SWP 6/90 GROWTH AND PERFORMANCE CONTRASTS BETWEEN 'TYPES' OF SMALL FIRMS

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GROWTH AND PERFORMANCE CONTRASTS BETWEEN 'TYPES' OF SMALL FIRMS

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INTRODUCTION

Over the past ten years new and small firm have been identified by most Western Governments as significant components of economic strategies for job and wealth creation. Implicit in these strategies has been the search for policies which will increase the supply of new firms, and will encourage established firms to grow. Yet significant growth is very much the exception, the majority firms spend the whole of their economic life within the small firm sector. Nevertheless, it may take some time, and whilst the ultimate size may remain small, firms do grow.

O'Farrell and Hitchens (1988a) have provided the most recent analysis of the "Alternative Theories of Small Firm Growth". They suggest that there are four main groups of theory - the industrial economics approach, the stochastic model, stage models, and the strategic management perspective. Each of these they find open to criticism, and conclude that it may be "easier to provide a critique of contemporary theories than to present a definitive new conceptual framework within which to study small firm growth" (O'Farrell and Hitchins, 1988a, p. 1379). We believe that the key to this conundrum lies in the underlying assumption, found most clearly in the stage models, that growth is linear, always follows both the same events, and the same sequence of events. The aim of this paper is to suggest a multi-dimensional approach to the understanding of the development of the small firm by providing empirical evidence as to the kaleidoscope of factors which describe firms of different sizes.

PREVIOUS RESEARCH

Previous studies have explored the relationship between the origins, personal characteristics (Khan, 1988; Westhead, 1988; Lafuente and Salas, 1989) and traits of owner-managers (Hornaday and Aboud, 1971; England, 1975; Kets de Vries, 1977; Brockhaus, 1982) and small business growth (Perry et al., 1988; Storey et al., 1987; Storey et al., 1989); the role of the 'incubator' organisation in

the founding of growth orientated firms (Cooper, 1985); managerial characteristics and the financial performance of small business (Hornaday and Wheatley, 1986; Filley and Aldag, 1988); the prediction of initial success in start-up ventures (Stuart and Abetti, 1987); and the business strategies and performance levels of new ventures which operate in different industry life cycle stages (Covin and Slevin, 1988). However, Milne and Thompson (1982) consider that the growth and development of a small business can be viewed, quite simply, in terms of how quickly the owner-manager can adapt and learn from the experience of dealing with the two environments within which the firm does its business (Hjern et al., 1980). The 'internal environment' consists of the resources of the firm itself and include, for example, the personal and leadership characteristics of the owner-manager (Gibb and Scott, 1985), the owner-managers age and its effect on his attitudes to growth (Deeks, 1976), occupational background, personal objectives, management style and decision-making, the level of the owners education and training, and personal values and attitudes. Internal managerial factors influencing growth also include the extent of the division of management labour and the proportion of highly qualified personnel; the control system and the extent to which planning is built into it (Gibb and Scott, 1985); the human potential of the organisation in terms of skills and flexibility of the work force; the financial situation of the company; the physical asset base of the company in terms of age and quality of machinery and equipment; availability of management time for coping with change; and awareness of the wider 'macro' environment and of the task environment. The 'external environment' includes, for example, suppliers, buyers, the strength of competition, potential entrants, interest rates, company taxation, degree of dependency upon a small number of customers, extent of complexity and uncertainty in the market served, sectoral trends, government policies, trends in exchange rates, and social, legal and political conditions.

The Internal Environment

The Owner-Manager: It is generally agreed that, for the small business, the objectives of the firm are synonymous with those of the owner (O'Farrell and Hitchins, 1988a, p.1373). Thus his value systems will influence whether a firm pursues the objective of growth or is content to pursue a 'survival' policy. Indeed, one reason for firms wishing to stay small is that the ownership and the

management reside in the same person and so future company goals are determined not only by commercial considerations but also by personal life-styles.

The problem with the studies which accept the thesis described above is that it automatically includes two basic assumptions. First, there is only one individual involved in the business or, if there is more than one, they all have the same concept of the business; and second, that all small firms are run by their founders. Both of these assumptions are clearly invalid. Indeed, some firms do not begin to grow significantly until second or third generations take control (Calori and Bonamy, 1989). These may, however, be the exceptions. In their study of the financial performance of small firms in New England, Begley and Boyd (1986, p.12) found that companies run by the founder grew more rapidly than those run by a successor, and longevity of the business was negatively associated with growth rate - older companies grew more slowly than younger companies.

Management: In any organisation, management collects and evaluates only a portion of the information concerning characteristics, processes, opportunities and constraints in both the 'internal task environment' and the 'external macro environment' (O'Farrell and Hitchens, 1988a). For the owner-manager, his ability to manage the business will be a function of the systems and structures which he creates as the business grows. However, in their study of 95 small firms which had experienced a five year surge in growth, Fombrun and Wally (1989, p.120) found that "rapid growth may induce managers to design systems that may work at odds with each other".

At the simplest level, some writers have asserted that there is an association between long-range planning and small firm development (Kudla, 1980). In a study of manufacturing firms in several northeastern states of the USA O'Neill et al., (1987, p.40) found the relationship between planning and performance were complex and that planning did not improve performance in all environments. Interestingly, they found that in the dynamic environments, analysis depressed performance whilst control encouraged performance and that "the planning function, then, is the ticket to the post-entrepreneurial stage, but it is no guarantee of a strong performance in that stage" (p.40). O'Neill and his colleagues also found that age, a surrogate for experience, had a positive effect on performance in dynamic environments. Bamberger (1983) has argued that "we can assume that there is a positive relationship between the existence of a more or less formal strategic planning system and the firm's

growth". There is, however, by no means universal agreement that planning is either necessary or desirable (Karger and Malik, 1975)

Production: O'Farrell and Hitchins (1988b, p.400) argue that production issues (such as design, quality control, correct use of machinery) in small manufacturing firms should be taken into account when considering competitiveness and small firms growth because "...getting production right is always a necessary condition of growth in all firms. Other factors may also be necessary conditions for companies in certain sectors such as: after sales service; customer liaison; selling; shortage of working capital and so on. However, although they may be necessary conditions, they are not sufficient". In their study of the competitive performance of small manufacturing firms in Scotland and the Mid-West of Ireland O'Farrell and Hitchins (1988b, p.409) also considered the influence of the comparative cost and quality of the firms' major physical assets - buildings and machinery (in terms of age and the level of introduction of computer numerically-controlled (CNC) machines). Interestingly, Irish firms had a substantially higher proportion of equipment less than five years old, whilst a higher percentage of Scottish firms had adopted CNC machines. However, there was no relationship between CNC machines per person and the quality and price competitiveness of Scottish engineering companies.

External Factors

Product / Market Structure: In the case of firms engaged in clothing and knitwear O'Farrell and Hitchens (1988b) found that the most common mechanism of growth in both Scotland and the Mid-West of Ireland was by increasing sales to existing customers. They also found that the poor quality of the supplier base in the mid-west of Ireland was a factor which affected growth strategies. The majority of firms in Ireland which purchased inputs locally reported problems of quality, design, delivery or some other dimension of supply performance.

Accepting that small firms are generally dependent upon one or a few products Wilson and Gorb (1983) examined the extent and nature of dependence in the London Borough of Camden. Their analysis highlighted three findings. First, many of the small firms studied were found to be dependent on a narrow range of industry or customer types. Second, dependence on a small number of customers was not necessarily harmful since it may reflect a symbiotic relationship between

the small and large firm with mutual benefits to both buyer and seller. For example, by reducing the costs of marketing, dependence lowers the general overheads in the new small firm thus reducing barriers to entry brought about by high unit costs and an absence of economies of scale. Third, Wilson and Gorb (1983, p.22) found that the youngest small firms were generally dependent on local and regional markets but that as they matured, they lost some of their dependence as their markets became more distant.

Porter (1980, 1985) has argued that the fundamental basis of above-average performance in the long-run is sustainable competitive advantage. He identified five groups whose actions (or threats of action) may limit a firm's profitability: competitors, customers, suppliers, potential competitors and suppliers of substitute products. Of particular importance to small firm growth he suggests are competitor strength and customer concentration. Whilst competitor strength is expected to diminish new venture performance. Customer concentration may be a nonlinear influence on performance with a medium value leading to the best result. When concentration is high so is customers' bargaining power. Low concentration implies a lack of power by customers but a start-up with a limited sales force may have difficulty establishing close contact with its customer base. This leaves it vulnerable to late entering competition from established firms. This view is supported in an empirical study of 34 investments in start-up companies in the USA (Roure and Keeley, 1989, p.214) which showed that 'buyer concentration' was a major factor explaining the success of technological start-ups. The level of competition in market segments also significantly influenced small firm growth with successful start-ups targeting market segments which have a relatively low level of competition. Roure and Keeley do, however, suggest that firms in Europe have a greater tendency to have attacked market segments with a higher level of competition.

Location: Mason and Harrison (1985) conclude that the local environment may be an important influence upon the prospects for small firm growth and expansion, and the characteristics of the region in which small firms are located will have a significant impact on their relative performance (Hitchins and O'Farrell, 1987, 1988; O'Farrell and Hitchins, 1988b, Sweeney, 1987). This is not a view which is confined to the United Kingdom. Lorenzoni and Oranati (1988) stress the importance of 'constellations of firms' and of a contrasting 'environmental texture', factors which they conclude have

contributed to the growth of the small firm sector in areas such Route 128 and Silicon Valley in the USA and the Prato district in Italy. This growth is made possible due to the availability of suppliers who thereby create an 'environmental texture' of opportunities not fully characterisable by a physical or a geographic boundary.

A key assumption in the creation of 'outsider' advisory organisations such as Enterprise Agencies, Development Boards, the Scottish Development Agency (SDA) in Scotland and the Welsh Development Agency (WDA) in Wales is that they should be able to play a significant role in improving the effectiveness of strategic planning in small firms. O'Farrell and Hitchins (1988a, p.1378) suggest that this structuring of the 'external' environment in the peripheral regions is based upon the view that small firm growth may be constrained by the lower quantity and quality of public and private services available. There is some evidence to support the view of a range of impediments to growth in peripheral regions. For example -

* venture capital availability is more limited in peripheral areas owing to the centralisation of the lending institutions and the distorted perception of risk by banks (Mason, 1987),

* lower rates of economic growth and lower levels of income in peripheral locations inhibit the opportunities for small firm expansion based upon local and regional markets (O'Farrell and Hitchins, 1988a, p.1378),

* small firms in peripheral regions suffer technical impediments to growth, as reflected in the lower rates of innovation compared with similar sized firms in core regions (Oakey et al, 1980),

* labour supply bottlenecks vary between regional and subregional markets (Hitchins and O'Farrell, 1987a),

* peripheral economies dominated by large firms may not provide an ideal source of labour for small firms. Skilled personnel recruited from such enterprises tend to be more narrowly specialised, and to lack the flexibility necessary for working in a small firm environment (Hitchins and O'Farrell, 1988a).

* in peripheral regions there is a restricted supply of managerial and organisational skills (Del Monte and Giannola, 1986, p.282) and the shortage of middle management staff have impeded the growth of some small firms (Hitchins and O'Farrell, 1988b),

* firms in less prosperous areas will be more vertically integrated than those in developed regions and this lack of specialisation reduces the competitiveness and the rate of growth of local firms (Del Monte and Giannola, 1986, p.282).

LIMITATIONS OF PREVIOUS RESEARCH

The research outlined above presents an apparently coherent and comprehensive picture of the factors influencing the growth of the small firm. However, despite the fact that it is generally agreed that the pressures upon the firm are complex and inter-related most of the studies discuss only one or two aspect of the firm's profile. Moreover, almost all are based on firms in the manufacturing sector. Indeed, this assumption is so clearly built into most research analyses that O'Farrell and Hitchens (1988a) do not even provide an appropriate caveat in their survey of the literature.

An even more surprising omission in most of the literature is a complete absence of any discussion of an appropriate measure of growth. Again, the studies have been uni-dimensional, covering employment, profits, value-added, sales turnover, and assets, and in some cases the parameters have not been defined at all. Underlying all these studies, however, is the assumption that performance and growth are not only interlinked, but one can be used as a surrogate for the other. This generally presumed correlation between size and performance is certainly not supported in the literature.

The studies in which measures of small firm performance are used are limited, mainly because the data is both difficult to obtain and notoriously unreliable. Moreover, and for the same reasons, there is very little which relates performance to that of competing firms in the market. For example, recognising the inherent difficulties both of collecting accurate company data and comparative market data, O'Neill et al (1987) simply asked owner-managers to rate their firm's performance relative to the previous five years using verbal anchors such as 'worse', 'same' or 'better'.

THIS RESEARCH

Most of the literature on the stages of growth of the firm attempt to describe a predictable set of characteristics at each stage (Steimetz, 1969; Churchill and Lewis, 1983; Kimberley et al., 1980).

These researchers agree with Devine (1979), Taylor and Thrift (1982), and Fombrun and Wally (1989, p.108) that this is too simplistic. It is more likely that all firms do not go through all stages but rather that they go through different stages, at different times, in different sequences, and that the total set of inputs to the business will shape and characterise the development pattern.

This research analysed the strategic profile of a cross section of 249 small firms in an attempt to reduce the data set to clusters of firms with similar characteristics, and to compare these characteristics with both size and performance.

Data for the analysis was derived from the Cranfield Small Firms Data Base (CSFDB). Firms in the sample are drawn from a wide variety of industries and locations. They range in size from 1 to 181 employees, and from less than £99,999 to over £10 million sales turnover. In all, 113 firms were engaged in manufacturing activities (45.6%), 103 firms were service firms (41.5%), and a further 29 firms were engaged in construction (11.1%). The average age of the surveyed firms was 26.6 years, and ranged from 1 year to 240 years. Forty-five per cent of firms were established in the last decade whilst 16.8% were established more than fifty years ago. In terms of the legal entity of the independent small firms, 80.6% were incorporated, 6.9% of firms were sole proprietorships, whilst a further 12.1% were a partnership. In total, 7,901 people were employed in the 245 firms providing employment data and each firm employed on average 32 people. A full description of the data collection process, and of the sample characteristics is found in Birley and Westhead (1988).

In the absence of longitudinal data for the firms in the sample, three measures of size are used as surrogates for presumed growth - Sales Turnover, Trading Profit and Total Number of Employees. Performance is measured by the owner-managers scoring of his firm's profit performance against the market.

Based upon the available literature, preliminary hypotheses were constructed to identify those individual factors which correlated significantly with size and performance, and to test the direction of the correlation. The significant variables were then subjected to cluster analysis in order to reduce the 222 firms to a small number of mutually exclusive groups (Hair et al., 1979).

PRELIMINARY HYPOTHESES

Age and Ownership:

1. Ownership Structure

* Firms with a diluted ownership structure, as reflected by a large number of shareholders, will be positively associated with a high level of growth and performance (SHAREHOLDERS).

* Firms without either current first generation majority owners (OWNERS) or current first generation senior executives (EXECUTIVES) will be associated negatively with growth and performance.

* Firms in which a large number of original founders who are still partners or shareholders (FOUNDERS) will be positively associated with high performance.

2. Age of the Business

* Mature firms (AGE) will be more securely established and will be positively associated with levels of growth and performance (for a disenting view see Begley and Boyd, 1986, p.12).

Management:

3. Managerial and Organisational Structure

* Firms with a diverse range of managerial functions currently operated (MAN) will be positively associated with small firm performance.

* Firms which have a high proportion of managerial functions which are the sole responsibility of one person (SOLE) will also be positively associated growth and performance.

* Firms with high levels of delegation of managerial functions to individuals (MANINDEX) will be positively associated with high performance.

4. Planning

* Firms which hold regular and frequent board meetings and management meetings (PLANMAN) will be positively associated with size and performance.

* Firms which hold regular and frequent meetings with their professional advisors - banker, accountant and lawyer - (PLANPROF) will be positively associated with size and performance.

* Firms which hold regular and frequent meetings with their customers and suppliers (PLANBUS) will be positively associated with size and performance.

5. Management Training

* Firms in which management has undergone some form of management training (MANTRAIN) will be positively associated with growth and high performance.

6. Financial Resource Base

* Firms which have received financial investment from a large number of sources (not including overdraft facilities from banks) (FINANCE) will be positively associated with size and performance.

Production:

7. Manufacturing Production Technology

* Manufacturing firms with non-manual control technology for the major manufactured product lines (PRODUCTION) will be associated with high levels of growth and high performance.

* Firms with relatively 'mature' pieces of production equipment (AGEPROD) will be negatively related to small firm performance.

* Firms which use sophisticated technology in the control of the administration base (CSADMIN) will be positively associated with size and performance.

Positioning - Industry and Location:

8. Industrial Structure

* The direction of relationship between the industry a firm is engaged varies tremendously from one sector to another within any broad industrial categories such as 'manufacturing and 'services' (Chaganti, 1986). Consequently, at this broad level of analysis the direction of association between the industry of the firm (INDUSTRY) and the level of performance is ambiguous and remains unclear.

9. Location

* Firms located in the prosperous and buoyant markets of the 'south' of England (the standard regions of East Anglia, the South East and the South West) (LOCATION) will be positively associated with high rates of small business growth and performance.

* Firms which have taken advantage of Government training schemes (TRAINING) will be negatively associated with size and performance.

* Firms which have taken advantage of Government grants (GRANTS) will be negatively associated with size and performance.

Product / Market Profile:

10. Diversity of the Product Base

* Firms with a wide number of major product lines or major service groups (PRODUCT) will be positively associated with size and performance.

* Firms which have introduced a large number of new major product lines or major service groups (NEWPRODUCT) during the previous year will be positively associated with size and performance.

11. Sales Revenue Dependency

* Firms with a high percentage of sales revenue accounted for by the major product line or service group (REVENUE) will be negatively associated with growth and performance.

12. Diversity and Location of the Customer and Supplier Base

* Firms with diverse customer bases (CUSTOMERS) and which have added significant numbers of new customers over the previous year (NEWCUSTOMERS) will be positively associated with size and performance.

* Firms which purchase goods and services from a wide number of suppliers (SUPPLIERS) which are becoming more diverse and wider in scale (NEWSUPPLIERS) will also be associated positively with high performance.

* Firms which are less dependent on trends and business demands in immediate 'local' (within a radius of 20 miles from the businesses operational premises) or 'regional' (between 20 and 100 miles) markets will be positively associated with small firm growth. Therefore, firms which sell the majority of their products and services in nationwide or overseas markets (DISTCUSTOMERS) will be positively related to high performance and those firms not exclusively supplied by 'local' suppliers (DISTSUPPLIERS) will also be positively associated with high performance.

13. Diversity and Size of Competition

* Firms with a small number of direct competitors (COMPETITION) will be positively associated with size and performance.

* The level of growth and performance, and the employment size of the major competitor (SIZECOMP) can be either positive or negative.

CORRELATION ANALYSIS

In this section each of the variables hypothesised to be associated with small firm growth and high performance are tested using bivariate and multivariate correlation and regression analysis. The objective of the analysis is to seek guidance and to delimit the level of importance of specified measurable factors presumed to be associated with small firm performance.

Bivariate Correlation Analysis

Table 1 shows the Pearson Product-Moment correlation coefficients between total employment size (Y_1) and each of the 31 surrogate variables. Fourteen of the surrogate variables were associated with total employment size at the 0.01 level of significance and a further two (EXECUTIVES and CSADMIN) at the 0.05 level of significance. Three variables (OWNERS, EXECUTIVES and AGEPROD) were not in the direction hypothesised. The eight surrogate variables found to be highly statistically associated (at the 0.000 level of significance) with the dependent variable (Y_1) were SHAREHOLDERS, AGE, MANTRAIN, AGEPROD, CUSTOMERS, NEWCUSTOMERS, SUPPLIERS and SIZECOMP.

Table 2 shows that thirteen of the surrogate variables were associated at the 0.01 level of significance with the level of sales for the last financial year, and a further one (MAN) at the 0.05 level of significance. The eight surrogate variables found to be highly statistically associated (at the 0.000 level of significance) with the dependent variable (Y_2) were AGE, AGEPROD, PLANMAN, MANTRAIN, LOCATION, CUSTOMERS, SUPPLIERS and SIZECOMP. The same three variables as above were not in the direction hypothesised.

Table 3 indicates that nine surrogate variables were associated with the third dependent performance measure - level of profitability for the last financial year (Y_3) at the 0.01 level of significance and a further five (SHAREHOLDERS, PLANPROF, NEWCUSTOMERS, SUPPLIERS and SIZECOMP) at the 0.05 level of significance. The five surrogate variables found to be highly statistically associated (at the 0.000 level of significance) with the dependent variable (Y_3) were

OWNERS, AGE, AGEPROD, MANTRAIN and CUSTOMERS. Six of the significant correlations were not in the direction hypothesised.

Multivariate Correlation and Regression Analysis

In order to explore the multivariate relationships between the performance measures and the surrogate variables and to test hypotheses detailed in the research literature the data was further subjected to multiple correlation and regression analysis. This statistical technique allows the association of each independent variable with the performance indicator to be examined while controlling for the effects of the other independent variables. The multivariate regression equations presented below were calculated using the 'forward inclusion method' and the technique starts by regressing the variable with the highest zero-order correlation against the dependent variable. A new independent variable is added at each step in order that the null hypothesis of no explanation can be rejected. The 0.05 level of significance was the selected level for the inclusion of significant independent surrogate variables. Relative profitability was not used in this analysis since the categorical data was not sufficiently robust.

Total employment size of the small firms (Y_1): Equation 1 below is based on the fifteen surrogate variables found to be statistically associated with total employment size at the 0.05 level of significance in Table 1. The AGEPROD variable has been omitted from Equation 1 and the following equations because over 54% of firms were engaged in non-manufacturing activities. Equation 1 which contains the six independent surrogate variables SUPPLIERS, CUSTOMERS DISTCUSTOMERS, AGE, MANTRAIN and NEWSUPPLIERS is statistically significant and has a high adjusted R^2 value of +0.49. It can be inferred from Equation 1 that firms which are mature in age, have diverse customer and supplier bases, customers in nationwide locations, with the management having undertaken management training and with a limited propensity to acquire new suppliers will record the highest rates of total employment.

Equation 1: Total Employment by Surrogate Variables (All 15 significant variables at p= 0.05)

$$Y_1 = \underset{(-0.21)}{-0.07} + \underset{(3.72)^{**}}{0.29\ (SUPPLIERS)} + \underset{(4.07)^{***}}{0.20\ (CUSTOMERS)} + \underset{(3.81)^{***}}{0.19\ (DISTCUSTOMERS)} +$$

$$\underset{(2.77)^{**}}{0.01\ (AGE)} + \underset{(2.75)^{**}}{0.42\ (MANTRAIN)} - \underset{(-2.03)^{*}}{0.31\ (NEWSUPPLIERS)}$$

Multiple R= 0.72 Adjusted R^2= 0.49 Standard Error of the Estimate= 0.74 n= 110

Note: For the equations the figures in brackets are 't' values.
* Significant at the 0.05 level of significance;
** Significant at the 0.01 level of significance; and
*** Significant at the 0.001 level of significance.

In order to calculate a more refined multiple regression equation only those seven surrogate variables found to be statistically associated with (Y_1) at the 0.000 level of significance were selected for inclusion in Equation 2. This refined model is based on 163 observations and has a larger standard error of 0.81 compared to 0.74 in Equation 1. Five independent surrogate variables are stated in Equation 2 and they include SUPPLIERS, AGE, SIZECOMP, CUSTOMERS and MAN. The equation is significant and it is has an adjusted R^2 of +0.39. Again, it can be inferred that mature firms, with diverse supplier and customer bases currently operating a wide range of managerial functions and whose major competitor is large in employment size will record the highest levels of total employment (Y_1).

Equation 2: Total Employment by Surrogate Variables (7 variables at p= 0.000)

$$Y_1 = \underset{(1.43)}{0.36} + \underset{(3.31)^{**}}{0.21\ (SUPPLIERS)} + \underset{(4.17)^{***}}{0.08\ (AGE)} + \underset{(3.81)^{***}}{0.12\ (SIZECOMP)} + \underset{(2.87)^{**}}{0.13\ (CUSTOMERS)}$$

$$+ \underset{(2.37)^{*}}{0.04\ (MAN)}$$

Multiple R= 0.64 Adjusted R^2= 0.39 Standard Error of the Estimate= 0.81 n= 163

Note: For the equations the figures in brackets are 't' values.
* Significant at the 0.05 level of significance;
** Significant at the 0.01 level of significance; and
*** Significant at the 0.001 level of significance.

Level of Sales: Equation 3 is based on the thirteen surrogate variables found to be statistically associated with level of sales for the last financial year (Y_2) at the 0.05 level of significance. This equation is statistically significant, has a high adjusted R^2 value of +0.46 and a standard error value of 0.60. It can be inferred from Equation 3 that mature firms with diverse customer and supplier bases, whose management has frequent management meetings and has undertaken management training with a large employment sized major competitor will record the highest level of sales.

Equation 3: Level of Sales by Surrogate Variables (All 13 significant variables at p= 0.05)

$$Y_2 = \underset{(0.67)}{0.02} + \underset{(2.14)^{*}}{0.12\,(\text{SUPPLIERS})} + \underset{(3.07)^{**}}{0.39\,(\text{MANTRAIN})} + \underset{(2.96)^{**}}{0.12\,(\text{CUSTOMERS})} +$$

$$\underset{(2.88)^{**}}{0.05\,(\text{PLANMAN})} + \underset{(2.46)^{*}}{0.00\,(\text{AGE})} + \underset{(2.01)^{*}}{0.06\,(\text{SIZECOMP})}$$

Multiple R= 0.70 Adjusted R^2= 0.46 Standard Error of the Estimate= 0.60 n= 111

Note: For the equations the figures in brackets are 't' values.
* Significant at the 0.05 level of significance; and
** Significant at the 0.01 level of significance.

A more refined model was calculated based on the seven surrogate variables found to be statistically associated with the dependent variable (Y_2) at the 0.000 level of significance. Equation 4 is based on 160 observations and it has a standard error of 0.65. The equation is statistically significant has a slightly lower adjusted R^2 value of +0.37 and the six independent variables (SUPPLIERS, MANTRAIN, AGE, SIZECOMP, PLANMAN and LOCATION) are found to be positively associated with the dependent variable. It can be inferred from Equation 4 that mature firms located in 'southern' markets with diverse supplier bases, very large major competitors, whose management has undertaken management training, who hold frequent management meetings, and have a large employment sized major competitor will record the highest levels of sales.

Equation 4: Level of Sales by Surrogate Variables (7 variables at p= 0.000)

$$Y_2 = \underset{(0.31)}{0.08} + \underset{(3.51)^{***}}{0.12\ (SUPPLIERS)} + \underset{(2.73)^{**}}{0.31\ (MANTRAIN)} + \underset{(4.03)^{***}}{0.01\ (AGE)} + \underset{(3.19)^{**}}{0.08\ (SIZECEOMP)} + \underset{(2.38)^{*}}{0.03\ (PLANMAN)} + \underset{(2.04)^{*}}{0.22\ (LOCATION)}$$

Multiple R= 0.63 Adjusted R^2= 0.37 Standard Error of the Estimate= 0.65 n= 160

Note: For the equations the figures in brackets are 't' values.
* Significant at the 0.05 level of significance;
** Significant at the 0.01 level of significance; and
*** Significant at the 0.001 level of significance.

Level of Profitability: Equation 5 is based on the thirteen surrogate variables found to be statistically associated with the level of profitability for the last financial year (Y_3) at the 0.05 level of significance. This equation is statistically significant, has an adjusted R^2 value of +0.13 and a standard error value of 2.56. It can be inferred from Equation 5 that mature firms whose management has undertaken management training and who hold irregular meetings with business contacts will record the highest level of profitability.

Equation 5: Level of Profitability by Surrogate Variables (All 13 significant variables)

$$Y_3 = \underset{(1.22)}{1.19} + \underset{(2.23)^{*}}{0.01\ (AGE)} + \underset{(2.47)^{*}}{1.30\ (MANTRAIN)} - \underset{(-2.32)^{*}}{0.17\ (PLANBUS)}$$

Multiple R= 0.39 Adjusted R^2= 0.13 Standard Error of the Estimate= 2.56 n= 110

Note: For the equations the figures in brackets are 't' values.
* Significant at the 0.05 level of significance.

A more refined model was calculated based on the eight surrogate variables found to be statistically associated with the dependent variable (Y_3) at the 0.01 level of significance. Equation 6 is based on 153 observations and it has a standard error of 2.57. The equation is statistically significant,

has a slightly higher adjusted R^2 value of +0.14. In contrast, to Equation 5 only two surrogate variables were found to be associated with the dependent variable, one positively (AGE) and the other negatively (FINANCE). It can be inferred from Equation 5 that mature firms which have not obtained financial investment (not including bank overdrafts) will record the highest levels of profitability.

Equation 6: Level of Profitability by Surrogate Variables (8 variables at p= 0.01)

$$Y_3 = \underset{(5.87)}{1.93} + \underset{(4.51)^{***}}{0.03\,(AGE)} - \underset{(-2.45)^{*}}{0.54\,(FINANCE)}$$

Multiple R= 0.39 Adjusted R^2= 0.14 Standard Error of the Estimate= 2.57 n= 153

Note: For the equations the figures in brackets are 't' values.
* Significant at the 0.05 level of significance; and
*** Significant at the 0.001 level of significance.

DATA REDUCTION USING PRINCIPAL COMPONENTS ANALYSIS

Whilst the multiple regression analysis provides useful insights into the combination of factors which contribute to size and performance, there remains an inherent assumption of linearity - that all firms conform to the described patterns sequentially. Therefore, an R-Mode Principal Components Analysis (PCA) was used in order to produce new combinations of the original data which could then be used as independent and orthogonal reference axes (or variables) in a classification of firm 'types' using Cluster Analysis.

The unrotated direct extraction of orthogonal reference axes by PCA did not adequately illuminate the inter-relationships between the collection of variables. As a consequence, the reference axes were rotated in order to isolate more meaningful dimensions. After varimax rotation, the first eleven components (out of a total of thirty-one components) accounted for 65.7% of the total variance (Table 4). The final model was found to be an appropriate factor analytic model as indicated by Bartlett's test of sphericity, the Kaiser-Meyer-Olkin measure of smapling adequacy, the anti-image correlation matrix, the test for sampling adequacy and the test for communality.

On the basis of the component loadings, the eleven components were given the following descriptive labels:

Component 1	Manufacturing firms with old manual product lines but sophisticated administration bases. Firms are in competition with a small number of direct competitors and whose customers are in nationwide locations.
Component 2	Firms with large and increasingly diverse customer and supplier bases.
Component 3	Relatively mature firms with current majority owners and senior executives with 'no relationship' to the original founders and executives.
Component 4	Small firms with frequent management meetings and frequent meetings with professional advisers and business contacts with diverse supplier bases. The management team has received some form of management training and have introduced a diverse computerised administration base.
Component 5	Firms with a large proportion of managerial functions the sole responsibility of one person and a high level of delegation.
Component 6	Very mature small firms with old manufacturing product lines which have few remaining original founders who are still partners or shareholders. Firms have not received financial investment from external sources.
Component 7	Firms with an increasingly diverse range of new as well as existing major product lines or major service groups and which have a small proportion of sales revenue accounted by the major product or service line.
Component 8	Firms with a large number of competitors but the major competitor is large in size. Customers are in nationwide locations and suppliers are 'non-local'.
Component 9	Small firms in the 'south' with local suppliers who have not applied for grants and training schemes.
Component 10	Concentrated ownership structure in firms with increasingly diverse supplier bases which have not applied for grants.
Component 11	Firms currently operating a diverse range of managerial functions with non-manual administration bases who are heavily dependent on the sales revenue accounted for by the major product line or service group.

It is clear from this evidence that the linked trends isolated in the component structure do have meaningful expression in terms of firm characteristics which stresses the need for a classification of firm 'types'.

CLASSIFICATION INTO 'TYPES' OF FIRMS

The simple description of component loadings is useful in that it describes the pattern of each single basic factor, but nothing other than intuitive classification can be attempted. Therefore, in order to obtain a classification of small firm 'types' based on 'internal' as well as 'external' environmental factors, Ward's Error Sum Of Squares Method of Cluster Analysis was used to group similar firms (Ward, 1963). In this study Ward's method produces a grouping of relatively homogeneous firm 'types' which have maximum between-group variance and minimum within-group variance. A dendrogram was drawn to display each stage in the grouping process. At step 215, the grouping procedure was stopped with the 222 firms being reduced to only eight firm 'types', and with a 83.63% loss of original detail in return for an increased level of 'generality'.

In order to give a descriptive label to each of the eight clusters (or firm 'types'), the cluster mean for each variable was compared to the respective global mean for that variable (Table 5).

Cluster 1 — This is the largest cluster of 63 generally non-manufacturing firms with diluted ownership structures which have a very diverse range of major product lines or major service groups. Firms are middle aged and have frequent management meetings but have received no finance from external sources. Customers as well as suppliers are 'non-local' and the firms have a large number of direct competitors.

Cluster 2 — Firms in which managerial functions are highly delegated and management meetings are held at quarterly intervals. These generally 'northern' firms have a small number of shareholders and for the manufacturing firms in the cluster the control technology in production lines is a manual one. This cluster contains 31 firms.

Cluster 3 — A cluster of 29 service firms in which a very small number of founders are still partners or shareholders. Management meetings and meetings with professionals are in frequent, a small number of managerial functions are currently operated, and the firms have sophisticated administration bases. Firms are in competition with a small number of direct competitors and the major competitor is large in size.

Cluster 4 — Small firms with highly diluted ownership structures and 'local' customers located in the the 'south'. Management meetings are generally annual in frequency. This cluster contains 36 firms.

Cluster 5 — Twelve very mature firms with family succession current majority owners and senior executives who have undergone some form of management training. In the firms a large number of managerial functions are operated but only a small proportion are the responsibility of one person and consequently these firms are associated with a low level of delegation. For the manufacturing firms in this cluster they operate very old manual production lines but are associated with sophisticated administration bases. Firms have diverse supplier bases with customers as well as suppliers located in nationwide locations. The firms have large major competitors.

Cluster 6 — This is the second largest cluster containing 48 very young manufacturing firms located in the 'north' associated with young production lines. The firms have modest customer bases and have contacted only a small number of new customers over the past twelve months. Grants from central or local Government have been applied for.

Cluster 7 — A single mature service firm located in the 'north' with the one original founder being the current majority owner and senior executive. The firm has one major service group and it obtains all of its sales revenue from it. Moreover, the business has less than 11 'local' customers and has not made a new customers in the past twelve months. In contrast, the firm has over 50 suppliers located in 'regional' locations. The firm faces competition from less than 11 direct competitors. Local or central Government training schemes and grants have not been applied for. The firm currently operates a wide range of managerial functions but only a small proportion are the responsibility of one person. Management meetings and meetings with professionals and business advisers are held frequently and the firm has introduced computer technology in the administration base. The owner-manager has undergone some form of management training but has not received financial investment from external sources.

Cluster 8 — Two very young service firms located in the 'north' with the original owner-manager founders being the current first generation majority owners and senior executives. The businesses are associated with a very small number of major service groups with the firms stating that the major service group accounted for all of their sales revenue. Firms in this cluster have less than 11 'nationwide' customers, the businesses are supplied by over 11 'non-local' suppliers. The two firms have not applied for training schemes or grants provided by local or central Government. Both the firms operate a small number of managerial functions which generally are the responsibility of one person. Management meetings and meetings with professionals and business contacts are infrequent in nature. One of the owner-managers has received management training while the other has not. Neither of the firms has received financial investment from external sources.

TYPES OF FIRMS AND PERFORMANCE DIFFERENCES

The final stage of the analysis compared business size and performance between the identified 'types' of small firms. The aim was to test whether the cross-sectional analysis presented any evidence to support the 'stages of development' theories. Did the clusters fall into a logical sequence when measured by size or performance? For example, was cluster 6 characterised by very small firms, cluster 1 medium sized firms, and cluster 5 large firms? Further, were the three firms which remained isolated from the rest of the sample the atypical 'high flyers'?

The data was first subjected to exploratory Chi-Squared analyses. Clusters 7 and 8 were excluded from analysis in order to satisfy the assumptions of the technique. The use of the Chi-Squared technique also allowed the inclusion of a further performance measure which it had not been possible to use in previous analysis since it was based upon only three categorical scores - respondents were asked to indicate whether they rated their business profit performance relative to

competition as 'good', 'about average', or 'poor'. Whilst these ratings are, clearly, subjective, their inclusion adds to the overall pattern of results.

Table 6 indicates that a larger proportion of firms in clusters 1, 3 and 5 (22.6%, 25.0% and 25.0%, respectively) had 50 or more total employees. In contrast, firms in cluster 4 had a greater tendency to be less than 10 employees in size (33.3%), whilst firms in cluster 2 had a greater propensity to be between 10 and 25 employees in size (41.9%). With regard to the level of sales for the last financial year it can be inferred from Table 7 that a markedly larger proportion of firms in clusters 1, 3 and 5 (40.0%, 44.4% and 70.0%, respectively) had sales of £1 million or more compared to firms in cluster 4 which had a tendency to have sales of less than £250,000 (38.9%). Firms in clusters 2 (44.8%) and 6 (43.8%) generally had sales between £250,000 and £999,999. In terms of the third performance measure it is apparent that the vast majority of firms in each of the clusters had made a profit in the last financial year (Table 8). However, Table 8 shows that a markedly larger proportion of firms in clusters 2, 3 and 4 had made a profit (86.2%, 82.1% and 88.9%), whilst firms in clusters 1, 5 and 6 had a greater propensity to have made a loss (20.0%, 27.3% and 18.8%, respectively). Finally, Table 9 indicates that the majority of firms (with the notable exception of firms in cluster 4) rated their businesses profit performance as being above average relative to competition with firms in clusters 3, 5 and 6 in fact stating it was 'good' (60.0%, 80.0% and 63.6%, respectively). Conversely, a markedly larger proportion of firms in cluster 4 (20.6%) stated their profit performance was 'poor' relative to competition.

The results detailed above have indicated that no statistically significant differences were observed in any of the Chi-Squared analyses conducted. There was no statistical relationship between cluster membership and either size, or performance. However, scrutiny of the individual results does indicate the following patterns (unless stated, no particular bias is evident).

Cluster 1 Fewer firms than expected with sales of less than £250,000.

Cluster 2 Essentially small firms employing between 10 and 50 people and with sales between £250,000 and £1m.

Cluster 3 Firms in this group are polarised in size - either employing less than 10 people, and with sales of less than £250,000, or employing more than 50 people and with sales of greater than £1m.

Cluster 4 Predominantly very small firms employing less than 10 people, with sales of less than £250,000, in profit, but rating their relative profit performance as 'average' or 'poor'.

Cluster 5 A large percentage of firms with sales of more than £1m, rating their relative profit performance as 'good'.

Cluster 6 A large percentage of firms with sales between £250,000 and £1m.

Cluster 7 A profitable firm which rates its profit performance as 'good' with less than 26 employees and sales less than £250,000.

Cluster 8 Two profitable firms rating their profit performance as 'average', both firms have between 10 and 25 employees and sales between £250,000 and £999,999.

The above analyses present no evidence to support the theories that small firms pass sequentially through pre-defined stages of growth. However, the Ch-Squared test is not particularly powerful, and so the two size measures were subjected to the more powerful Analysis of Variance test for differences between the mean values in each cluster. No significant differences were identified between the clusters for sales revenue (/F/ = 0.824, d.f. = 5, Significance Level = 0.790) or for total employees (/F/ = 0.824, d.f. = 5, Significance Level = 0.534). Therefore, it was not possible to rank the clusters in order of their size.

SUMMARY AND CONCLUSIONS

The aim of this paper has been to study the inter-relationships between all the factors in the strategic profile of a sample of small firms, and, by using cross-sectional analysis, to attempt to identify any evidence to support the 'stages of growth' theories. Three surrogates for comparative growth were used in the analysis - number of employees, sales turnover, and profitability. The analysis follows five sequential stages - bivariate correlation analysis, multivariate correlation and regression analysis, cluster analysis, chi-squared analysis, and, finally, analysis of variance.

The results from the bivariate correlation analyses are remarkably consistent (see Table 10). Thus, the size of the small firms in the sample measured in terms of both number of employees and sales revenue are characterised by ownership structure, age, and market positioning as reflected in customer, supplier, and competitor bases. There is also some indication that growing firms may develop more complex management, as reflected in the number of managerial functions and the frequency of management meetings. However, there is no evidence that this extends to the use of

outside advisors (PLANPROF, PLANBUS), or to the development of a management structure through delegation (SOLE, MANINDEX).

The results for profit are particularly interesting since many are counter-intuitive. Whilst market profile continues to be important, the more that ownership and management is divorced from the original owners, the higher the profitability; and involvement with outside advisers or trainers, and the use of outside finance, is negatively related to profitability!

Subjecting the data to the more stringent technique of multivariate regression analysis reduces the number of variables, but re-inforces the overall conclusion. In particular, there is a marked absence of any relationship between the organisational structural variables and size, although it is comforting to these authors that management training does appear to make some contribution to size and profitability!

The multiple regression analyses support the theory of a combination of factors contributing to the growth and development of the firm, but they provide little illumination as to the profile of the firms in the sample, or the extent to which firms with a particular combination of characteristics are likely to grow or to be profitable. Moreover, the inherent assumption of linearity implies that all small firms follow the same pattern; that, since age is one of the predictive variables, all firms must grow; and that firms adjust their rate of growth by adjusting, for example, their customer base.

This assumption, found in much of the literature, that all firms follow the same prescribed path and that the small firm sector is essentially homogeneous has been subjected to very little empirical examination. The cluster analysis conducted in this study identified eight different types of small firm characterised by 'internal' variables of ownership, management and product structure; and by 'external' variables of product / market positioning. Unlike the preliminary regression analyses this use of cluster analysis took account of the small firm which experienced only limited growth. For example, the manufacturing firms in cluster 2 have highly delegated management structures and hold regular management meetings suggesting relatively large firms which have evolved through a number of 'growth stages'. However, we find that they are almost certainly 'family' (with a small number of shareholders) firms, and are primarily small, employing less than 50 people and with sales revenue of less than £1m. It would have been extremely neat to find that, having identified eight clusters of firms, three of which had potential as the 'high flyers' of the sample, and our cross-sectional analysis had

captured firms at various stages of growth. However, the Chi-Squared analyses and the Analysis of Variance tests identified no significant differences between the clusters with regard to size. Consequently, any ranking would be invalid.

These results are based upon a comprehensive analysis of the strategic profile of a random sample of small firms using thirty-one 'internal' and 'external' variables. In the cross-sectional analysis, there is no support for the theories that (all) firms pass sequentially through a series of growth stages. From our observation of the firms during the data collection period, this is a conclusion that we find intuitively appealing. Clearly firms do change, but not necessarily in any prescribed sequence. Indeed, the evidence presented in this paper suggests that we should be developing theories which better describe the heterogeneity of the sector. Moreover, we should be seeking to analyse the development within clusters of firms rather than seeking generalised over-arching theories for all firms.

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Appendix 1: Small Firm Characteristics Variables

SHAREHOLDERS	Number of shareholders or partners
OWNERS	Family relationship of current majority owners to founders
EXECUTIVES	Family relationship of current senior executives to founders
FOUNDERS	Number of original founders who are still partners or shareholders
AGE	Age of the small business (Years)
MAN	Total number of managerial functions which currently operate within the firm
SOLE	Total number of managerial function the sole responsibility of one person
MANINDEX	Managerial score function index (total number of managerial function the sole responsibility of one person / total number of managerial functions which currently operate within the firm)
PLANMAN	Frequency of board and management meetings
PLANPROF	Frequency of meetings with professional advisers such as the bank, an accountant and a solicitor
PLANBUS	Frequency of meetings with business contacts such as major customers and major suppliers
MANTRAIN	Has the small business management team received any management training?
FINANCE	Number of sources of received financial investment
PRODUCTION	Control technology for the major manufactured product lines
AGEPROD	The age of the oldest piece of production equipment (months)
CSADMIN	Control technology used in the administration base
INDUSTRY	Industrial activity of the small firm
LOCATION	Location of the small business

TRAINING	Has the small business applied for any local or central Government training schemes in the last three months?
GRANTS	Has the small business applied for any local or central Government grants in the last three months?
PRODUCT	Number of major product lines or major service groups
NEWPRODUCT	Number of new major product lines or major service groups added in the last twelve months
REVENUE	Percentage of sales revenue accounted for by the major product line or service group
CUSTOMERS	Total number of customers
NEWCUSTOMERS	Number of new customers in the past twelve months
SUPPLIERS	Total number of suppliers
NEWSUPPLIERS	Number of new suppliers in the past twelve months
DISTCUSTOMERS	Distribution of the majority of customers from operational premises
DISTSUPPLIERS	Distribution of the majority of suppliers from operational premises
COMPETITION	Number of direct competitors
SIZECOMP	Employment size of major competitor

Table 1 Correlation Coefficients Between the Total Number of Employees Employed (Y_1) in the Small Firms and SMall Firm Characteristics

Independent variables	Hypothesised direction of relationship	Pearson correlation coefficient (r)	Coefficient of determination (r^2)	Level of significance of 'r'	Number of observations (n)
SHAREHOLDERS	+	0.27	0.07	0.000	232
OWNERS	-	0.16	0.03	0.009	216
EXECUTIVES	-	0.15	0.02	0.022	188
FOUNDERS	+	-0.01	0.00	0.450	167
AGE	+	0.36	0.13	0.000	242
MAN	+	0.21	0.04	0.001	243
SOLE	+	0.05	0.00	0.228	242
MANINDEX	+	-0.04	0.00	0.271	241
PLANMAN	+	0.17	0.03	0.002	247
PLANPROF	+	0.00	0.00	0.473	247
PLANBUS	+	-0.05	0.00	0.234	247
MANTRAIN	+	0.29	0.08	0.000	228
FINANCE	+	0.06	0.00	0.179	245
PRODUCTION	+	0.05	0.00	0.316	92
AGEPROD	-	0.46	0.21	0.000	95
CSADMIN	+	0.11	0.01	0.039	244
INDUSTRY	+/-	0.01	0.00	0.453	245
LOCATION	+	0.08	0.01	0.099	241
TRAINING	-	-0.18	0.03	0.002	239
GRANTS	-	-0.03	0.00	0.311	244
PRODUCT	+	-0.03	0.00	0.349	227
NEWPRODUCT	+	-0.04	0.00	0.299	204
REVENUE	-	-0.09	0.01	0.099	218
CUSTOMERS	+	0.32	0.10	0.000	243
NEWCUSTOMERS	+	0.24	0.06	0.000	236
SUPPLIERS	+	0.30	0.09	0.000	238
NEWSUPPLIERS	+	0.18	0.03	0.003	225
DISTCUSTOMERS	+	0.16	0.03	0.006	243
DISTSUPPLIERS	+	0.03	0.00	0.350	238
COMPETITION	-	0.01	0.00	0.454	230
SIZECOMP	+/-	0.33	0.11	0.000	190

Note: 'r' value has a level of significance of 0.05 or less.

Table 2 Correlation Coefficients Between the Level of Sales For the Last Financial Year (Y_2) In the Small Firms and Small Firm Characteristics

Independent variables	Hypothesised direction of relationship	Pearson correlation coefficient (r)	Coefficient of determination (r^2)	Level of significance of 'r'	Number of observations (n)
INTERNAL FACTORS					
SHAREHOLDERS	+	0.07	0.01	0.143	227
OWNERS	-	0.21	0.04	0.001	210
EXECUTIVES	-	0.17	0.03	0.010	183
FOUNDERS	+	-0.02	0.00	0.381	163
AGE	+	0.38	0.15	0.000	236
MAN	+	0.14	0.02	0.018	236
SOLE	+	0.01	0.00	0.432	235
MANINDEX	+	-0.06	0.00	0.187	234
PLANMAN	+	0.22	0.05	0.000	240
PLANPROF	+	-0.04	0.00	0.278	240
PLANBUS	+	-0.01	0.00	0.467	240
MANTRAIN	+	0.27	0.07	0.000	222
FINANCE	+	0.06	0.00	0.183	240
PRODUCTION	+	-0.00	0.00	0.487	89
AGEPROD	-	0.36	0.13	0.000	92
CSADMIN	+	0.07	0.01	0.136	238
INDUSTRY	+/-	0.08	0.01	0.104	239
LOCATION	+	0.22	0.05	0.000	235
TRAINING	-	-0.06	0.00	0.181	233
GRANTS	-	0.06	0.00	0.160	238
PRODUCT	+	-0.09	0.01	0.093	220
NEWPRODUCT	+	-0.03	0.00	0.352	198
REVENUE	-	-0.80	0.01	0.117	218
CUSTOMERS	+	0.39	0.15	0.000	238
NEWCUSTOMERS	+	0.18	0.03	0.003	230
SUPPLIERS	+	0.33	0.11	0.000	233
NEWSUPPLIERS	+	0.17	0.03	0.007	219
DISTCUSTOMERS	+	0.16	0.03	0.006	238
DISTSUPPLIERS	+	0.09	0.01	0.097	233
COMPETITION	-	0.07	0.01	0.137	224
SIZECOMP	+/-	0.35	0.12	0.000	184

Note: 'r' value has a level of significance of 0.05 or less.

Table 3 Correlation Coefficients Between the Level of Trading Profit / Loss For the Last Financial Year (Y_3) in the Small Firms and Small Firm Characteristics

Independent variables	Hypothesised direction of relationship	Pearson correlation coefficient (r)	Coefficient of determination (r^2)	Level of significance of 'r'	Number of observations (n)
SHAREHOLDERS	+	0.13	0.02	0.026	221
OWNERS	-	0.21	0.04	0.001	204
EXECUTIVES	-	0.19	0.04	0.005	178
FOUNDERS	+	-0.02	0.00	0.385	159
AGE	+	0.35	0.12	0.000	230
MAN	+	0.08	0.01	0.110	230
SOLE	+	0.02	0.00	0.404	229
MANINDEX	+	-0.06	0.00	0.187	228
PLANMAN	+	0.02	0.00	0.402	234
PLANPROF	+	-0.12	0.01	0.029	234
PLANBUS	+	-0.17	0.03	0.006	234
MANTRAIN	+	-0.18	0.03	0.003	234
FINANCE	+	0.17	0.03	0.005	216
PRODUCTION	+	0.06	0.00	0.277	91
AGEPROD	-	0.40	0.16	0.000	94
CSADMIN	+	-0.05	0.00	0.205	232
INDUSTRY	+/-	0.03	0.00	0.313	233
LOCATION	+	0.16	0.03	0.007	229
TRAINING	-	-0.03	0.00	0.321	227
GRANTS	-	0.05	0.00	0.217	232
PRODUCT	+	-0.05	0.00	0.238	215
NEWPRODUCT	+	0.04	0.00	0.314	193
REVENUE	-	0.08	0.01	0.130	213
CUSTOMERS	+	0.21	0.05	0.001	232
NEWCUSTOMERS	+	0.14	0.02	0.021	225
SUPPLIERS	+	0.13	0.02	0.030	227
NEWSUPPLIERS	+	0.06	0.00	0.212	214
DISTCUSTOMERS	+	0.06	0.00	0.194	232
DISTSUPPLIERS	+	-0.04	0.00	0.253	227
COMPETITION	-	-0.06	0.00	0.180	218
SIZECOMP	+/-	0.14	0.02	0.032	183

Note: 'r' value has a level of significance of 0.05 or less.

Table 4 Standardisation of Small Firm Characteristics Using A Varimax Rotated Principal Components Analysis

Variables	Varimax rotated components											Communality (h^2)
	1	2	3	4	5	6	7	8	9	10	11	
SHAREHOLDERS	0.01	0.17	-0.13	0.07	-0.01	0.07	-0.04	0.14	0.12	-0.78	-0.08	0.71
OWNERS	-0.04	0.03	0.90	-0.00	0.01	0.02	-0.07	-0.01	0.05	0.07	-0.04	0.83
EXECUTIVES	-0.02	-0.01	0.86	0.13	-0.04	0.15	0.06	0.05	0.07	0.07	0.04	0.80
FOUNDERS	0.03	-0.14	-0.12	-0.05	0.05	-0.77	0.06	0.05	0.03	-0.01	-0.03	0.64
AGE	0.24	0.30	0.35	0.02	-0.19	0.58	-0.09	-0.04	0.02	-0.08	-0.02	0.66
MAN	0.24	0.21	0.02	0.09	0.04	-0.08	0.13	0.05	-0.03	0.06	0.78	0.75
SOLE	0.13	0.04	-0.01	0.03	0.91	-0.08	0.07	0.06	0.01	0.03	0.26	0.93
MANINDEX	0.03	-0.05	-0.04	0.04	0.92	0.01	-0.01	0.05	-0.03	-0.00	-0.25	0.92
PLANMAN	-0.04	0.03	0.11	0.70	0.03	-0.01	-0.00	0.10	0.09	-0.04	-0.11	0.54
PLANPROF	-0.15	-0.18	-0.11	0.57	0.01	-0.13	-0.04	-0.14	-0.19	-0.05	-0.13	0.49
PLANBUS	0.06	-0.12	-0.27	0.36	0.23	0.22	0.07	-0.05	-0.26	0.25	0.04	0.46
MANTRAIN	0.05	0.14	0.12	0.54	0.00	0.10	0.12	0.02	-0.04	0.01	0.14	0.37
FINANCE	0.05	0.20	0.09	0.04	-0.11	-0.48	-0.09	-0.09	-0.27	0.07	0.14	0.41
PRODUCTION	0.86	-0.06	-0.06	-0.02	0.08	-0.07	-0.00	-0.02	-0.11	0.01	0.08	0.78
AGEPROD	0.74	0.10	0.18	-0.02	0.04	0.35	-0.02	0.07	-0.02	0.02	0.03	0.72
CSADMIN	0.45	-0.13	-0.10	0.48	0.01	-0.01	-0.15	0.03	0.03	0.07	0.35	0.61
INDUSTRY	-0.80	0.20	0.07	-0.01	-0.07	0.09	-0.02	-0.02	0.10	-0.05	-0.05	0.71
LOCATION	-0.12	0.13	0.15	-0.00	0.04	0.06	-0.14	-0.08	0.74	-0.07	0.08	0.64
TRAINING	-0.06	-0.14	-0.06	-0.21	-0.15	-0.08	0.12	0.36	0.39	0.12	-0.19	0.45
GRANTS	-0.25	0.01	-0.15	-0.16	-0.00	0.31	-0.09	0.10	0.45	0.38	-0.16	0.60
PRODUCT	-0.08	0.01	-0.02	0.05	-0.03	0.14	0.81	-0.05	0.01	0.07	0.06	0.70
NEWPRODUCT	0.04	0.09	-0.01	-0.02	0.08	-0.21	0.79	-0.00	-0.08	-0.07	-0.13	0.71
REVENUE	-0.12	-0.12	-0.03	-0.20	-0.06	0.01	-0.36	0.00	0.01	-0.04	0.57	0.53
CUSTOMERS	-0.09	0.85	0.07	-0.03	0.02	0.15	0.07	-0.03	0.02	-0.06	0.02	0.77
NEWCUSTOMERS	-0.18	0.81	-0.07	-0.04	-0.03	0.01	0.05	-0.02	-0.02	-0.12	0.09	0.72
SUPPLIERS	0.30	0.50	0.07	0.37	0.04	0.00	0.05	0.14	0.13	0.44	-0.06	0.72
NEWSUPPLIERS	0.15	0.46	0.18	0.35	-0.05	-0.34	-0.05	0.13	0.07	0.43	-0.09	0.72
DISTCUSTOMERS	0.39	-0.03	-0.04	0.11	0.08	-0.12	-0.08	0.64	-0.19	-0.08	-0.03	0.65
DISTSUPPLIERS	0.16	0.14	-0.11	-0.10	0.11	-0.05	-0.17	0.43	-0.54	0.32	0.03	0.69
COMPETITION	-0.42	-0.08	0.10	0.09	0.09	0.15	-0.03	0.38	0.24	0.19	0.16	0.50
SIZECOMP	-0.12	0.04	0.06	0.01	0.04	0.05	-0.00	0.76	0.00	-0.09	0.05	0.61
Eigenvalue	2.92	2.29	2.00	1.91	1.86	1.76	1.60	1.58	1.55	1.43	1.42	20.32
Per cent of variance	9.4	7.4	6.5	6.2	6.0	5.7	5.2	5.1	5.0	4.6	4.6	
Cumulative % of variance	9.4	16.8	23.3	29.5	35.5	41.2	46.4	51.5	56.5	61.1	65.7	

Table 5 Cluster Characteristics of Small Firm Types

Variables	Clusters								Global Mean	Standard Deviation
	1	2	3	4	5	6	7	8		
SHAREHOLDERS	44.87	3.45	4.89	5,464 *	38.36	5.51	3.00	4.00	897.86	12,735.73
OWNERS	1.67	1.61	1.67	1.81	2.00 *	1.34	1.00 **	1.00 **	1.63	0.83
EXECUTIVES	1.80	2.04	1.73	2.07	2.18 *	1.50	1.00 **	1.00 **	1.82	0.94
FOUNDERS	2.65	2.60	1.83 *	2.05	2.13	2.67	1.00 **	2.00	2.44	1.76
AGE	28.70	19.26	32.61	34.31	45.42 **	14.43 *	30.00	4.50 **	26.40	35.06
MAN	9.46	9.81	8.44 *	9.58	10.67 *	10.02	14.00 ***	4.50 **	9.56	3.96
SOLE	4.01	5.00 *	3.27	3.89	2.92 *	3.66	6.00 **	3.50	3.91	3.73
MANINDEX	0.46	0.50	0.46	0.44	0.30 *	0.39	0.43	0.78 **	0.44	0.36
PLANMAN	4.66	4.97 *	3.79 *	3.93 *	4.46	4.83	5.00 *	3.00 **	4.48	1.93
PLANPROF	3.20	3.35	2.97 *	3.30	3.19	3.41	4.00 **	4.00 **	3.26	1.12
PLANBUS	3.99	4.39	3.60	4.10	3.29	4.24	5.00 *	3.00 *	4.02	1.94
MANTRAIN	1.50	1.62	1.60	1.44	1.75 *	1.61	1.00 ***	1.50	1.56	0.50
FINANCE	0.78	0.87	0.82	0.83	1.00	0.85	0.00 **	0.00 **	0.82	0.93
PRODUCTION	2.74	3.00 *	2.80	2.83	3.00 *	2.78	0.00 **	0.00 **	2.81	0.59
AGEPROD	157.72	121.00	167.70	179.19	247.20 **	86.50 *	0.00 **	0.00 **	142.52	149.14
CSADMIN	9.62	9.35	8.86 *	9.33	10.18 *	10.02	11.00 **	7.50	9.53	2.21
INDUSTRY	1.86	2.00	2.21 *	1.91	1.67	1.63 *	3.00 ***	3.00 ***	1.89	0.94
LOCATION	1.51	1.41	1.46	1.57 *	1.42	1.24 *	1.00 **	1.00 **	1.43	0.50
TRAINING	1.89	1.87	1.81	1.89	1.92	1.87	2.00 *	2.00 *	1.87	0.33
GRANTS	1.84	1.74	1.86	1.75	1.83	1.63 *	2.00 **	2.00 **	1.77	0.42
PRODUCT	204.61	41.07	6.93	14.66	16.60	7.28	1.00	5.50	68.99	708.00
NEWPRODUCT	4.15	5.46	1.27	1.46	4.90	1.45	0.00 *	0.00 *	2.96	11.29
REVENUE	68.82	69.85	70.76	66.25	74.38	67.80	100.00 ***	100.00 ***	69.26	28.51
CUSTOMERS	3.94	3.74	3.96	3.75	3.55	3.17 *	1.00 ***	1.00 ***	3.66	1.60
NEWCUSTOMERS	2.44	2.13	2.57	2.41	2.09	1.87 *	0.00 ***	0.00 ***	2.26	1.42
SUPPLIERS	2.59	2.37	2.36	2.51	3.09 *	2.37	3.00 *	2.50	2.50	1.11
NEWSUPPLIERS	1.31	1.24	1.21	1.18	1.60 **	1.22	1.00 *	1.00 *	1.26	0.56
DISTCUSTOMERS	3.54	3.29	3.55	3.08 *	4.09 *	3.83	1.00 ***	5.50 ***	3.53	1.57

Variables	Clusters								Global Mean	Standard Deviation
	1	2	3	4	5	6	7	8		
DISTSUPPLIERS	3.56	3.17	3.55	3.76	3.91 *	3.46	3.00 *	3.50	3.53	1.49
COMPETITION	3.93	3.74	3.35 *	3.97	3.92	3.56	3.00 *	3.50	3.74	1.52
SIZECOMP	3.58	3.08	4.20 *	3.20	4.00 *	3.31	3.00	2.50 *	3.46	2.03
Number of firms in the cluster	63	31	29	36	12	48	1	2		

Notes: * Cluster mean which deviates by more than a quarter of a standard deviation from the respective global mean is underlined;
** Cluster mean which deviates by more than half a standard deviation from the respective global mean is underlined; and
*** Cluster mean which deviates by more than a standard deviation from the respective global mean is underlined.

Table 6 Total Employment Size of the Small Firms

Cluster	Total employment size								Total	
	1-9		10-25		26-49		≥50			
	No	%	No	%	No	%	No	%	No	%
1	13	21.0	20	32.3	15	24.2	14	22.6	62	100.1
2	5	16.1	13	41.9	11	35.5	2	6.5	31	100.0
3	8	28.6	9	32.1	4	14.3	7	25.0	28	100.0
4	12	33.3	7	19.4	10	27.8	7	19.4	36	99.9
5	3	25.0	4	33.3	2	16.7	3	25.0	12	100.0
6	12	25.5	14	29.8	11	23.4	10	21.3	47	100.0
Total	53	24.5	67	31.0	53	24.5	43	19.9	216	99.9

X^2= 12.20 d.f.= 15 Significance= 0.6641 Accept H_0

Table 7 Level of Sales for the Last Financial Year

Cluster	Level of sales for the last financial year						Total	
	≤£249,999		£250,000-£999,999		£1m or more			
	No	%	No	%	No	%	No	%
1	14	23.3	22	36.7	24	40.0	60	100.0
2	10	34.5	13	44.8	6	20.7	29	100.0
3	10	37.0	5	18.5	12	44.4	27	99.9
4	14	38.9	8	22.2	14	38.9	36	100.0
5	2	20.0	1	10.0	7	70.0	10	100.0
6	13	27.1	21	43.8	14	29.2	48	100.1
Total	63	30.0	70	33.3	77	36.7	210	100.0

X^2= 17.06 d.f.= 10 Significance= 0.0730 Accept H_0

Table 8 Number of Businesses Operating at the Following Levels of Profitability for the Last Financial Year

Cluster	Level of profitability for the last financial year						Total	
	Profit		Loss		Break-even			
	No	%	No	%	No	%	No	%
1	44	73.3	12	20.0	4	6.7	60	100.0
2	25	86.2	1	3.4	3	10.3	29	99.9
3	23	82.1	3	10.7	2	7.1	28	99.9
4	32	88.9	3	8.3	1	2.8	36	100.0
5	8	72.7	3	27.3	0	0.0	11	100.0
6	37	77.1	9	18.8	2	4.2	48	100.1
Total	169	79.7	31	14.6	12	5.7	212	100.0

Table 9 Rating the Businesses Profit Performance Relative to Competition

Cluster	Rating the businesses profit performance relative to competition						Total	
	Good		About average		Poor			
	No	%	No	%	No	%	No	%
1	34	58.6	16	27.6	8	13.8	58	100.0
2	15	55.6	7	25.9	5	18.5	27	100.0
3	15	60.0	6	24.0	4	16.0	25	100.0
4	16	47.1	11	32.4	7	20.6	34	100.1
5	8	80.0	2	20.0	0	0.0	10	100.0
6	28	63.6	13	29.5	3	6.8	44	99.9
Total	116	58.6	55	27.8	27	13.6	198	100.0

Table 10 Bivariate Correlations at the 0.05 Level of Significance

Small firm characteristics variables	Performance measures		
	Employees	Sales	Profit
SHAREHOLDERS	Yes	No	Yes
OWNERS	Yes	Yes	Yes
EXECUTIVES	Yes	Yes	Yes
FOUNDERS	No	No	No
AGE	Yes	Yes	Yes
MAN	Yes	Yes	No
SOLE	No	No	No
MANINDEX	No	No	No
PLANMAN	Yes	Yes	No
PLANPROF	No	No	Yes
PLANBUS	No	No	Yes
MANTRAIN	Yes	Yes	Yes
FINANCE	No	No	Yes
PRODUCTION	No	No	No
AGEPROD	Yes	Yes	Yes
CSADMIN	Yes	No	No
INDUSTRY	No	No	No
LOCATION	No	Yes	Yes
TRAINING	Yes	No	No
GRANTS	No	No	No
PRODUCT	No	No	No
NEWPRODUCT	No	No	No
REVENUE	No	No	No
CUSTOMERS	Yes	Yes	Yes
NEWCUSTOMERS	Yes	Yes	Yes
SUPPLIERS	Yes	Yes	Yes
NEWSUPPLIERS	Yes	Yes	No
DISTCUSTOMERS	Yes	Yes	No
DISTSUPPLIERS	No	No	No
COMPETITION	No	No	No
SIZECOMP	Yes	Yes	Yes