

Strategic planning—a comparison of high and low technology manufacturing small firms

Nicholas O'Regan*, Abby Ghobadian

Middlesex University Business School, The Burroughs, London NW4 4BT, UK

Abstract

This paper contends that firms can be classified according to the level of technology deployed in their products and processes into two main types: high and low technology firms. The paper further contends that the level of technology deployed will impact on the overall strategic planning process and its main drivers: leadership and organisational culture resulting in differing levels of corporate performance.

Based on a nation-wide sample of 194 Managing Directors and Chief Executives of small and medium sized manufacturing firms, this study found that high technology firms tend to emphasise transformational and human resources leadership styles. Both of these leadership styles correlate positively with strategic planning and with the majority of performance indicators used. On the other hand, low technology firms emphasise transactional leadership, which correlates with internal strategy characteristics and short-term performance indicators. Similar results were obtained when culture styles were correlated with strategy and performance indicators in both types of firms. Finally, the overall performance of both types of firms indicates that high technology firms performed better than low technology firms.

The findings suggest that low technology firms can achieve a similar confidence in facing the external environment as high technology firms by changing their strategic planning, leadership and organisational culture emphasis.

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1. Introduction

Managing Directors face increasingly dynamic, complex and unpredictable environments where technology, the nature of competition, globalisation, industry boundaries and the rules of the game are changing dramatically (Hitt et al., 2001).

The degree and complexity of change in the current economic environment is driving firms to seek new ways of conducting business to create wealth (Stopford, 2001). But change need not be detrimental—it can also be opportunities that firms should seek to exploit (Shane and Venkatraman, 2000). Hitt et al. (2001) contend that the deployment of new technology is the key to grasp such opportunities. Already, small and medium sized firms (SMEs) are embracing new and high technology (Sampller, 1998).

Technology has altered 'the fundamentals of design, manufacture, distribution and organisation alike' (Peters,

1989, p. 19), and has resulted in a transformation of economic and social life. In a later work, Peters (1997) suggests that the organisation of the past has changed and with it has gone the accepted features of the traditional firm, such as stability, predictability and certainty. As an example of the rapid rate of change, Scott (2000) states that the average product life cycle has halved over the past 10 years.

New technology is continually advancing and is likely to affect all aspects of firm performance; for example, research and development, design services and the drivers of strategic planning. Its impact is seen not only on issues such as greater efficiency in production, but also on corporate structures, communication and creativity. This suggests that technological change is a critical factor in gaining/retaining/sustaining competitive advantage. Accordingly, the authors contend that the strategic planning processes of high technology firms will differ from those of low technology firms. In addition, the emphasis placed on the drivers of strategic planning: organisational culture and leadership, will also differ.

* Corresponding author. Tel.: +44 208 362 6162.

E-mail address: n.o'regan@mdx.ac.uk (N. O'Regan).

2. Aims of the research

Strategy research is directed in the main, to examine why firms differ in overall performance (Barnett and Burgelman, 1996; Schendel, 1996). More specifically, this paper contends that firms can be divided according to the level of technology deployed in their processes and product development and that the level of technology impacts on the overall strategy and performance of the firm.

While there are many similarities in the problems that face high and low technology firms, they both operate in the same business environment, there is a lack of empirical research on the emphasis given to the drivers of strategy in both types of firms. To date, few studies have so far concentrated on an integrated analysis comprising the strategic planning processes and the factors that influence it, and its subsequent impact on organisational performance. Accordingly, the findings are of benefit to practitioners and academics as they explain and predict an empirical phenomena (the integrated impact of culture, leadership and strategy on organisational performance in both high and low technology firms) that is not fully explained or predicted by conceptual frameworks already in existence (Shane and Venkatraman, 2000).

The aims of this paper are, therefore, to identify if high technology firms place a different emphasis on strategic planning, culture and leadership compared with low technology firms. The following sections outline the rationale for the categorisation of firms into high and low technology manufacturing firms, an evaluation of strategic planning as a means of gaining competitive advantage, a brief discussion of the main influences on strategic planning: organisational culture and leadership, the methodology for the study, data analysis and conclusions.

3. Firm categorisation

The sample consisted of 1000 small and medium sized manufacturing firms throughout the UK. SMEs were chosen as they tend to be more vulnerable to environmental forces compared with larger firms in aspects such as access to financial capital, a strong reliance on a narrow product range, and a more limited market presence. The manufacturing sector was chosen as strategy adaptation is usually more pronounced compared with the services sector, arising from its higher levels of fixed commitment (Swartz and Iacobucci, 2000).

Practical considerations largely guided the choice of the two industrial sectors examined. The aim was to identify industries that were economically important and where it was possible to find many high and low technology SMEs. Following careful consideration, the electronics and engineering sectors (SIC 37 and SIC 38) were chosen. Both sectors match the criteria for the study and provide

a significant contrast in terms of product maturity and technology deployment.

SIC 37 includes industries producing mature products which arguably are more likely to produce standard products, often low-cost, undifferentiated and low technology. The sub-sectors included in the study are:

- 3711—Motor vehicles and passengers car bodies
- 3713—Truck and bus bodies
- 3714—Motor vehicle parts
- 3715—Truck trailers
- 3751—Motor cycles, bicycles, and parts.

SIC 38 includes industries whose products are likely to be less mature, have a shorter life cycle and have a high value-added content. The majority of these firms could be categorised as high technology firms. It could be argued that these firms have higher investment, higher management capability and more highly skilled employees, which influence the formulation and deployment of their strategic planning.

The following sub-sectors were covered by the study:

- 3811—Engineering, laboratory, scientific and research instruments and associated equipment
- 3822—Automatic controls for regulating residential and commercial environments and appliances
- 3823—Industrial instruments for measurement, display and control of process variables; and related products
- 3824—Totalising fluid meters and counting devices
- 3825—Instruments for measuring and testing of electricity and electrical signals
- 3829—Measuring and controlling
- 3841—Surgical and medical instruments and apparatus
- 3873—Watches, clocks, clockwork operated devices and parts.

4. Strategic planning to gain competitive advantage

Strategy is defined by Farjoun (2002) as “the planned or actual co-ordination of the firms major goals and actions, in time and space, that continuously co-align the firm with its environment”. This definition encapsulates three inter-related points: behaviour, co-ordination and adaptation. In practice, the essence of strategy is the improvement of competitiveness.

This is probably one of the most challenging tasks facing any firm, given the increasingly volatile business environment. In doing so, it is necessary to ensure that as far as possible, the organisation ‘fits’ the outside environment and meets customer needs both effectively and efficiently (Drihlon and Estime, 1993). Porter (1996) states that effective strategic planning gives a firm competitive advantage over its competitors as it “renders choices about what not to do, as important as choices about what

to do". He continues by saying that "the root of the problem is the failure to distinguish between operational effectiveness and strategy", as firms pursue the same goal of organisational effectiveness, which he compares with "a series of races down identical paths, that no one can win".

Undoubtedly, the concept of corporate strategy has assumed increasing importance over the past two decades largely as the result of more intense competition and the need to meet the demands of the fast changing external environment. To survive and gain competitive advantage, organisations of all sizes increasingly need to pursue well developed and clear cut strategies (Ghoshal and Bartlett, 1990; Powell, 1992).

Yet small firms are often stated to be 'naive about planning and the development of strategy' (Deakins and Freel, 1998). The number of ways that small firms tend to respond to change exemplifies this. Firstly, they tend to look inward rather than outwards and ignore change. Secondly, some continue to rely on efficiency based measures as their 'strategic plan' for the future. Thirdly, some firms believe that, as they are part of a localised supply chain, they are immune to any external influences.

A number of empirical studies have concluded that small firms employing a strategic planning approach performed better than those that did not (Bracker et al., 1988). Roper (1997) reached a similar conclusion in a study of strategic planning in 703 small firms. Berman et al. (1997, p. 4) found that "firms that plan produce better financial results than firms that do not plan". Ghobadian and O'Regan (2000) carried out a comprehensive review of previous empirical research examining the link between strategy and performance. In this review, the findings indicated a mixed picture.

A number of writers argue that these mixed results are due to the lack of a clear definition of strategy and a consistent method for measuring performance (Boyd and Reuning-Elliott, 1998; Snow and Thomas, 1994). Others suggest that the differences in the empirical study findings to date could be attributed to small sample sizes (Matthews and Scott, 1995), or lack of industry variety (Risseeuw and Masurel, 1994). Short et al. (2002) state that "methodological problems seem likely to underlie at least a portion of the equivocal findings about performance". They studied the sampling designs of 437 empirical studies of performance published between 1980 and 1999. They suggest that "one reason strategy research often found conflicting results when investigating organisational performance may be that the vast majority of authors do not rely on random sampling procedures". They suggest that when sampling units are not selected at random, sampling variability is unpredictable, making results less reliable and making causal inferences more difficult.

To develop a consistent picture and address the problems identified above, we deployed measures of strategy similar to those used by Ramanujam et al. (1986), Ramanujam and Venkatraman (1987), Veliyath and Shortell (1993), Kargar (1996), and Kargar and Parnell (1996). Based on the work of

these authors, the literature review and qualitative interviews, we identified the following characteristics to describe the strategic planning process: external orientation, internal orientation, departmental co-operation, resources for strategy, systems capability/creativity, strategy as a control mechanism and the use of analytical techniques.

5. The main influences on strategic planning

The main influences on strategic planning are arguably, organisational culture and leadership. Each of these concepts will be considered in this section.

5.1. Culture

Culture is defined by Hofstede (1984) as "the way things are done in the business" illustrating the firms' philosophy or character and distinguishing the members of one organisation from another. Lounsbury and Glynn (2001) define culture as "an interpretive framework through individuals make sense of their own behaviour, as well as collectivists in their society".

Organisational culture is often seen as the conduit through which top management can encourage the development and deployment of corporate strategy. Conversely, culture is considered as a major obstacle in the implementation of new ideas, processes and systems (Morgan, 1989). The culture of any organisation relates to its values and beliefs, which are often influenced by various factors including the company's founder (Schein, 1985). The 'established organisation' tends to keep and build on the initial behaviour and values (Daft and Weick, 1984). This pattern can be recognised in many firms as founding members often stress personal beliefs, values, and assumptions on a range of issues from the business strategy to the environment (Brown, 1995). In an empirical study, Hitt et al. (1997) indicate that differences arising from the business environment manifested in the culture of the firm, impact on the decision making processes of leaders.

Research on culture and what comprises the various dimensions of culture is limited (Ashkanasy et al., 2000). Indeed, Cooke and Szumal (2000) suggest that the determination of new initiatives by leaders to propagate controls, results in a 'cultural bypass' and has an adverse impact on the motivation and loyalty of employees. The literature focuses on larger firms and suggests that corporate strategy is influenced by organisational culture (Barney, 1986). However, while there are many published works detailing opinions or anecdotes, the authors of this study were unable to locate any empirical work specifically examining the relationship between culture and corporate strategy in manufacturing small firms. Therefore, there is a need to empirically test the validity of the implied relationship between culture and strategy. Culture was operationalised based on dimensions tested and validated by

Wilderom and van den Berg (1997) on small firms. The culture styles used in this study are external orientation, internal orientation, empowerment, intergroup orientation and human resources.

6. Leadership

Leadership is a topical issue in both high and low technology firms. Most managers perceive leadership to have a high degree of importance in the attainment of profitability and competitive advantage (Moxley, 2000). Despite extensive coverage in the literature, there is no single accepted definition of leadership. Selected definitions include: “the process whereby one individual influences other group members towards the attainment of defined group or organisational goals” (Yuhl, 1989), “the art or process of influencing people so that they will strive willingly and enthusiastically toward the achievement of the group’s mission” (Wehrich and Koontz, 1993). A broader definition is provided by Ackoff (1999) which refers to leadership as “guiding, encouraging and facilitating others in the pursuit of ends by the use of means, both of which they have either selected or approved”. From a practical viewpoint, Bennis and Nanus (1985) suggest that the principle task of leadership is to ensure the effective deployment of the strategic plan.

The impact of leadership on the success of organisations is well documented (Motowidlo, 1992). Miller and Shamsie (2001) state that “a growing body of literature has identified the significant impact that leader’s characteristics can have on both strategic direction and overall organisational performance”.

Effective leadership is dependant on the creation of a widely shared mission aimed at the achievement of the firms’ vision (Feigenbaum et al., 1996; Hamel and Prahalad, 1989). Today’s business environment is characterised by global competition, variable customer needs and greater utilisation of human resources. This new environment calls for ‘new kinds of management abilities’ (Arvonen and Pettersson, 2002). Accordingly, leadership is a critical element managing these diverse factors. However, it is accepted that emphasis on leadership attributes can lead to different types of performance such as internal or external outcomes. For example, in a study of 49 departments in a Swedish industrial company, Arvonen and Pettersson (2002) found that leadership behaviour influenced internal effectiveness and the capacity for change.

“While the literature reflects no consensus regarding whether corporate leadership ‘matters’, there is a little disagreement that the most powerful executive position is that of CEO” (Daily et al., 2002, p. 391). This is particularly true in the case of small firms where the CEO tends to ‘occupy a position of unique influence, serving as the locus of control and decision-making’.

Begley and Boyd (1986) state that the role of the Chief Executive in the smaller firm is more significant as he/she is

the controlling influence with regard to decisions and strategy. Chief Executives exert an influence on the firm that is significant and which may be either good or bad (Day and Lord, 1988), although Hambrick and Mason (1984) state that the environmental circumstances surrounding the firm dictate the leaders’ actions to a large degree.

Wilderom and van den Berg (1997) in an empirical study of small firms derived, tested and validated four main leadership styles: *transformational*, *transaction*, *human resources* and *laissez faire* styles. To ensure external validity we deployed these constructs in our study. Their validity was further tested in qualitative interviews with six chief executives of SMEs, employers’ representatives bodies and in the pilot phase of the fieldwork.

7. Organisational performance

Performance measurement is defined in the literature as “all aspects of performance that are relevant for the existence of an organisation as a whole” and success as the “way the organisation carries its objectives into effect” (Flapper et al., 1996).

Accordingly, an effective performance measurement system ought to cover all aspects of performance that are relevant for the existence of an organisation and the means by which it achieves success and growth (Kaplan and Norton, 1996; Hillman and Keim, 2001). This means that any performance measurement system ought to include more than just financial measures. This point is well established as many authors contend that any credible model of performance measurement must have more than one criterion (Veliyath and Shortell, 1993; Brown and Laverick, 1994; Kargar and Parnell, 1996). However, as Daily et al. (2002) point out, there is a distinct lack of consistency in what constitutes firm performance. Laitinen (2002) suggests that performance “can be defined as the ability of an object to produce results in a dimension determined, a priori, in relation to a target”. He also suggests that a well-organised system of performance measurement may be the single most powerful mechanism at management’s disposal to enhance the probability of successful strategy implementation.

Laitinen (2002) states that “when financial and non-financial measures are incorporated in the same model, managers can survey performance in several areas simultaneously in order to enable efficient strategic decision making”. In seeking to establish appropriate performance indicators, we firstly examined existing studies on SMEs. Kargar and Parnell (1996) used two dimensions of performance “satisfaction with the financial outcomes perceived to be associated with the planning process” and “satisfaction with the contribution of strategic planning efforts to overall organisational performance”.

Our exploratory interviews with the Managing Directors of six firms indicated that customer satisfaction measures and innovation indicators are also important performance

dimensions. This study, therefore, uses a broad range of performance dimensions, which include these measures along with organisational effectiveness and financial performance.

However, the exploratory interviews and discussions with employer federations suggested that, in general, it was not possible to obtain wide-ranging hard measures of performance. Even if it were possible, it would have been extremely difficult to establish a link between variation in performance and factors used in the strategic planning process because potentially many factors contribute to changes in performance. Therefore, we adopted the notion of measurement against purpose propagated by Steiner (1979). In practice we assessed the degree of satisfaction with a battery of performance measures arising from individual factors used in the strategic planning process. Previous research relies on the use of perceived measures to operationalise performance (Spanos and Lioukas, 2001; Luo and Park, 2001; Kargar and Parnell, 1996; Venkatraman and Ramanujam, 1987).

In addition, Hillman and Keim (2001) state that perceptual measures are used in research sample frames comprising SMEs as such samples are unlikely to yield adequate and reliable financial data as well as potential interpretation problems arising from varying accounting conventions or managerial manipulation.

Andersen et al. (2001) suggest that linking strategic objectives with performance helps with the articulation of causality. They state that this approach has clear advantages such as helping SMEs to gain a thorough understanding of strategy by raising the awareness of strategy throughout the entire organisation and by providing a focus to enhance the achievement of the strategic objectives.

8. Methodology

To identify potential respondents for participation in the study, sample criteria were established. While no one directory provides an entirely suitable sampling frame, a random sample was available from a reputable commercial firm. As there are nearly 15,000 electronic/engineering small firms in the UK (DTI, 1996), a simple random sampling method was used.

Data were gathered by means of a self-reporting survey questionnaire, consisting of questions to infer the existence of a strategic planning process and to establish the degree of perception of satisfaction with the results of the strategic planning process. Selecting a self-reporting respondent is a well-established approach in management research (Avolio et al., 1991).

The strategy, culture and leadership constructs used a five-point Likert type scale, with a response of 1 indicating that an item that received 'no emphasis' and 5 indicating that an item received 'strong emphasis'. Respondents were also asked to indicate, on a five-point scale ranging from

'highly dissatisfied' to 'highly satisfied,' the extent to which they were satisfied with their firm's performance on four separate criteria: financial results, organisational effectiveness, customer satisfaction, and innovation.

Correlation analysis was carried out to ascertain the correlation between leadership and culture styles with strategy characteristics and performance indicators in high and low technology firms.

We used managerial perceptions as they shape to a significant degree the strategic behaviour of the firm. This is consistent with Chattopadhyay et al. (1999) and Spanos and Lioukas (2001). Gioia and Chittipeddi (1991, p. 434) states "the CEO is portrayed as someone who has primary responsibility for setting strategic directions and plans for the organisation, as well as responsibility for guiding actions that will realise those plans". In a review of the literature, Westphal and Frederickson (2001) found that top management has a significant impact on strategic direction and change. We chose to use Chief Executives as respondents in this study as they are seen as having a wide breadth of knowledge of all the organisations functions, activities and operating environment (Frost et al., 2002; Hillman and Keim, 2001).

9. Response

One hundred and ninety-four valid responses were received—a response rate of 27.5%. This represents a highly satisfactory response—see Hart (1987). Non-respondents were assessed to determine whether there were any significant differences with respondents. A comparison of demographic data and performance criteria revealed no discernible differences. An analysis of the responses based on the number of employees in each firm is depicted in Fig. 1.

While the number of firms with 1–19 employees accounts for over 82% of all manufacturing firms in the UK, the response rate for this category in this study is only 23.7%. It could be reasonably expected in a random sample, that a much higher sample of firms in this size bracket would respond. Smaller firms, however, are often constrained by resource restrictions in completing and returning questionnaires. This was confirmed by the follow up telephone calls when Managing Directors of firms employing fewer than 20 employees, cited lack of time or resources as the reason for their non-response. However, this did not result in a serious problem of bias in the data. It is important to note that although the sample does not precisely mirror the population, there are nevertheless, enough cases in each size category to facilitate meaningful analysis.

10. Respondents by industrial classification

In response to the question on technology levels deployed, 105 firms indicated that they were primarily

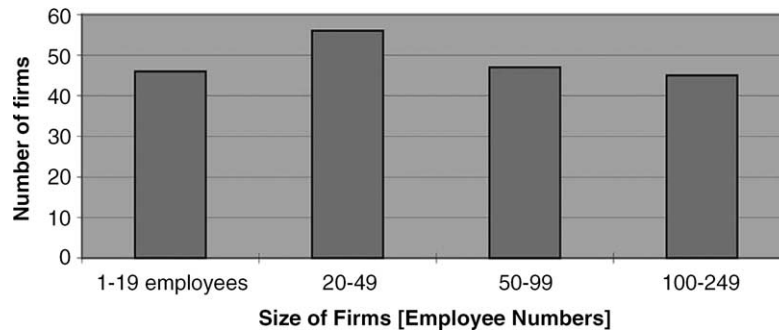


Fig. 1. Number and size of respondent firms.

low technology orientated, whereas 89 firms indicated that they were high technology orientated.

11. Age of respondent firms

The questionnaire asks respondents to indicate the year that their company was established. The replies indicate a broad spread of dates from 1837 to 1994. Table 1 summarises the analysis using arbitrary age groupings for both high and low technology firms.

All the SMEs surveyed are established over 5 years and are thought likely to have developed a reasonable structure and survived their potentially most turbulent years (Pickle and Abrahamson, 1976). A chi-square test ($\chi^2=59.95$, $df=63$, $p=0.58501$) indicates that the sample of high technology firms does not differ significantly from the sample of low technology firms in relation to the period established.

12. Managing Director profiles

Table 2 briefly summarises the responses to Managing Director profile questions.

Table 2 indicates that over 21% of Managing Directors are less than 40 years old. It also shows that 66% of Managing Directors are aged between 40 and 60 years old with nearly 13% aged over 60 years. Interestingly, whilst it might be expected that younger Managing Directors would be involved in the high technology sector, the analysis indicates that the age profile in both sectors is broadly

Table 1
Age of respondent firms

Age grouping (years)	Percentage of firms	Number of firms by sector	
		Low technology	High technology
5–10	25.7	18	32
11–20	26.3	22	29
21–50	22.7	27	17
51–100	22.7	33	11
>100	2.6	5	0
<i>n</i> = 194			

similar. A chi square test indicates no association between the age of the Managing Director and the sector ($\chi^2=4.95$, $df=5$, $p=0.42264$).

13. The operating environment

The study sought to elicit the emphasis given by both types of firms to their operating environment using 10 attributes. Table 3 summarises the responses.

The analysis indicates that there is no significant difference in the perception of the operating environment by both types of firms. An interesting finding is that low technology firms have a greater fear of new firms from the UK and overseas entering their markets. It could be argued that low technology firms perceive that their existing markets are vulnerable to competition.

Table 3 indicates that in general, Managing Directors perceive technological change in products and technological change in processes to be the most important aspects describing the environment within which their firms operate. The Managing Directors of all SME size categories give similar emphasis to these three attributes.

The most frequently cited cause for concern relates to the threat of overseas firms entering the market (cited by 50% of respondents to be important or very important). This probably arises from greater world trade and globalisation. This attribute has the highest standard deviation indicating a broad dispersion. Interestingly, the threats of overseas and new UK firms entering the market are feared to a lesser extent by high technology firm compared with low technology firms. This could be argued to indicate that

Table 2
Managing Director profile characteristics

Age (years)	Number	Percentage
Under 24	2	1.0
25–29	9	4.6
30–39	30	15.5
40–49	53	27.3
50–59	75	38.7
Over 60	25	12.9
<i>n</i> = 194		

Table 3
Perception of the operating environment by high and low technology firms (mean scores)

Environment attribute	Level of technology	
	High	Low
Threat of UK firms entering the market	2.410	2.737
Stable environment posing little threats	2.692	2.705
A decreasing product life cycle	3.003	2.968
Changing regulatory environment	3.181	3.147
Threat of substitute goods	3.126	3.148
Turbulent environment	3.196	3.179
Threat from overseas firms	3.202	3.326
Technological change in processes	3.699	3.484
Technological change in products	3.458	3.316

high technology firms are more confident in facing the market place.

14. Sector type and leadership style

The four leadership styles were examined using correlation analysis to ascertain their influence on strategy and organisational performance in respect of both high and low technology firms. The results are depicted in Tables 4 and 5.

The analysis of Table 4 indicates that high technology firms have predominantly transformational and human resources leadership styles whereas low technology firms tend to emphasise a transactional leadership style to a greater extent. Where low technology firms emphasised leadership styles other than transactional, the correlation analysis indicated an association with the *internal orientation and strategy as controlling mechanism* characteristics of strategic planning. This finding is profound and clearly shows that low technology firms are more inward looking and may fail to grasp any potential opportunities arising. On the other hand, the analysis suggests that high technology firms tend to be more outward looking and have a leadership ethos consistent with the achievement of enhanced performance. We also correlated the leadership style of both types of firms with perceived overall performance as depicted in Table 5.

Table 4
Leadership–strategy correlations in high and low technology firms

Leadership style	Firm technology level							
	Transformation		Human resources		Transactional		Laissez faire	
	High	Low	High	Low	High	Low	High	Low
Internal orientation	–	–	–	–	–	√*	–	–
External orientation	√**	–	√*	–	–	–	–	–
Departmental co-operation	√*	–	√**	–	–	–	–	–
Analytical techniques	√**	–	√*	–	–	–	–	–
Staff creativity	√**	–	√*	–	–	–	–	–
Strategy—a control mechanism	–	–	√**	–	–	**	–	–

*Correlation signification at the 0.01 level (2-tailed). **Correlation significant at the 0.05 level (2-tailed).

The analysis of Table 5 indicates that high technology firms emphasising transformational and human resources leadership styles indicate a significant correlation with many of the measures used to indicate performance. In addition, low technology firms indicate only one significant correlation with performance: transactional leadership in relation to the improvement of short-term performance. No correlation was indicated between low or high technology firms emphasising *laissez faire* type leadership.

15. Organisational culture

The five culture styles were examined using correlation analysis to ascertain their influence on strategy and organisational performance in respect of both high and low technology firms. The results are depicted in Tables 6 and 7.

The analysis of Table 6 indicates that the emphasis by high technology firms on all the culture styles correlate significantly with the external orientated characteristics of strategic planning. On the other hand, the emphasis by low technology firms indicate significant correlation in respect of both internal orientated strategic planning characteristics: *internal orientation and strategy as a control mechanism*. This finding confirms the internal orientated leadership style for low technology firms depicted in Table 4. We also correlated the culture styles of both types of firms with perceived overall performance as depicted in Table 7.

The analysis of Table 7 indicates that the external orientation and human resources culture styles are significantly correlated with most of the measures used to indicate performance. In addition, the achievement of short-term performance is the only significant correlation between low technology culture style and performance in low technology firms.

16. High and low technology firm performance

Performance was measured according to the perception of the Managing Directors in relation to a number of

Table 5
Comparison of leadership–performance correlations in high and low technology firms

Leadership style	Firm technology level								
	Transformation		Human resources		Transactional		Laissez faire		
	High	Low	High	Low	High	Low	High	Low	
Customer satisfaction	√*	–	√**	–	–	–	–	–	–
Customer retention	√**	–	√**	–	–	–	–	–	–
Market share	√*	–	√*	–	–	–	–	–	–
Avoid problem areas	√*	–	–	–	–	–	–	–	–
Short-term performance	–	–	–	–	–	–	√*	–	–
Long-term performance	√*	–	–	–	–	–	–	–	–
Innovation	√*	–	√**	–	–	–	–	–	–

*Correlation significant at the 0.05 level (2-tailed). **Correlation significant at the 0.01 level (2-tailed).

Table 6
Culture–strategy correlations in high and low technology firms

Culture styles	Technology level									
	External orientation		Internal orientation		Human resources		Intergroup		Empowerment	
	High	Low	High	Low	High	Low	High	Low	High	Low
Internal orientation	–	–	–	√*	–	–	–	–	–	–
External orientation	√**	–	–	–	√**	–	–	–	√**	–
Departmental co-operation	–	–	–	–	–	–	√**	–	√**	–
Analytical techniques	√**	–	–	–	–	–	–	–	–	–
Staff creativity	√**	–	–	–	–	–	–	–	√**	–
Strategy—a control mechanism	–	–	–	√**	–	–	–	–	–	–

*Correlation significant at the 0.05 level (2-tailed). **Correlation significant at the 0.01 level (2-tailed).

attributes covering financial performance, customer orientation, organisational effectiveness and learning/innovation (outlined in Table 8).

The analysis indicates that both types of firms emphasise performance based on financial and non-financial criteria. However, high technology firms indicate higher levels of achievement in all the performance areas indicated, with the exception of *improving short-term performance*. Low technology firms arguably avoid problem areas to a greater extent due to the technology levels deployed and the emphasis on internal orientation.

17. Practical implications of the findings

In line with the contention of Kelemen and Bansal (2002) and Hodgkinson (2001), this section will relate the findings to contemporary management practice. Low technology firms differ from high technology firms in a number of important areas:

- *Perception of the operating environment*—low technology firms fear other UK and overseas competitors entering the market. This fear could be argued to result from the next two factors.

Table 7
Comparison of culture–performance correlations in high and low technology firms

Culture styles	Technology level									
	External orientation		Internal orientation		Human resources		Intergroup		Empowerment	
	High	Low	High	Low	High	Low	High	Low	High	Low
Customer satisfaction	√*	–	–	–	–	–	–	–	√**	–
Customer retention	√**	–	–	–	√**	–	–	–	–	–
Market share	√*	–	–	–	√*	–	–	–	–	–
Avoid problem areas	√*	–	–	–	–	–	–	–	√**	–
Short-term performance	–	–	–	√**	–	√*	–	–	–	–
Long-term performance	√*	–	–	–	–	–	–	–	–	–
Innovation	√*	–	–	√**	–	–	–	–	–	–

*Correlation significant at the 0.05 level (2-tailed). **Correlation significant at the 0.01 level (2-tailed).

Table 8
Perceived performance in high and low technology firms

Performance indicator	Technology level	
	High	Low
Financial performance	4.048	3.642
Customer satisfaction	4.047	3.895
Customer retention	4.094	4.021
Market share	3.688	3.509
Avoiding problem areas	3.453	3.405
Improving short-term performance	3.456	3.821
Improving long-term performance	3.854	3.468
Innovation	3.797	3.126

- **Leadership**—low technology firms' leadership style is mainly transactional and indicates a significant correlation with the internal orientation and control characteristics of strategic planning. Transactional leadership style positively correlates with only one indicator of performance: *improving short-term performance*. On the other hand, high technology firms emphasise transformational and human resources leadership styles and indicate significant correlations with all the characteristics of strategic planning with the exception of internal orientation. An examination of the correlation analysis between leadership and performance indicates that both transformational and human resources styles of leadership correlate with all the indicators of performance with the exception of improving *short-term performance*.
- **Organisational culture**—in a similar manner to leadership, low technology firms' culture styles indicates a significant correlation with the internal orientation and control characteristics of strategic planning. In a correlation of low technology culture styles and performance indicators, only one significant correlation is indicated: *improving short-term performance*. On the other hand, high technology firms indicate significant correlations with all the characteristics of strategic planning with the exception of internal orientation. An examination of the correlation analysis between organisational culture and performance indicates that both transformational and human resources styles of leadership correlate with all the indicators of performance with the exception of improving *short-term performance*.
- **Overall performance**—an analysis of the perception of performance achieved by both low and high technology firms indicates that high technology firms experience a higher degree of achievement in respect of all the performance indicators with the exception of *improving short-term performance*.

Arguably, the fear of increased competition from both domestic and international competitors arises from the emphasis by low technology firms on the attributes of strategic planning, culture and leadership. Their culture and leadership styles appear to have a strong short-term focus,

which is mirrored by their overall performance. Accordingly, low technology firms wishing to enhance their performance would be well advised to change their emphasis on strategic direction and adapt a more outward looking culture and leadership approach. Only then will they be able to face increasing competition with some degree of confidence.

18. Conclusions

This paper presents the findings of an empirical study that compared high and low technology firms and their respective emphases on the attributes of strategic planning, leadership and organisational culture.

The study found that high technology firms have a more external orientated strategic outlook, leadership style and culture ethos. The findings suggest that this leads to greater overall performance. This finding, if repeated in other studies, has profound implications for policy makers and small business advisers and confirms significant differences between both types of firms.

The study has some limitations. For example, it assumed that SIC 37 and 38 were internally homogeneous and did not evaluate the sub-sectors. This assumption should be tested in future studies. Secondly, future research should consider a more in-depth approach. It would have been beneficial to augment the quantitative data with qualitative in depth case studies or an ethnographic approach. This study focuses on the managerial processes used in the formulation and deployment of the strategic planning process and does not focus on entrepreneurial styles of management or the personal characteristics of the Managing Directors. Arguably the individual entrepreneurial management style could potentially influence the culture, leadership and strategic planning processes of both high and low technology firms. Other factors such as the educational and social background of the Managing Director could also be potential influences.

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Nicholas O'Regan is the principal lecturer in Business Studies at Middlesex University Business School. His research interests include the organisational culture, leadership and strategic planning processes of small and medium sized organisations. Other research interests include the deployment of technology and the use of e-business in SMEs.

Abby Ghobadian is the Director of the Institute of Research and CISMR and Professor of Operations and Manufacturing Strategy at Middlesex University Business School. His research interests lie principally in operations and environmental management as well as the formulation and deployment of corporate strategy in small and medium sized organisations.