



**SWP 25/90 DISCRIMINATING FACTORS IN THE STRATEGIC
PROFILE OF 'SMALL' AND 'LARGE' SMALL FIRMS**

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INTRODUCTION

The election of Mrs. Thatcher's first Conservative Government in 1979 heralded a shift in economic policy in the United Kingdom from conventional 'demand' management to one which gave priority to the 'supply-side'. Within this context, the timely publication of a report on the 'The Job Generation Process' in the United States by David Birch (1979) provided an important new focus in economic policy for many western economies - the small firm sector.

Using Dunn and Bradstreet Market Identifier files as his data base, Birch studied the employment profile of American industry and commerce during the period 1969 to 1976. His most quoted and most used result was that 66% of net new jobs were created in firms with 20 or less employees, and 80% in firms with 100 or less employees. Since the publication of the report, debate on its methodological limitations, and thus its accuracy, has been fierce (Armington and Odle, 1982; Birley, 1984; Storey and Johnson, 1986, 1987; Gallagher and Doyle, 1986; Gallagher and Stewart, 1986). Moreover, subsequent researchers have warned that these are aggregate results, and that job generation will vary according to region (Gudgin, 1978; Birch, 1979; Cross, 1981; Birley, 1986; Gudgin et al., 1989; Williams, 1989; for a dissenting view see Dobson, 1989, p.623), industrial sector (Acs and Audretsch, 1989; Williams, 1989), to time period (Kirchhoff and Phillips, 1988, p.266; Teitz et al., 1981; Dobson, 1989), and to country (Bollard and Harper, 1986). However, despite these various caveats, researchers continue to agree that the overall conclusion, that small firms make a major contribution to job generation, remains robust (Birch, 1987; Kirchhoff and Phillips, 1988; Williams, 1989).

Interestingly, Williams (1989, p.22) in Australia has shown that 'larger small' enterprises (over 15 employees) are significantly more likely to survive and are more fertile job creators than the 'smaller smalls'. Dobson (1989, p.623) has presented evidence in his study of manufacturing employment

change in West Yorkshire that "the key discriminating factor, as in other works, is establishment size". Similarly, his results lend support to the idea that it is among small plants (between 11 and 20 employees) that the potential for employment growth is most likely. Bollard and Harper (1986, p.20) also found that 6 to 20 employment size class in a comparative sense had a slightly higher net job generation rate, and gross employment growth rates showed an "inverse relationship to establishment size: smaller units generate new jobs at the highest rate" (p.25). These authors concluded that (p.26) "the 6-20 employees grouping appears particularly dynamic in this respect and may repay further study for policy purposes". However, a dissenting view has been presented by Kirchoff (1989, p.14-15) who indicates that a greater concentration of net employment increase in Massachusetts was among firms with more than 500 employees.

It has been suggested by Cooper et al., (1989) that one important factor in understanding diversity in entrepreneurship is the initial employment size of the firm. Survey results from the United States have indicated that smaller ventures (25 employees or less at the time of the first survey) showed larger percentage increases in sales and also higher increases in absolute and percentage increases in numbers of employees. Based on this empirical evidence these authors concluded that, "...the growth of the smaller start-ups suggests that even those ventures that appear to have few resources and modest potential can, in the aggregate, contribute substantially to the economy" (p.318).

Further, on a note of caution, studies in the United States (Birley, 1986) and the United Kingdom (Johnson, 1987) suggest that this increase in the small firm sector's share of total employment is not necessarily due to any change in the sectoral employment creation pattern but rather due to the concurrent contraction of large firms (Shutt and Whittington, 1984). Moreover, in their study of the Job Generation Process in Great Britain, Fothergill and Gudgin (1979) could find no real evidence that small and new firms are an "overwhelming source of new jobs". Further, in his evaluation of the Gallagher and Doyle (1986) study in the United Kingdom, Hart (1987) concluded that "their case is not proven, although there are features of recent experience which may point in that direction".

The above conclusions are based upon large sample studies of small firms and reflect the overall behaviour of the sector. However, small firms are not all alike and should not be regarded as a

homogeneous entity with equal potential or, indeed, enthusiasm for growth (O'Farrell and Hitchins, 1988, p.1375). Some do not have either the inclination, expertise, or resources to grow, whilst others constrain their growth for fear of, for example, the loss of ownership through acquisition, or of managerial control. Moreover, these broad statements about the job generation potential are being espoused at a time when other small business economists are searching for a better understanding of the size dimension - how and why firm behaviour varies with size, what determines the formation, growth and dissolution of firms, what is the role of small firms in the introduction of new products and the evolution of industries, and what are the dynamic relationships between small firms and the macroeconomic variables of output and employment (Brock and Evans, 1989, p.7). Of particular relevance to this study is recent work by Evans (1987a, 1987b) and Dunne et al, (1987) who found that -

1. Firm growth decreases with firm size for firms of the same age and decreases with firm age for firms of the same size (see also Jovanovic, 1982).
2. The variability of firm growth decreases with firm age for firms of the same size and, to a weaker extent, with firm size for firms of the same age.
3. The probability that a firm will fail over a given period of time decreases with firm size for firms of the same age and decreases with firm age for firms of the same size.

However, as Brock and Evans (1989, p.12) note, what is not clear from these results are the reasons for the 'age-size-growth' regularities.

THIS RESEARCH

The research outlined above indicates that there is little detailed knowledge of the characteristics of small firms in relation to their size, as measured by the number of employees. Moreover, there is no guidance in the literature as to the possible relevant characteristics within the total spectrum of the firms' strategic profile. Therefore, this paper poses one basic research question -

Are there any significant differences in the strategic profile of 'small' small firms, and 'large' small firms?

DEFINING THE SMALL FIRM

Defining what is meant by a 'small' firm is not only a prerequisite for research itself, but is also required for realistic policy-making by national and local government (Curran and Stanworth, 1984, p. 128). Unfortunately, definition of a 'small' firm is not a simple matter. Neck (1977), for example, quoted an American study in 1975 which identified more than fifty statistical definitions of a small firm in seventy-five countries. Not surprisingly, he suggested that the criteria for 'small' should vary according to the context of the study. In the United Kingdom Bolton (1971) emphasised the need for a clear 'economic' as distinct from 'statistical' definition of small firms, and suggested that true small firms are those that have: relatively small market shares; a high degree of personalised owner-management; independence in that they do not form part of a larger enterprise; and that the owner-managers should be free from outside control in taking their principal decisions (Bolton, 1971, p.1-2). Moreover, the quantitative indicator for empirical research for the manufacturing sector had an upper limit of 200 employees. Since 1971 the Bolton statistical definition has increasingly been adopted in the United Kingdom but over the subsequent twenty-eight year time period technological changes have progressively led to increased capital ratios as well as a dramatic increase in the value of output / sales per person employed. Using measures of output or sales turnover, a firm employing 200 employees twenty years ago would need at most today some 100 employees to maintain its size (Jackson, 1988, p. 17). Increasingly, therefore, this limit of 200 employees is recognised as being far too high (Curran and Stanworth, 1984, p.129), although some researchers continue to use even higher limits. For example, in a recent study on job generation in the United States, Acs and Audretsch (1989) imply an upper limit of 500 employees.

However, Curran and Burrows (1989) have argued that quantitative definitions of small firm size imply a false homogeneity among the economic units being distinguished. These authors argue that, "Quantitative definitions do have the appeal of precision but...this precision is often spurious" (1989, p.264). Further, Curran and Stanworth (1986) have suggested that often quantitative definitions have led to a 'size-reductionism' in the explanations and interpretations offered. Building on the work of Rainnie (1988) it is suggested by Curran and Burrows (1989, p.267) that there is a "...a need to ensure that small scale activities are conceptualised as a part of a wider economic order and not seen as isolated form or only dualistically related to it". Moreover, they propose a non-quantitative

approach to the problem of conceptualisation which combines legal independence with definitions of 'size' grounded in the meaning and experiences of those engaged in various kinds of economic activity. These authors do, however, appreciate that, "Of course, 'size' plays some part in the way the economic unit functions but only in relation to the other factors...[economic or industrial sector (or subsector), technology, locality, labour and product markets or wider economic structure of the economy as a whole]...and often only in an indirect way as a mediating influence" (1989, p.264-265).

At the lower end of the size spectrum, results from a random sample of 909 members of a national household panel in the USA have recently indicated that more than three quarters of the respondents believed that the maximum number of employees which a business can have and still be called 'small' was 25 (Peterson et al., 1986, p.65). After the conceptual problems surrounding the term 'small' the latter 'quantitative' result is intuitively appealing to these researchers. Therefore, for the purposes of this paper, small firms will be defined as follows:

- * 'Small' small firms= 25 or fewer employees
- * 'Large' small firms= 26 or more employees

DATA COLLECTED

The paper draws upon data from 245 independent small firms in the Cranfield Small Firms Data Base (CSFDB) almost equally split between 'small' firms (25 or fewer total employees in size) (56.7%) and 'large' firms (26 or more total employees in size) (43.8%). The CSFDB was set up to monitor the changes in the strategic profiles of a sample of small firms. The data collected is wide ranging, and for each company includes performance measures, balance sheet structure, cost structure, employment profile, ownership structure, management structure, product width and depth, customer and supplier profiles, manufacturing, marketing and financial strategies, and sources of external advice and assistance. Firms in the sample are from a diverse range of industries, both service and manufacturing, account for approximately £318 million of sales revenue, range in size from 1 to 181 employees, and from less than £100,000 in sales to greater than £10 million. In total 7,901 people were employed in the 245 firms which supplied data with 139 'small' firms accounting for 1,681 total employees, whilst 106 'large' firms accounted for 6,220 total employees. For a full description of the

data collection methods see Birley and Westhead (1988a), and of the sample characteristics see Birley and Westhead (1988b).

RESULTS

Chi-Squared analyses were first conducted to identify individual differences between 'small' and 'large' firms. For three variables listed in Table 1 it was not possible to compute a Chi-Squared statistic due to the assumptions of the test. However, the first part of the results section below describes the individual analyses in more detail.

Ownership and employment patterns

Industry: No significant difference was recorded between the industrial characteristics of the small firms surveyed in the two employment size groups (Criteria 1 in Table 1). Although, a slightly larger proportion of 'small' (48.2%) rather than 'large' firms (43.4%) were engaged in manufacturing activities.

Location: With regard to the location of firms no statistically significant difference was recorded between firms in the two employment size groups, although there is some evidence that most 'large' firms were located in the generally more affluent and buoyant 'south' of the United Kingdom (the standard regions of East Anglia, the South East and the South West of England) (55.2%) than in the 'north' (the remaining standard regions of the United Kingdom) (Criteria 2).

Ownership: Over 66% of 'small' firms were first generation current majority owners compared with only 44.7% of 'large' firms (Criteria 3). In contrast, 'large' firms had a greater tendency either to have owners with no relationship to the original founders, or to be family succession firms (9.9% compared to 29.8%). Similarly, over 62% of 'small' firms had current first generation senior executives, whilst senior executives in 37.9% of 'large' firms had no relationship to the founders family (Criteria 4). This point is reinforced when it is noted that a significantly greater number of 'large' firms had no original founders who were still partners or shareholders (18.9% and 43.3% in 'small' and 'large' firms, respectively)

(Criteria 5). Not surprisingly, a significantly larger proportion of 'large' firms had more than 2 shareholders / partners (43.7% and 74.2% in 'small' and 'large' firms, respectively) (Criteria 6).

Age: Preliminary analysis of the data suggests that the total employment size of firms in the sample is directly related to the age of the businesses (Criteria 7). Significantly more 'small' firms were less than 6 years old (36.2% and 10.8% in 'small' and 'large' firms, respectively), whilst a markedly higher proportion of 'large' firms were more than 45 years old (6.5% and 37.3% in 'small' and 'large' firms, respectively).

Employment: Over 47% of all firms had no part-time directors (i.e. non-executive directors) (Criteria 8). Moreover, Table 2 shows total employment by industrial category . The majority of total employment in 'small' firms (43.7%) is concentrated in the two manufacturing sectors of 'other manufacturing' and 'metal goods, engineering and vehicles' (416 and 314 employees, respectively). In 'large' firms total employment is more evenly distributed amongst the surveyed firms but 57.0% of total employment was concentrated in 'distribution, hotels, catering, repairs' (1,368 employees), 'metal goods, engineering and vehicles' (1,111 employees) and 'other manufacturing' (1,069 employees). It also must be noted that whilst the one 'large' firm in 'agriculture, forestry and fishing' would appear to be significantly larger than the rest in this group, analysis of the data by employment status shows these jobs to be mainly casual.

Sales

Sales: As expected, significantly more 'large' firms had sales of £1 million or more (12.2% and 66.7% in 'small' and 'large' firms, respectively), whilst over 49% of 'small' firms had sales of less than £250,000 (Criteria 9 in Table 1). Moreover, a slightly larger proportion of 'small' rather than 'large' firms obtained over 80% of their sales revenue on the basis of their major product or service (50.8% and 36.2% in 'small' and 'large' firms, respectively) (Criteria 10).

Profitability

Profit: Over 77% of both sizes of firms had made a profit in the last financial year but a slightly larger percentage of 'small' firms had either made a loss (14.4%) or were at break-even (7.6%) point (Criteria 11). There was no difference between firms in the two size groups with regard to their rating their businesses profit performance relative to competition, although, a slightly larger percentage of 'large' rather than 'small' rated their businesses profit performance as being better than average (54.9% compared to 59.6%) (Criteria 12).

Product base

Product lines: Significantly more 'large' firms rather than 'small' firms had more than ten major product lines or major service groups (8.5% and 19.6% in 'small' and 'large' firms, respectively), whilst a larger proportion of 'small' firms had only one major product line or major service group (28.7% and 15.5% in 'small' and 'large' firms, respectively) (Criteria 13). In both employment size groups over 54% of firms had not introduced a new major product or major service group in the last twelve months (Criteria 14).

Customers: Not surprisingly, significantly more 'large' rather 'small' firms had more than 100 customers (42.6% and 75.2% in 'small' and 'large' firms, respectively) (Criteria 15), whilst a larger proportion of 'small' firms had between 11 and 50 customers (32.4% and 9.5% in 'small' and 'large' firms, respectively). Over the past twelve months 'large' firms had a significantly greater tendency to have acquired more than 50 new customers (24.2% and 40.1% in 'small' and 'large' firms, respectively), whilst 'small' firms had a greater propensity to have acquired between 1 and 10 new customers (37.9% and 18.6% in 'small' and 'large' firms, respectively) (Criteria 16). 'Large' firms (41.3%) had a significantly greater proportion of their customers in nationwide locations than 'small' firms (24.6%) (Criteria 17). Indeed 'small' firms would appear to have a greater tendency to serve local markets within a radius of twenty miles from their operational premises (44.1% compared to 28.9%).

Suppliers: Significantly more 'small' firms tended to use fewer than eleven suppliers (28.6% and 3.8% in 'small' and 'large' firms, respectively), whilst a larger proportion of 'large' firms were served by more than 100 suppliers (10.5% compared to 36.5%) (Criteria 18). Also, a significantly larger proportion of

'large' firms had contacted more than 10 new suppliers in the past twelve months than their counterparts (15.8% and 31.1% in 'small' and 'large' firms, respectively) (Criteria 19). No difference was recorded between 'small' and 'large' firms with regard to the geographic location of the majority of suppliers serving the firms (Criteria 20).

Competition

Competition: In both size groups over 41% of firms stated they had less than eleven direct competitors (46.4% and 42.0% in 'small' and 'large' firms, respectively) (Criteria 21). Indeed, 5.5% of 'small' firms and 3.0% of 'large' firms felt that they had no direct competitors. A statistically significant difference was recorded between 'small' and 'large' firms in terms of the employment size of their major competitor (Criteria 22) with markedly more 'small' firms having a tendency to compete with firms less than 51 employees in size, whilst their larger counterparts had a greater propensity to have a major competitor which was greater than 100 employees in size.

Technology base

Production systems: The mean age of the oldest piece of production equipment owned by 'large' firms was significantly greater than that owned by 'small' firms ($t = -4.65$, significance = 0.000) (Table 3). However, no significant difference was recorded between the two groups with regard to the age of the newest piece of production equipment ($t = -0.55$, significance = 0.583). Also, no significant difference between 'small' and 'large' firms was recorded in terms of the mean cost of the most important piece of equipment bought in the last year ($t = -1.42$, significance = 0.159) (Table 4).

The leading technology used in control systems in both sizes of firms was manual and in only a few instances were personal computers, mini computers, computer mainframes and computer bureaux found to be appropriate control technologies and they were more readily adopted by 'large' firms. Interestingly, a significantly larger proportion of 'small' firms rather than 'large' firms had manual technology for the following control systems: sales ledger (64.2% compared to 21.9%), invoices (69.3% compared to 38.1%), payroll (65.0% compared to 15.2%), cash flow control (62.0% compared to 44.8%) and management accountants (59.9% compared to 38.1%).

Administration base: Significantly more 'small' firms rather than their 'larger' counterparts did not have access to at least one personal computer (53.4% and 38.1% in 'small' and 'large' firms, respectively), whilst a greater proportion of 'large' firms had the use of four or more personal computers (12.2% compared to 30.9%) (Criteria 23 in Table 1).

Financial data

Asset base: The majority of firms in the sample preferred to own rather than to hire or lease their assets, although there was a significantly greater tendency for 'large' firms to own premises (26.5% compared to 68.9%) and computers (44.1% compared to 65.1%). A significantly larger proportion of 'small' firms were also found to own their plant / equipment (75.0% compared to 89.6%) and to hire premises (49.3% compared to 21.7%).

Cost base: The leading component of the cost base of both size groups was salaries and wages and was about the same in both groups (38.7% and 39.6% in 'small' and 'large' firms, respectively) as was spending on sales and marketing (6.9% and 6.5% in 'small' and 'large' firms, respectively). When each of the above aspects of the cost base were subjected to a finer level of analysis (Criterion 24 to 31) rent (Criteria 27) and rates (Criteria 28) costs were found to be significantly higher in 'small' firms rather than 'large' firms. Also, the absolute level of interest payments were significantly higher in 'large' firms with a larger proportion having interest costs over £20,000 (6.7% and 30.2% in 'small' and 'large' firms, respectively) (Criteria 32).

Investment: Sources of received financial investment were different between the two employment size groups though not statistically significant. In 'small' firms the leading sources were employees, the family, a Development Board and the Government Loan Guarantee Scheme, whilst in 'large' firms the four leading sources of funds were employees, the family, a merchant bank and another company. A significantly larger proportion of 'small' rather than 'large' firms had received financial investment from at least one source (61.2% and 51.9% in 'small' and 'large' firms, respectively) (Criteria 33).

Insurance: Small firms in both size groups had similar levels of insurance for owners or directors personal liability, employers liability, life of the owners / partners, professional indemnity, product liability, credit and 'other'. However, significantly more 'large' rather than 'small' firms had insurance for export credit guarantee (Criteria 38), vehicle (Criteria 41), theft, flood (Criteria 42), buildings (Criteria 43) and plant / equipment (Criteria 44).

Management of the firm

Managerial functions: Over 70% of firms in both size groups operated the management functions of general management, finance, purchasing, accounting sales and marketing. However, a significantly greater number of 'large' firms operated area / regional management, finance, engineering, quality control, computer systems and stores functions. Moreover, a significantly larger proportion of 'large' firms currently operated more than twelve managerial functions (19.7% and 31.4% in 'small' and 'large' firms, respectively) (Criteria 46). In only the three functions of general management, finance and accounting did over 38% of both 'small' as well as 'large' firms state that these managerial functions were the sole responsibility of one person. In 'large' firms finance, accounting, sales, distribution, transport, engineering, quality control and computer systems were most likely to be the responsibility of one person. However, over 44% of both types of firms had between 1 and 4 managerial functions currently operated that were the sole responsibility of one person (Criteria 47). Surprisingly, a larger proportion of 'small' firms were associated with a managerial delegation score (number of managerial functions operated within the firm / number of managerial functions which are the sole responsibility of one person) over 0.50 (43.1% and 36.2% in 'small' and 'large' firms, respectively) (Criteria 48).

Planning: The majority of firms in both size groups held board meetings quarterly or even less frequently, though a larger proportion of 'small' firms stated that they never held board meetings (Criteria 49). In marked contrast, the majority of all firms hold management meetings either weekly or monthly (Criteria 50). Meetings with banks have a significantly greater tendency to be held in 'small' firms quarterly, whilst by 'large' firms they are either six monthly or annually (Criteria 51). However, meetings with an accountant in firms of both sizes was either quarterly, six monthly or annually (Criteria

52). Meetings with a solicitor in both size groups are more irregular depending upon particular circumstances and needs but a significantly larger proportion of 'small' firms had meetings at least on an annual basis (Criteria 53). In the market place 'small' firms were more likely to hold weekly meetings with major customers (Criteria 54), whilst meetings with major suppliers in both size groups were generally at intervals of no less than three months (Criteria 55).

Training: The frequency of regular training for management is a rarity in both 'small' (11.3%) and 'large' (15.7%) firms (Criteria 56). However, significantly more 'large' firms rather than their 'small' firm counterparts had undertaken some form of management training (47.6% compared to 70.6%). Interestingly, over 21% of firms stated in both groups that their workforce had never attended any training courses at all this being significantly more evident in 'small' firms rather than 'large' firms (47.1% compared to 21.3%) (Criteria 57).

Training schemes: In both size groups over 81% of firms had not applied for any local or central government training schemes in the last three months (90.3% compared to 81.6%) (Criteria 58). Also, over 59% of 'small' as well as 'large' firms had employed no Youth Training Scheme (YTS) trainees (75.2% and 60.0% in 'small' and 'large' firms, respectively) but 'large' firms had a significantly greater tendency to have employed two or more YTS trainees (10.2% compared to 24.7%) (Criteria 59).

Market research: Over 66% of firms in both size groups had never conducted a formal market research study (Criteria 60). For those firms which had conducted a study 'small' firms generally conducted them 'in-house', whilst 'large' firms used not only 'in-house' resources but consultants and market research companies (Criteria 61). In terms of the cost of the market research studies a larger proportion of 'large' firms spent over £1,000 (Criteria 62).

Sources of assistance

Agencies: 'Small' firms had a greater propensity to contact small firms assistance agencies than their 'larger' counterparts (Criteria 63). However, in both size groups the majority of firms had never

contacted a small firms assistance agency, and for those 'small' firms contacting an agency only 9.6% of the contacts were regular in frequency.

Sources of help: The leading sources of both advice and information in the two size groups remain the traditional sources of the accountant, the solicitor and the bank. The small amount of training in the two size groups was mainly provided by a local educational institution. In terms of the usefulness of the sources of advice and assistance firms rated the advice given on a scale from 1 'not at all useful' to 5 'very useful'. On average 'small' firms suggested that professional advisers (e.g. accountant, bank, consultants and solicitor) (mean score of 3.59) and business contacts (e.g. business contacts, customer, supplier and trade association) (mean score of 3.51) were the most helpful sources of advice and assistance. Similarly, for 'large' firms the two leading sources of advice and assistance were business contacts (mean score of 3.74) and professional advisers (mean score of 3.72).

DISCRIMINANT ANALYSIS

The results shown in Table 1 and discussed above show prime facie evidence for differences between 'small' and 'large' firms on a number of dimensions. Descriptive statistics and univariate tests of significance presented have provided basic information about the distributions of the variables and helped to identify some differences. However, in order to identify the combination of factors which best discriminated between 'small' and 'large' firms' in the sample, the data were further subjected to a stepwise discriminant analysis minimising the Wilks' lambda using the SPSSX statistical package (Norusis, 1985). Discriminant analysis is the appropriate statistical technique when the dependent variable is categorical (nominal or nonmetric) and involves deriving the linear combination of the variables which will discriminate best between the a priori defined groups (Hair et al., 1979; Klecka, 1980). It is widely regarded as a fairly robust technique for examining differences between two or more groups of objects with respect to several variables simultaneously (Norusis, 1985, p.73 and p.109). Thus, the technique allows differences between 'small' and 'large' firms to be identified and the results from the analysis provide a means to assign (and classify) any business into the total employment size group it most closely resembles.

Twenty-eight variables found to be significantly different at the 0.05 level of significance between the 'small' and 'large' firms detailed above were used in an exploratory discriminant analysis which was based upon data from 161 businesses. Five variables relating to the family relationship of senior executives, the mean age of the oldest piece of production equipment, the percentage of total costs accounted for by rent, the employment size of the firms major competitor and the frequency of training for the workforce were omitted because they had a large number of missing cases associated with them which would have reduced the efficiency of the exploratory discriminant analysis.

Table 5 shows the stepwise solution arrived after step 10 with each of the ten variables in the model having a significant Wilks' lambda. The calculated Wilks' lambda value (0.4217) for the final model is statistically significant indicating that the null hypothesis that the population means are equal can be rejected. The eigenvalue (1.3712) and the canonical correlation value (0.7604) for the discriminant function show that the substantive utility of the function is very high. A strong relationship exists among the two groups and the discriminant function which indicates that there is much more between-groups variability than within-group variability. Another indicator of the effectiveness of the discriminant function is the degree of predictive accuracy measured by the percentage of cases (or business) classified correctly. On the basis of the discriminant score, it is possible using the Bayes' rule for classifying businesses into one of the two groups ('small' and 'large' firms). A business is classified, based on its discriminant score into the group for which the posterior probability is largest. That is, it is assigned to the most likely group based on its discriminant score (Norusis, 1985, p. 82-83). The results of the analysis were deemed to be acceptable since the discriminating function correctly classified 208 out of 245 businesses (113 out of 139 'small' firms and 95 out of 106 'large' firms) (84.9%). The ten standardised canonical coefficients in Table 5 indicate the relative importance of the variable and are used to describe the significant differences between the 'small' and 'large' firm groups. The structure matrix shows how closely a variable and a discriminating function are related and a discriminant function is described on the basis of the structure matrix.

SUMMARY AND CONCLUSION

Clearly, the size divisions in this analysis are crude and there is a need for more detailed analysis of size-related factors in the growth of the firm. Nevertheless, by avoiding the temptation to make any a priori assumptions but rather by analysing all aspects of the strategic profile of the firm, the study presents some interesting findings which form the basis for future research. Recognising the complex and inter-related nature of the various aspects of the firm, and even in such small firms, the research has used discriminant analysis to identify those characteristics of the firms which best discriminate between the two size groups. The results fall into four main groupings - size, market, management, and assistance.

Size: The older firms in the sample are those with the higher sales revenues, and the greater number of employees, but not necessarily those with the more diverse ownership. On the surface, this is not a particularly surprising result. However, recent data has shown that in the majority of cases, the size of the firm tends to be set at the start, and that the larger new firms are those which tend to survive (Birley, 1987) beyond the first two or three years. Moreover, a recent study of retail establishments (King and Wicker, 1988) has shown that the 'death' rates of firms begins to decline steadily after the age of four. Therefore, it is the view of these researchers that the finding in this research is likely to reflect the natural evolution of the small firm sector.

Market: Interestingly, the larger firms do not appear to serve wider markets than their smaller colleagues, although they do tend to draw upon a wider supplier base.

Management: The results here do not support any particular trend in the development of systems and structures as the firm grows. From the large number of variables analysed, only a few emerged as discriminating between the two groups. In terms of systems, the larger the workforce the more likely that the firm had moved to a mechanised payroll system, but it did not follow that the firm had mechanised in other areas such as the sales ledger, or cash flow control. However, the larger firms did appear to have consolidated their asset base by the purchase, as opposed to lease or hire, of both their premises and plant and equipment. Along with this, they had also incurred building insurance

costs. However, there was no relationship between size and any other type of insurance, both small and large firms were equally likely to pay for professional indemnity, product liability, or vehicle insurance - or not.

The larger firms operated a wider range of managerial functions than the smaller firms, but this did not imply that they also delegated more. When a 'delegation index' was constructed which reflected the extent to which a managerial function was the sole responsibility of one person, the index did not survive the discriminant analysis. Size would appear not to be a factor in the cost structures analysed. The discriminant analysis found no evidence that the larger firms had a higher fixed cost structure, or that they spent proportionately more on, for example marketing or market research, with one gratifying exception. Larger firms would appear to indulge in more management training than the smaller firms.

Assistance: Firms were asked a variety of questions about the external advice and assistance which they sought. They were asked not only who they talked to, but also how useful was the assistance they received. The survey covered the whole spectrum of external influences on the firm - the professional advisers, business contacts, family and friends, and the small firms advisory network. Interestingly, only one emerged from the discriminant analysis. Smaller firms had had some contact with the small firms assistance agencies, the larger firms had not!

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Table 1 Statistically Significant Differences Between 'Small' and 'Large' Firms

Criteria	Chi-square (X^2)	Degrees of freedom (d.f)	Significant difference at the 0.01 level significance	Significant difference at 0.05 level of significance
1. Industry	1.01	2		NO
2. Location	3.31	1		NO
3. Family relationship of current majority owners	15.93	2	<u>YES</u>	
4. Family relationship of current senior executives	16.33	2	<u>YES</u>	
5. Number of original founders who are still partners or shareholders	18.23	4	<u>YES</u>	
6. Number of shareholders / partners, if other than a sole proprietorship	23.59	5	<u>YES</u>	
7. Age of the business	51.71	3	<u>YES</u>	
8. If the company is incorporated the number of the directors who do not work full-time in the firm	4.03	3		NO
9. Level of sales for the last financial year	92.65	2	<u>YES</u>	
10. Percentage of sales revenue accounted for by the major product line or service group	5.56	3		NO
11. Level of profitability for the last financial year	0.94	2		NO
12. Rating the business profit performance relative to competition	1.50	4		NO
13. Total number of major product lines or major service groups	14.76	5		<u>YES</u>
14. Total number of new major product lines or major service groups added in the last 12 months	2.30	2		NO
15. Total number of customers	31.86	3	<u>YES</u>	
16. Number of new customers in the past 12 months	14.96	4	<u>YES</u>	
17. Geographic location of majority of customers	11.32	5		<u>YES</u>
18. Total number of suppliers	38.49	3	<u>YES</u>	
19. Number of new suppliers in the past 12 months	10.09	2	<u>YES</u>	
20. Geographic location of majority of suppliers	6.70	5		NO
21. Number of direct competitors	4.44	5		NO
22. Employment size of major competitor	21.14	3	<u>YES</u>	
23. Total number of personal computers	12.85	4		<u>YES</u>
24. Percentage of total costs by salaries & wages costs	3.40	4		NO
25. Percentage of total costs by sales & marketing costs	2.41	4		NO
26. Percentage of total costs by training costs	2.29	3		NO
27. Percentage of total costs by rents costs	17.09	4	<u>YES</u>	
28. Percentage of total costs by rates costs	12.52	4		<u>YES</u>
29. Percentage of total costs by insurance costs	8.17	4		NO
30. Percentage of total costs by research & development costs	3.64	3		NO
31. Percentage of total costs by interest payments costs	6.76	4		NO
32. Interest cost for the last financial year (£'000s)	28.17	3	<u>YES</u>	
33. Number of sources of received financial investment	9.26	2	<u>YES</u>	
34. Owners or directors personal liability insurance	2.40	1		NO
35. Employers liability insurance	n.a.			
36. Life of the owners / partners insurance	1.47	1		NO
37. Professional indemnity insurance	0.00	1		NO
38. Export credit guarantee insurance	10.21	1	<u>YES</u>	
39. Product liability insurance	0.97	1		NO
40. Credit insurance	0.78	1		NO
41. Vehicle insurance	4.69	1		<u>YES</u>
42. Theft, flood insurance	5.45	1		<u>YES</u>
43. Buildings insurance	20.37	1	<u>YES</u>	
44. Plant / equipment insurance	9.09	1	<u>YES</u>	

Criteria	Chi-square (χ^2)	Degrees of freedom (d.f)	Significant difference at the 0.01 level significance	Significant difference at 0.05 level of significance
45. Other insurance	0.59	1		NO
46. Number of managerial functions currently operated	15.00	3	<u>YES</u>	
47. Number of managerial functions currently operated the sole responsibility of one person	4.33	4		NO
48. Managerial delegation score	12.10	4		<u>YES</u>
49. Frequency of board meetings	11.89	6		NO
50. Frequency of management meetings	n.a.			
51. Frequency of meetings with the bank	13.43	6		<u>YES</u>
52. Frequency of meetings with accountants	5.61	6		NO
53. Frequency of meetings with solicitors	9.00	3		<u>YES</u>
54. Frequency of meetings with major customers	11.54	5		<u>YES</u>
55. Frequency of meetings with major suppliers	11.97	6		NO
56. Frequency of majority training for management	12.20	2	<u>YES</u>	
57. Majority training for the workforce	5.66	1		<u>YES</u>
58. Has the business applied for any local or central government training schemes?	3.10	1		NO
59. Number of Youth Training Scheme (YTS) trainees currently employed	9.66	3		<u>YES</u>
60. Market research study conducted	0.00	1		NO
61. Who conducted the last formal market research study?	n.a.			
62. Cost of the last formal market research study (£'s)	7.85	2		<u>YES</u>
63. Frequency of contact with small firms assistance agencies	10.78	2	<u>YES</u>	

Note: n.a. Due to the assumptions of the Chi-Square test it was not possible to calculate a coefficient.

Table 2 Total Employment Size by Total Employment in Industrial Categories

Industry (1990 SIC)	Size					
	1-25			>26		
	Number of small firms	Total employment	Mean	Number of small firms	Total employment	Mean
0 Agriculture, forestry & fishing	1	7	7.00	1	181	181.00
1 & 2 Energy & water supply; Manufacture of metals & chemicals	10	138	13.80	8	497	62.13
3 Metal goods, engineering and vehicles	26	314	12.08	24	1,111	46.29
4 Other manufacturing	30	416	13.87	15	1,069	71.27
5 Construction	18	233	12.94	11	738	67.09
6 Distribution, hotels, catering, repairs	22	249	11.32	23	1,368	59.48
7 Transport & communication	4	58	14.50	4	150	37.50
8 Banking & finance	17	180	10.59	13	776	59.69
9 Other services	9	75	8.33	7	330	47.14
Total	137	1,670	12.19	106	6,220	58.68

Table 3 Total Employment Size by Age of the Oldest Piece of Production Equipment

Size	Age of the oldest piece of production equipment (months)				
	Mean	Median	Minimum	Maximum	Number of firms
1-25	92.8	72	5	540	55
≥26	224.0	180	24	720	43

t = -4.65, d.f. = 96, Significance = 0.000.

Table 4 Total Employment Size by the Cost of the Most Important Piece of Production Equipment Bought in the Last Year (£'s)

Size	Cost of the most important piece of production equipment bought in the last year (£'s)				
	Mean	Median	Minimum	Maximum	Number of firms
1-25	21,488	8,000	1,000	220,000	43
≥26	50,875	15,000	1,000	800,000	40

t = -1.42, d.f. = 81, Significance = 0.159.

Table 5 Discriminant Groups

Variable	Standardised canonical discriminant function coefficients	Pooled within-groups correlations (structure matrix)	Wilks lambda	Significance level
Level of sales for the last financial year	0.583	0.742	0.570	0.000
Payroll manual administration technology	-0.336	-0.506	0.504	0.000
Total number of suppliers	0.253	0.461	0.476	0.000
Buildings insurance	0.171	0.317	0.461	0.000
Premises - owned	0.182	0.438	0.451	0.000
Number of managerial functions currently operated	0.179	0.201	0.442	0.000
Contact with local small firms assistance agencies	0.158	0.300	0.435	0.000
Age of the business	0.169	0.395	0.430	0.000
Plant / equipment - owned	0.150	0.140	0.425	0.000
Management training	0.130	-0.192	0.422	0.000

Notes: Function 1:

Eigenvalue for function= 1.3712
Chi-Squared= 118.29

Canonical correlation= 0.7604
d.f.= 10

Wilks' Lambda= 0.4217
Significance= 0.0000 0

Canonical discriminant function evaluated at group means (Group Centroid).

	Function 1
1	-1.0999
2	1.2293