be captured instead by the residuals. An essentially similar effect might result if strategic decisions made by small firms were interrelated. To test for the presence of this type of effect correlations

between equation residuals were constructed. Of particular interest was whether there was any significant correlation between the residuals of the models relating to new product groups, quality certification, ownership and control and standardised recruitment. In fact only two out of the 15 correlation coefficients between the residuals of these equations were significant (at the 5 per cent level) compared to a third of the correlations between the residuals from the full set strategic choice models.[13] These correlations provide no support for any suggestion of any missing 'common factor' between the weaker strategic choice models. It is clear, however, that despite the range of variables included in the exploratory analysis, and the re-examination of individual variables after the estimation of the final Logit models, there was still general evidence of important missing or unobserved variables.

## 6. Conclusions

Analyses of small business growth are too often partial, focusing on the impact of particular enterprise or entrepreneurial characteristics. Moreover, where multivariate approaches are used these typically lack any very formal structure leading to uncertainty concerning the size and sign of the underlying structural parameters. This is important because it is often priors about these underlying structural relationships or parameters which determine decisions about the targeting of small business support. For example, it might be thought desirable to back well educated or trained entrepreneurs in the belief that educational status is in some way linked to more rapid company growth. Implicit in this judgement, however, is the view that possession of a high level of education will improve the performance of certain functional or strategic areas which will in turn contribute to accelerated growth. A structural analysis allows these intermediate mechanisms to be directly observed.

The exposure of these intermediate mechanisms has two important implications. First, it may help to correct priors which are wrong. One might, for example, hold the view that a track record in an industry and/or experience of working in large firms would lead to a greater propensity to take strategic initiatives and hence to more rapid company growth. The structural analysis conducted here suggests, contrary to expectations, that both large firm and industry experience had a negative effect on firms' propensity to take strategic initiatives related to products, markets and management systems. The second implication of using a structural model is that it enables a distinction to be made between mechanisms which would be observationally equivalent in reduced-form or semi-reduced form equations. Consider, for example, a positive observed relationship between the willingness of an entrepreneur to share power and business growth. Two mechanisms could be envisaged as to how this effect might be operating. First, the attitudes of the entrepreneur could be having a positive effect on firms' strategic actions and this in turn could be having a positive effect on growth. Alternatively, the attitudes of the entrepreneur could be having a negative effect on a particular strategy which was then having a negative effect on growth. A structural analysis identifies both elements of this linkage explicitly allowing a distinction to be made. In the analysis here, a willingness on the part of the entrepreneur to share power was negatively linked to firms' propensity to take strategic initiatives related to their product or market position (Table III).

The empirical analysis here focused on the determinants of firms' strategic choices, and distinguished four groups of explanatory variables: the firms' market position; the characteristics, motivation and attitudes of the entrepreneur; the firms' strategic targets; and, the market conditions the firm faced. Firms' propensity to undertake strategic initiatives relating to management and control were influenced only weakly by market position, business targets or operating environment. Instead, entrepreneurial characteristics were dominant with age having a strong negative effect but education and experience acting positively. Business targets, firms' market position and the operating environment were, however, important determinants of firms' propensity to take strategic initiatives relating to products, markets and management systems. Here the analysis suggested that the most strategically active companies would have diversified product and market profiles, little quality advantage, and formalised targets for rapid sales growth. The age of the entrepreneur was less

important here although prior industry and large firm experience were negative influences. The level of education and training of the entrepreneur was again a significant positive factor.

Despite the range of potential explanatory variables considered here the empirical models fail to capture all of the important influences on firms strategic choices. The regressions for new product groups, new quality certification and the centralisation of ownership and control, in particular, produced low percentages of correct predictions. There are three possible developments. First, other variables omitted from this study could be included. Possible candidates might be the gender of the entrepreneur (Jones, 1991), or whether the entrepreneur was a member of a professional organisation or had other businesses (Barkham et al., 1996). Secondly, there might be some value in refining the definitions of some of variables included in current study, in particular those relating to company growth and firms' strategic targets. Thirdly, the potential value of more complex estimation techniques could be explored which would allow explicitly for inter-relationships between firms' strategic choices.

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## Notes

[1] Other survey based studies tend to rely on a more axiomatic approach, imputing positive or negative linkages where particular combinations of circumstances and events are observed (e.g. Cambridge Small Business Research Centre, 1992).

[2] A relatively straightforward entrepreneurial objective function is implicit in this formulation, although not dealt with explicitly. That is entrepreneur will seek to innovate to minimise the difference between $S_t$ and $S_t$* given the firms initial position ($S_{t-1}$), entrepreneurial resources ($E_t$) and anticipated business conditions ($O_t^e$).

[3] Alternative specifications here would include the incorporation of adaptive or partial adjustment mechanisms as firms respond to the success of previous strategic initiatives. The cross-sectional survey data used here, however, is not well suited to modeling such dynamic effects.

[4] The situation is complicated further in some studies (e.g. Barkham et al., 1996) which do not estimate the pure reduced-form equation (3a) but a semi-reduced-form, including some elements of It on the right hand side. In statistical terms this presents no difficulty due to the recursive character of the underlying structural relationships (i.e. that $I_t$ is predetermined with respect to $S_t$). In intuitive terms, however, the interpretation of such an equation is more confused with entrepreneurial characteristics, for example, influencing company performance both directly and indirectly (through their effect on innovation).

[5] In the case of a single choice variable estimation of this type of relationship is straightforward using a univariate Logit model. If as here, however, there are more than one choice variable estimation becomes more complex. In a bivariate context (i.e. one where the firm is making a decision concerning two related strategic choices or innovations), there are four alternative outcomes and standard estimation methods based on analytical results are practicable (see Greene, 1993). With larger numbers of choice variables analytical approaches become infeasible due to the necessity to evaluate high-dimensional integrals in the appropriate likelihood functions (Maddala, 1993). This difficulty has led to some discussion in the literature of alternative frameworks, most recently estimation methods based on techniques to simulate the choice probabilities that arise in the evaluation of the likelihood function (e.g. Borsch-Supan and Hajivassiliou, 1993). Even these techniques, however, have substantial computational requirements with large numbers of choice variables (twelve in the current context). The preferred approach here is therefore to make use of standard single equation Logit formulations and after estimation to examine any correlations between equation errors.

[6] The sample bias towards Northern Ireland firms reflected primarily a greater level of encouragement for firms to participate by the Northern development agencies. See Barkham et al. (1996) for a survey of the performance characteristics of Northern Ireland firms compared to some other UK regions, and Gudgin et al. (1995) for a survey of the relative performance of small businesses in Northern Ireland and the Republic of Ireland.

[7] The choice of managerial techniques might be expected to change with both the size of the firm (Scott and Bruce, 1987), its production technology and the complexity of its operating environment (Woodward, 1965).

[8] Fifty-three explanatory factors (defined in the annex) were included in the exploratory stage of the analysis. In the majority of cases these related to the position of each firm at the start of the sample period (i.e. in 1991). There were two exceptions. First, no information was available on the growth of each business prior to 1991. The turnover growth variable included in the analysis therefore related to the 1991–93 period. Secondly, no information was available on the strategic targets of the firms in 1991. Instead, the variables used relate to firms' targets in the post-1994 period. To the extent that firms' strategic targets remained unchanged these variables will provide an indication of firms' objectives in 1991. There is the clear possibility, however, that targets set in 1994 may

reflect the business experiences of firms since 1991. This suggests the potential for reverse causality and the importance of a cautious interpretation of these variables' coefficients.

[9] Detailed results from this stage of the analysis are available from the author.

[10] See Beesley and Rothwell (1989) for a discussion of the potential importance of graduate employees to small firms' technological development capability.

[11] See in particular, Storey (1994) table 5.7, p. 127.

[12] Although see Buzzell and Gale (1987) on the negative effect of high investment intensity on profitability in different market conditions.

[13] Twenty-two of the 66 residual correlations were significant at the 5 per cent level, this suggested a standardised normal test statistic of 10.0.

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ANNEX
Explanatory variables included in the initial analysis

| Variable name | Definition |
|---|---|
| 1. *Initial market position* | |
| LFIRMAGE | An indicator of the age of the business (in years) in 1991. |
| LNOFOUND | A numerical indicator of the number of founders of the firm. Where the entrepreneur was the only founder this variable took value one. |
| LDIVIS | An indicator variable taking the value 1 if the firm was part of a group of companies and zero otherwise. |
| LPARTN | An indicator variable taking the value 1 if the firm was a legal partnership and zero otherwise. |
| LPRODFOC | An indicator variable taking the value 1 if the firm had 90 per cent or more of its sales focused in a single product or product group. Product groups could be differentiated by technology, geographical focus or product type. |
| LMARKFOC | An indicator variable taking the value 1 if the firm had 90 per cent or more of its sales focused in a single geographical market. Five areas were identified: Northern Ireland, the Republic of Ireland, Great Britain, the rest of the EU and elsewhere. |
| LQABOVE | An indicator variable taking value 1 if the firm's product quality was above that of its closest competitors in 1991 and zero otherwise. This variable and the next three were based on the firm's own assessment. |
| LQBELOW | An indicator variable taking value 1 if the firm's product quality was below that of its closest competitors in 1991 and zero otherwise. |
| LPABOVE | An indicator variable taking value 1 if the firm's product price was above that of its closest competitors in 1991 and zero otherwise. |
| LPBELOW | An indicator variable taking value 1 if the firm's product price was above that of its closest competitors in 1991 and zero otherwise. |
| LISO9000 | An indicator variable taking value 1 if the firm had either ISO 9000 or BS5750 certification in 1991. |
| LAOT91 | The ratio of net assets to turnover in 1991. |
| LPOT91 | The ratio of net profit to turnover in 1991 in per cent. |
| LTOGROW | The average annual percentage rate of real turnover growth from 1991–93. |
| LPTA91 | The ratio of net profit to net assets in 1991 in per cent. |
| 2. *Entrepreneurial characteristics etc* | |
| EFOUND | An indicator variable taking the value 1 if the entrepreneur was a founder of the company and zero otherwise. |
| ESOLEFOU | An indicator variable taking the value 1 if the entrepreneur was the sole founder and zero otherwise. |
| ESIGEQ | An indicator variable taking the value 1 if the entrepreneur has a significant equity stake in the business (i.e. s/he owns 20 per cent of the equity). |
| EFMFIRM | An indicator variable taking the value 1 if the entrepreneur's father or mother ran a business. |
| EFMOFIRM | An indicator variable taking the value 1 if the entrepreneur's father or mother owned a firm. |
| EGCSE | An indicator variable taking the value 1 if the entrepreneur's highest educational qualification was at GCSE level. |
| EAPPRENT | An indicator variable taking the value 1 if the entrepreneur's highest educational qualification was at OND or apprenticeship level. |
| EALEVEL | An indicator variable taking the value 1 if the entrepreneur's highest educational qualification was at A-level. |
| EDEGREE | An indicator variable taking the value 1 if the entrepreneur's highest educational qualification was at HND or degree level. |
| ESHPOW | An indicator variable taking the value 1 if the entrepreneur was willing to share power to achieve an expansion of the business. |
| ESHOWN | An indicator variable taking the value 1 if the entrepreneur was willing to share ownership to achieve an expansion of the business. |
| EAGE | The age of the entrepreneur in 1991 (measured in years). |
| ELFEXP | An indicator variable taking the value 1 if the entrepreneur had previous experience of working in firms with 500 or more employees. |

*Annex (continued)*

| Variable name | Definition |
|---|---|
| EMFEXP | An indicator variable taking the value 1 if the entrepreneur had previous experience of working in firms with 100–499 employees. |
| ESFEXP | An indicator variable taking the value 1 if the entrepreneur had previous experience of working in firms with less than 100 employees. |
| EINDYRS | The entrepreneur's number of years in the current industry in years. |
| EOTHBUS | An indicator variable taking the value 1 if the entrepreneur was involved in other businesses. |
| 3. *Strategic targets* | |
| EBOTURN | An indicator variable taking the value 1 if turnover growth was an 'important' or 'very important' business objective. |
| EBOEMP | An indicator variable taking the value 1 if employment growth was an 'important' or 'very important' business objective. |
| EBOPROF | An indicator variable taking the value 1 if profit growth was an 'important' or 'very important' business objective. |
| TPLAN | An indicator variable taking the value 1 if the firm had a formal (i.e. written) strategic plan. |
| TSALES | An indicator variable taking the value 1 if the firm's strategic plan included quantified sales growth targets. |
| TPROF | An indicator variable taking the value 1 if the firm's strategic plan included quantified profit growth targets. |
| TINV | An indicator variable taking the value 1 if the firm's strategic plan included quantified investment growth targets. |
| TMS | An indicator variable taking the value 1 if the firm's strategic plan included quantified market share growth targets. |
| TTDEC | An indicator variable taking the value 1 if in the firm's strategic plan there was a turnover target and this was for reduced sales. |
| TTSTABLE | An indicator variable taking the value 1 if in the firm's strategic plan there was a turnover target and this was for stable turnover. |
| TTSLOWG | s An indicator variable taking the value 1 if in the firm's strategic plan there was a turnover target and this was for slow sales growth (i.e. less than 20 per cent pa). |
| TTFASTG | An indicator variable taking the value 1 if in the firm's strategic plan there was a turnover target and this was for rapid sales growth (i.e. more than 20 per cent pa). |
| 4. *Operating environment of the firm* | |
| MCOMPET | The number of competitors the firm faces in its main product markets. |
| MCUSTPOW | An indicator variable taking the value 1 if customer power was an 'important' or 'very important' element of competition in the firm's markets. |
| MSUPPOW | An indicator variable taking the value 1 if supplier power was an 'important' or 'very important' element of competition in the firm's markets. |
| MNEWENT | An indicator variable taking the value 1 if the threat of new entrants was an 'important' or 'very important' element of competition in the firm's markets. |
| MSUBS | An indicator variable taking the value 1 if the threat of substitute products was an 'important' or 'very important' element of competition in the firm's markets. |
| MSHMATS | An indicator variable taking the value 1 if the firm's markets were characterised by significant material shortages. |
| MSHLAB | An indicator variable taking the value 1 if the firm's markets were characterised by significant labour shortages. |
| MSHFIN | An indicator variable taking the value 1 if the firm's markets were characterised by significant finance shortages. |
| MHIGHCR | An indicator variable taking the value 1 if the initial capital requirement for entry into the firm's industry was above £400,000. |