

# Core Capabilities as Predictors of Growth Potential in Small Manufacturing Firms

by Ian Chaston and Terry Mangles

## Abstract

Although the academic literature provides a number of theories about the management of growth, none appears to offer a predictive technique for consistently determining the potential of a smaller firm to achieve a growth objective. An alternative approach to these models is one that assumes that growth firms exhibit common characteristics. Four major research projects on small firm performance have been used to evolve a survey tool to research the relationship between performance and orga-

nizational capability. The results of discriminant analysis suggest that the probability of achieving growth is increased by avoiding excessive emphasis on single transformation initiatives and that different capabilities must be given priority depending upon the current revenue performance position of the firm. Application of discriminant analysis is described in relation to government agencies using the tool to enhance their small firm sector advisory services.

An extensive body of academic literature is concerned with the factors influencing the performance of small firms. Gibbs and Davies (1990) suggested that the majority of this research can be classified under four major headings: entrepreneurial personality, organization development, functional management skills, and sectoral economics. While each of these areas of research have provided useful insight into the successful operation of small firms, each is limited in the ability to provide an accurate predictive model of small firm performance.

The research on entrepreneurial personality, by building on McClelland and Winter's (1969) achievement model, seeks to link the personal characteristics

of the owner/manager with the performance of the company. Research by Kets de Vries (1977) and Gupta (1984) showed a correlation between owner/manager personality and strategic decision-making. Unfortunately, although various typologies have evolved for classifying the entrepreneur, none of them have been convincingly correlated to the observed performance of the business (Brockhaus 1982).

A common element in the research concerned with organization development is an examination of the relationship between the goals of the entrepreneur and the objectives of the organization (Steinmetz 1969). In many instances, this research assumes the need for a move from an entrepreneurial to a "professional" management style. This research often recommends actions in relation to the firm's current position on a "stages of growth" model (Greiner 1972). However, given the current debate on the needs of larger organizations to become more entrepreneurial (Slevin and Covin 1990), some doubts

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must exist about whether the growth stage model should be offered as a normative theory for the activities of SME owner/managers.

Research on functional management usually emphasizes the need for the smaller firm to adopt a more formalized approach to such activities as strategic planning and the installation of effective control systems (Brock and Evans 1989). Although this decision-making approach has received extensive coverage in the literature, there is still only limited evidence to support the view that clear links exist between these activities and the subsequent growth rate of the firm (Carland, Carland, and Abbey 1989).

Sectoral studies usually seek to identify influential factors within an industrial system as the basis for predicting potential for growth. They have been able to demonstrate clear relationships between the performance of original equipment manufacturers and the growth rates of small business sub-contractors in such sectors as the car, computer, and consumer electronics industries (Storey et al. 1987). Overall, however, these studies do not appear to provide the basis for a generalized predictive model for the management of SME organizations (Doctor, Van der Haorst, and Stokman 1989).

These four areas of research on the growth of small firms have all made significant contributions to our understanding of management processes within these smaller firms. Unfortunately, it is difficult to use any of these various concepts to develop a generalized technique for predicting the growth potential of the small firm with any degree of consistency (Gibb and Davies 1990). Hence it does seem there is a need to examine other approaches to this specific problem.

## **Method**

### **Identifying Characteristics Exhibited by Growth Firms**

In the search for performance predictors, one possibility is to adopt the holistic view that key characteristics exhibited

by growth firms are a reflection of the internal capabilities of the organization. If this is true, then an evaluation of the current capabilities of a firm can be used to define appropriate actions for enhancing the firm's future performance. To identify the key characteristics of growth firms, the input of four different studies was synthesized: Coopers & Lybrand 1994; Burns 1994; Brickau 1994; and Tradenz 1990. These studies were selected because in each case: (1) the researchers used a large sample; (2) their methodology was developed through careful pilot testing; and (3) quantitative data were collected. These criteria allowed for statistical testing of hypotheses some degree of statistical validation of the results was ensured. These studies found the following to be important determinants of small firm growth:

UK Firms (Coopers & Lybrand 1994):

Perceive their markets as intensively competitive

Are flexible decision-makers

Seek leadership through offering superior quality in a niche market

Deliver superior pre/post sales service

Use technology-driven solutions to achieve a superior position

Emphasize fast, frequent launch of new/improved products and draw upon external sources of knowledge to assist these activities

Emphasize application of technology and management techniques such as cross-functional teams and process re-engineering to optimize productivity

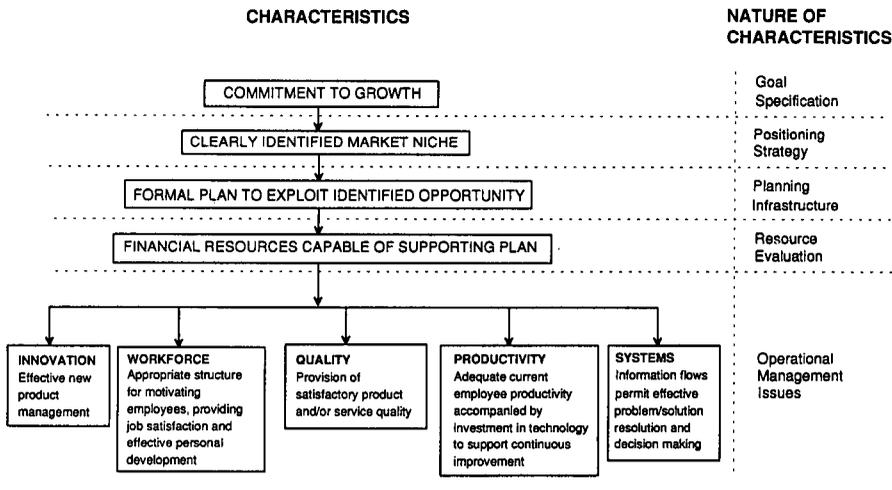
Recognize the need to invest in the continual development of their employees

Rely mainly on internal profits to fund future investments.

European Community Firms (Burns 1994):

Seek niches and exploit superior performance to differentiate themselves from competition

**Figure 1**  
**A Visual Representation of Characteristics Exhibited by Growth Firm**



Operate in markets where there is only an average-to-low intensity of competition

Utilize clearly defined strategies and business plans to guide future activities

Rely mainly on internally-generated funds to finance future investment.

German Firms (Brickau 1994):

Emphasize acquisition of detailed knowledge of external factors capable of influencing performance

Can clearly specify their competitive advantages

Seek niches exploited through a superiority positioning

German firms use strategies and plans to guide future performance

Concurrently seek to improve products through innovation and to enhance productivity through adoption of new process technologies

Fund investment mainly from internal sources.

New Zealand and Export Firms (Tradenz 1990):

Emphasize R&D to achieve continuous innovation and to gain control of unique technologies

Orient themselves towards achieving "world class" superiority in specialist niches

Use structured plans based upon extensive information searches to guide future performance

Exhibit a very entrepreneurial management style and encourage employee-based decision making

Carry a strong commitment to superior quality coupled with high productivity as a path to achieving a competitive advantage.

The outputs from these four studies were used to construct the visual representation of the key characteristics associated with growth shown in Figure 1. To validate this representation, group discussions were held with 12 individuals employed by a government-funded agency responsible for delivering support programs to small firms in Southwest England. The results of the four studies were presented and participants were asked to comment on the completeness of the visual representation based on their experience of the issues

which should be covered when offering guidance to small firms about the management of growth.

### Translating Characteristics into Capability

To determine whether there is a measurable relationship between the specified characteristics required to achieve growth and the capabilities of the firm, the variables described in Figure 1 were translated into 24 statements describing capabilities in the areas of (1) identifying a market niche; (2) exploiting an identified niche by offering a superior product; (3) developing a formal business plan; (4) having adequate financial resources to fund business activities; (5) managing new product development innovatively; (6) conducting effective human resource management; (7) practicing good quality management; (8) optimizing employee productivity; and (9) making good use of manual and Information Technology (IT)-based information and control systems.

The resultant questionnaire utilized a five-point scale ranging from "Totally Adequate" to "Totally Inadequate" to

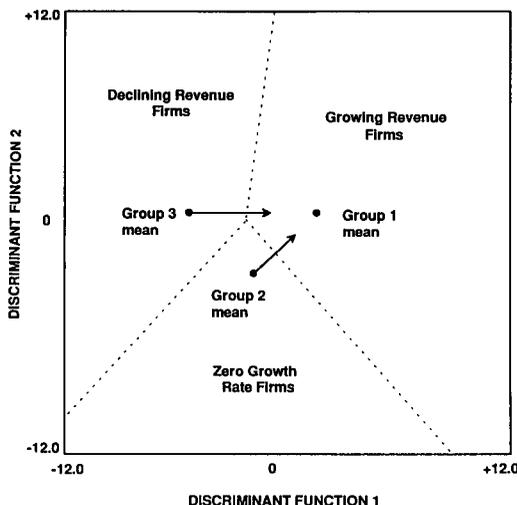
measure senior managers' perceptions of the current capabilities of their firm. For example, in relation to the issue of innovation, the survey tool asked the respondent to comment on the firm's current ability to: (1) successfully develop and launch new products; (2) increase the number of new products to be launched over the next 3 years; (3) reduce the time taken to develop and launch new products over the next 3 years; and (4) develop new products which will attract new customers and/or permit entry into new markets.

Sales revenue over the last 3 years was selected as the measurement of firm performance. A six-category classification was established: (1) sales revenue increased by more than 30 percent; (2) sales revenue increased between 11 and 30 percent; (3) sales revenue increased between 1 and 10 percent; (4) no change was seen; (5) sales revenue decreased 1 to 10 percent; and (6) sales revenue decreased more than 10 percent.

### Survey and Data Analysis Method

The draft questionnaire was sent to 27 individuals employed by a government

**Figure 2**  
**Territorial Map of All Firms Indicating Directional Vectors for Firms Wishing to Move From Zero Growth/Decline to Revenue Growth**



agency, and their comments were incorporated into the survey tool. Then, following a pilot testing of the research tool with a group of owner/managers, the survey was mailed to 300 manufacturing firms selected at random from a commercial database. Each selection was screened against the following criteria: (1) being an autonomous entity, not a subsidiary of a national/multi-national firm; (2) average annual sales in the range of £100,000 - £3 million; and (3) a workforce size of 10-100 employees. Usable responses were received from 92 firms, representing a response rate of 30.7 percent.

As the purpose of this study was to determine whether there is a quantitative relationship between the growth of firms and their internal capabilities, the data were analyzed using discriminant analysis. The attraction of this technique is that it tests the accuracy by which the data classify specified groupings and it provides a quantitative statement of the degree by which each variable contributes to the overall classification (Punj and Stewart 1983).

## Results

### Relationships between Growth and Capability for All Firms

For purposes of analysis, the six category classification was compressed into three categories: Group 1—revenue growth; Group 2—no revenue change; or Group 3—revenue decline. Changes in revenue over the last 3 years were used to determine the categories. The first discriminant analysis produced two statistically significant discriminant functions which correctly classified 95.6 percent of the cases. Canonical discriminant functions 1 and 2 explained 88.25 percent and 11.75 percent of total variance, respectively.

The territorial map associated with this analysis is shown in Figure 2, and the discriminant function coefficients for the capability variables which have a strong influence over group means are summarized in Table 1. These results suggest that in the management of growth, the firm needs to recognize that certain capabilities (for example, "ability to optimize employee productivity") are critically more important influencers of performance than others and that, depending upon current circumstances

**Table 1**  
**Discriminant Function Coefficient Values for Capability Variables**  
**Which Have a Major Influence on the Performance of all Firms**

| Discriminant Function 1 Variables                        | Discriminant Function Standardized Coefficients |
|--|---|
| Optimize employee productivity                           | +1.10179  |
| Develop and launch new products                          | +0.85481  |
| Offer products superior to that of competition           | +0.66181  |
| Utilize I.T. to acquire and analyze key information      | -1.08587  |
| <b>Discriminant Function 2 Variables</b>                 |   |
| Structure organization to optimize employee productivity | +0.48303  |
| Measure customer quality expectations                    | +0.44754  |
| Rapidly identify changes in market conditions            | +0.42078  |
| Offer products superior to that of competition           | -0.87612  |
| Implement employee skills development programs           | -0.62178  |
| Implement actions to close identified quality gaps       | -0.55740  |

Function 1 eigenvalue = 4.3827

Function 2 eigenvalue = 0.5837

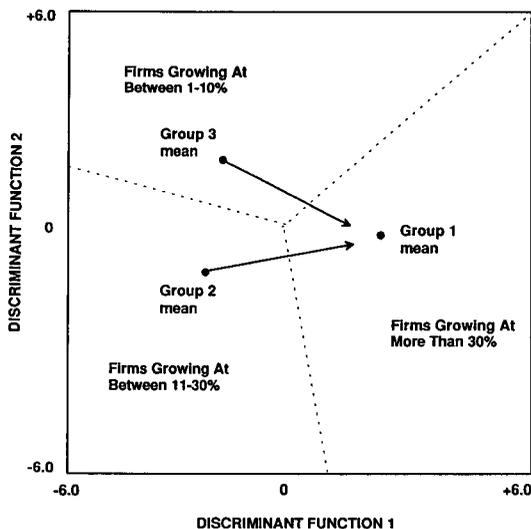
confronting an organization, undue emphasis on upgrading a specific capability may actually have a negative impact on growth. For example, if a non-growth firm directed scarce resources towards improving its utilization of information technology (IT) to acquire and analyze information, this may actually result in declining sales revenue.

The discriminant analysis and the associated territorial map shown in Figure 2 can provide guidance on selecting and prioritizing actions which will have the greatest impact on the firm's future performance. For example, in the case of a firm with a profile which places it near the Group 2 mean (indicating unchanged sales revenue over the last 3 years), growth objective activity on the horizontal axis should focus on upgrading any identified weaknesses in the areas of employee productivity, new product management, and product superiority. Activity on the vertical axis should focus on upgrading organizational structure, measuring customer expectations, and identifying changing market conditions. Just as importantly, however, such a firm should recognize that any

concurrent allocation of additional resources in the areas of information management, product superiority, employee training, or closure of quality gaps may exert a negative influence on overall performance and should be avoided for the time being. For a firm placed near the Group 3 mean (sales revenue has declined over the last 3 years), the same advice applies in terms of moving along the horizontal axis by seeking to improve capability in the areas of employee productivity, new product development, and product superiority. It is probable, however, that the magnitude of improvement along this dimension will have to be much greater than that demanded for a Group 2-type organization.

An even larger variance between type of firm and necessary action is apparent in relation to the vertical axis for a Group 3-type firm. Firstly, in seeking to move from decline to growth, only very minor benefits would accrue from changes in capability factors influencing the vertical positioning of the firm on the territorial map. Secondly, because the required vertical direction of movement is down-

**Figure 3**  
**Territorial Map of Growth Firms Indicating Directional Vectors for Firms Wishing to Increase Future Revenue**



wards, unlike for the Group 2-type business, the firm should give priority to allocating resources to the areas of product superiority, employee training, and closure of quality gaps.

### Relationships between Performance and Capability for Growth Firms

Again using revenue over the last 3 years as the discriminator, a second discriminant analysis was undertaken for only those firms exhibiting growth. This

analysis identified Group 1 as "revenue growth >30 percent"; Group 2 as "revenue growth of between 11 and 30 percent"; and Group 3 as "revenue growth between 1 and 10 percent." In this analysis, the two discriminant functions correctly classified 88.9 percent of the cases. Canonical discriminant functions 1 and 2 explained 58.76 percent and 41.24 percent of total variance, respectively.

The territorial map associated with this analysis is shown in Figure 3, and

**Table 2**  
**Discriminant Function Coefficient Values for Capability Variables Which Have a Major Influence on the Performance of Growth Firms**

| <b>Discriminant Function 1 Variables</b>  | <b>Discriminant Function Standardized Coefficients</b> |
|---|--|
| Measure customer quality expectations   | +0.95455   |
| Develop new products to attract new customers/permit new market entry                     | +0.79210   |
| Invest in assets to continuously improve product quality and/or optimize production costs | +0.74987   |
| Reduce time to develop and launch new products  | +0.68638   |
| Operate an appraisal system to assist employees achieve full potential                    | +0.63238   |
| Introduce new technologies to enhance productivity  | -1.09663   |
| Offer products superior to those of competition   | -0.96232   |
| Use customer requirements to specify quality standards                                    | -0.65877   |
| <b>Discriminant Function 2 Variables</b>  |  |
| Use customer requirements to specify quality standards                                    | +1.53287   |
| Structure organization to optimize workforce effectiveness                                | +0.93540   |
| Operate an appraisal system to assist employees achieve full potential                    | +0.62133   |
| Rapidly identify changes in market conditions   | +0.61430   |
| Identify specialist market niches to occupy   | -1.20171   |
| Utilize I.T. to acquire and analyze key information                                       | -1.04714   |
| Identify new ways of enhancing employee productivity                                      | -0.90727   |
| Introduce new technologies to enhance productivity  | -0.67803   |
| Implement employee skills development programs  | -0.64543   |
| Increase the number of new product launches   | -0.62162   |

Function 1 eigenvalue = 2.4868

Function 2 eigenvalue = 1.7453

the discriminant function coefficients for the capability variables which have important influence over group means are summarized in Table 2. These results suggest that as firms move into the growth phase, new areas of capability (for example, the ability to measure customer expectations over service quality) begin to have critical influence on performance. Also, as evidenced by Function 2, 41.24 percent of variance, the interaction between variables in terms of positive or negative influence becomes more complex as firms begin to experience growth.

The discriminant analysis and the associated territorial map shown in Figure 3 can be utilized to help firms whose revenue has been growing at a rate less than 30 percent over the last 3 years to establish priorities for capability enhancement. In the case of a firm with a profile near the Group 2 mean (sales revenue has increased by between 11 and 30 percent over the last 3 years), growth objective activity should focus on moving along the horizontal axis by upgrading: (1) the ability to measure customer quality expectations; (2) develop new products capable of attracting new customers/permit entry into new markets; (3) reduce the development time for new products; (4) invest in assets to improve quality and reduce costs; and (5) use an appraisal system to empower employees to achieve their full potential. Conversely, any concurrent attempts at this stage to allocate resources towards investment in new technologies, product superiority, or using customer requirements to define quality standards may possibly have a negative influence on the firm's performance.

A position near the Group 2 mean indicates that actions along the vertical axis will have less influence on achieving growth. To move vertically, emphasis should be placed on greater capability in the areas of using customer knowledge to define quality standards, structuring the organization, training employees, and identifying changing market conditions. Conversely, at this stage

actions in such areas as identifying market niches, use of IT for information management, or identifying new ways of enhancing productivity may possibly have a negative influence.

For a firm placed near the Group 3 mean (revenue increases between 1 and 10 percent over the last 3 years), the same advice applies in terms of moving horizontally. A larger variance between types of firm and necessary action, however, is apparent in relation to the vertical direction of change for the Group 3-type firm. Because the required vertical direction of movement is downwards, to achieve a higher rate of growth the firm should concentrate on capability improvement in the areas of (1) niche identification; (2) utilizing IT for analyzing information; and (3) identifying new means of enhancing productivity. Furthermore, at this time little benefit would accrue from actions to further upgrade capability in the areas of using customer knowledge to define quality standards, structuring the organization, employee training, or identifying changing market conditions.

## **Discussion**

### **A Holistic Approach to Management**

The Western world's struggle to halt further losses in market share to Pacific Rim competitors has generated an explosion of explanations and guidance on how firms can regain a global leadership position. Firms are offered an ever-expanding list of techniques for transforming the organization, including total quality management (T.Q.M.), just in time (J.I.T.), employee empowerment, delayering, downsizing, process re-engineering, becoming customer responsive, and reducing time-to-market. Although these techniques were developed for large national and multinational organizations, it is not unusual for SMEs to be exhorted to adopt these philosophies. Within Europe these messages are frequently reinforced by governments offering subsidized access to consultants who will assist owner/managers in the

adoption' of the latest technique for achieving a competitive advantage.

The results of this study do not contradict any of the claims made about how these various mechanisms can transform an organization. As can be seen from the values for the standardized discriminant function coefficients in Tables 1 and 2, enhanced capability in the areas of employee productivity, product performance, innovation, quality control, and employee development all make an important contribution towards enhancing the performance of the firm.

However, the other message which emerges from these data is the critical importance of adopting a balanced approach in the management of all aspects of the organization. If external advisors persuade the firm to place excessive emphasis on upgrading a single dimension of capability, then there is a significant risk that internal capabilities will become unbalanced. In the most extreme situation, transformation initiatives which focus on one specific variable could actually have the undesired outcome of impairing the future performance of the firm.

### **Application of the Discriminant Function Results**

One UK business support agency has already recognized the potential implications of these findings in relation to their approval of applications for government grants to support performance improvement initiatives. A review of available case materials revealed that the vast majority of approved grants are for projects which focus on a single aspect of the organization such as creating a formal business plan or the installation of a computer-based management information system. Although the firms believe these activities have been beneficial, only in a very few cases was there evidence of any real improvement in overall performance.

This contrasts with the minority of cases in which the firm is engaged in a wider-ranging transformation program

and seeks grant aid to support one aspect of these activities. For example, one engineering firm determined that a gradual erosion in market share reflected the need to be more innovative, improve quality, and adopt a J.I.T. philosophy. Management implemented a broad portfolio of actions which included restructuring, investing in new process technology, and seeking greater customer participation in new product development projects. These changes had significant implications on current work practices, and grant aid was sought for employee development under the UK government's Investors In People scheme. Within 12 months, the success of this transformation strategy was reflected in a significant upswing in orders and the subsequent need to expand capacity accompanied by the creation of over 25 new jobs. In light of this situation, the support agency has now moved towards a policy that funding applications should demonstrate how the proposed grant-aided project fits into the firm's overall program for upgrading internal capabilities.

The support agency has also recognized that the predictive features of the discriminant analysis technique means that data from capability surveys might possibly be utilized in a number of ways, including: (1) advising firms on which areas of capability enhancement will have the greatest impact on performance; (2) evaluating the viability of actions for achieving growth objectives that may have been recommended to a firm by a management consultant; (3) assessing the viability of a proposed plan of action to improve the competitive position of a firm; (4) monitoring the actual achievements of management consultants employed to implement a grant-aided project; (5) undertaking cost/benefit evaluations of projects to assess the value of actual outcomes achieved versus funds expended; and (6) implementing post-project assessments of the appropriateness of a firm's long-term action plan for growth.

To permit support agencies to utilize the technique, the discriminant function equations have been incorporated into a simple graphical analysis software tool which can be run using Microsoft Excel V5 as the operating platform. The software is being made available to support agencies in the UK early in 1996. Until further research has been completed, however, application of the technique has to be restricted to small engineering companies because this is the only sector for which discriminant function equations have been constructed. Experience to date, however, has demonstrated that the concept provides an extremely powerful tool for guiding small firm economic regeneration projects for this sector of UK industry. Firms and their external advisors have on a number of occasions been forced to rethink their proposed initiatives after using this technique. In some cases, the firm concluded they would be ill-advised to progress along a selected path of action. In other situations, firms have determined that an alternative allocation of resources to upgrade internal capabilities would make a stronger contribution towards the achievement of a growth objective.

At this point, data generated from longitudinal studies are not yet sufficient to validate conclusively the technique in relation to monitoring project progress, undertaking cost/benefit evaluations, or making post-project assessments of future action plans. Nevertheless, outcomes to date have been sufficiently encouraging that research is now underway to extend the technique to other sectors of UK industry, and the software is being tested for applications by government agencies in both Australia and New Zealand.

### **Conclusion**

The results of the discriminant analysis appear to add three useful contributions to the existing body of knowledge which can be offered to owner/managers seeking guidance on the effective management of growth. Firstly, the probability of achieving a growth objective is increased if the firm avoids excessive

emphasis on single-strategy transformation initiatives such as T.Q.M. or employee empowerment which may create an internal imbalance. Secondly, in planning a performance improvement program, different capabilities must be given priority depending upon whether the current revenue position is one of decline, no change, or growth. Thirdly, for firms experiencing a relatively low rate of revenue growth, the correct decision rule for allocating resources to certain areas of capability enhancement differs from that which should be adopted by firms growing at a higher rate.

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